

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 1

Aquatic Ecology - 2 points

2

A) Within a lake ecosystem, energy is continuously flowing and biomass is being produced or broken down. Scientists have developed several terms to describe these processes, Three of these terms are listed, below. Beside each of these terms, write the letter of the definition, below, which applies to that term. (1.5 pts – 0.5 pts ea)

TERMS	DEFINITIONS
i) Standing crop _____	1) the rate of production per unit time
ii) Biomass _____	2) the weight of organic matter which can be sampled or harvested at any one time from an area
iii) Productivity _____	3) the weight of all living material in a unit area at a given time

B) True or False. Circle the best answer. (0.5 pts)

Biomass can be low, while productivity is high (e.g. when grazing and predation rates are high). Likewise, biomass can be large, while productivity is low (e.g. when grazing and predation rates are low).

True

False

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A) (1.5 pts in total, 0.5 pts each) i) 2 ii) 3 iii) 1 B) True (0.5 pts)
Reference:	Limnology, A Brief Treatise on Eutrophication, Standing Crop, Biomass & Productivity

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Forestry - 10 points

- A) How have Aboriginal people historically passed on Traditional Ecological Knowledge (TEK) from generation to generation? (2 pts)
- B) On the map provided, there is information indicated about the area. Which three (3) items (labeled from a to f) were most likely determined through the collection and interpretation of TEK. (3 pts)
- C) List three steps taken to transfer TEK to map form. (3 pts)
- D) List two (2) reasons an Aboriginal community would make a map containing TEK?(2 pts)

10

TABLE:	1
Stop Attendant:	0,
Equipment:	two maps to be provided
Answer:	A) story telling or spiritual practice or song B) good moose hunting area, sacred site, and rare medicine, C) interview elders, translate, visit sites with GPS, transfer points to map, D) to demonstrate areas of significance to industry and government planners, to preserve areas of interest, to maintain TEK for future generations,
Reference:	Envirothon workshop handouts and talk, and model forest link - http://www.modelforest.net/cmfn/en/

Soils and Land Use - 2 points

- A) What soil order would this monolith belong to? (1 pt)
- B) Under what type of vegetation would this profile develop? (1 pt)

2

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Luvisol Soil monolith, and CSSC (Canadian System of Soil Classification)

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Answer:	A) Luvisol (one mark) B. Forested vegetation (one mark)
Reference:	A and B): Canadian System of Soil Classification pg 4

Wildlife - 2 points

Using the Plants of the Western Boreal Forest and Aspen Parkland field guide provided at this stop, identify the plants in these two (2) photos. (2 pts – 1 pt ea)

2

Photo 1 - _____

Photo 2 - _____

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Plants of the Western Boreal Forest and Aspen Parkland field guide and two plant photos
Answer:	1 point for each: TBD
Reference:	Common knowledge on using field guides

Theme - 2 points

Define the four (4) terms list below: (2 pts – 0.5 ea)

Permeability:

Unsaturated zone:

Percolation:

Confining bed:

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Permeability - a measure of water's ability to flow through a geologic deposit, dependent on the shape and size of pores in the deposit and their interconnection. Unsaturated zone - subsurface region above the saturated zone where pore spaces contain air and water. Percolation - water infiltrates into the soil slowly seeps downward under the force of gravity. Confining bed - a geological deposit of low permeability that impedes the flow of groundwater.

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Reference:	Ontario Envirothon 2009-2010 Current Issue Module: Protection of Groundwater. page 5-6
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STOP 2

Aquatic Ecology - 10 points

<hr/> 10

Install an unused filter paper in the filtration funnel. Using the small jar supplied, collect a sample of lake water from the pail (supplied), and filter 100 ml of this lake water using the filtration apparatus. Carefully remove the filter paper and examine it. Compare it visually to the sample filter paper on display through which has been filtered 100 ml of water taken from campground water supply system (from nearby faucet). Based on your observations, answer the following questions.

A) Circle the name of the filter that contains the greater amount of residue. (1 pt)

Lake water filter

Campground water filter

B) Circle the number of the listed phrase that most accurately completes the following statement: (1 pt)

The purpose of filtering this water is...

(i) to make the lake water safe for drinking

(ii) to separate the dissolved and particulate fractions

(iii) to determine if the water is pure

C) If we were to analyze the residue on the lake water filter, list five things that you would expect it to contain. (5 pts - 1 pt ea)

(i) _____

(ii) _____

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(iii) _____

(iv) _____

(v) _____

D) The campground does not have an elaborate water treatment facility, but the water in its supply system is considered safe to drink (potable). Given this information, and your observations of the campground water filter, what is the most probable source of the water used in the campground? (1 pt)

E) In the list, below, circle the two (2) chemicals that would probably be found in highest concentrations in the campground water? (1 pt – 0.5 pts ea)

- arsenic calcium iron magnesium
 manganese radium uranium

F) To what quality of water do these two chemicals contribute? (1 pt)

TABLE:	1
Stop Attendant:	1, John Shearer
Equipment:	Two (2) complete sets of the following items: Table for filtration apparatus, side-arm filtration flask with attached suction tubing and hand-operated vacuum pump, stopper with attached two-piece filtration funnel and clamp, 47 mm diameter GF/C filter papers (1 per team plus extras), container (pail) containing lake water for filtering, display filter through which 100 ml of campground water has been filtered, small jar for collecting lake water to be filtered.
Answer:	<p>a) Lake water filter (1 pt)</p> <p>b) (ii) (1 pt)</p> <p>c) Possible answers include: algae or phytoplankton; zooplankton or copepods, cladocerans or daphnia, rotifers, mites; silt or clay particles or soil particles; dead plant material; insects; pollen; etc. (1pt per correct answer for a total of 5 pt)</p> <p>d) groundwater or underground water or well water (1 pt)</p> <p>e) calcium and magnesium (The others could be present in very low concentrations, but would be toxic in higher concentrations) (0.5 pt each for 1 pt total)</p> <p>f) hardness (1 pt)</p>

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Reference:	Site Training workshops Aquatic Sampling Techniques Water Quality Groundwater in Manitoba, p. 22-26
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Forestry - 2 points

A) What does PSP stand for? (1 point)

2

B) What is the purpose of the recently announced Canadian Boreal Forest Agreement (1 Pt)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A. Permanent Sample Plot, B) in exchange for a temporary reduction in harvesting in key cariboo areas, NGO's will cease negative industry publicity – especailly internationally
Reference:	Sources – Forestry handouts, newspaper, web

Soils and Land Use - 2 points

A) Rotational grazing is the grazing of livestock in a controlled and grouped movement around a pasture, to allow for regrowth of vegetation. There are some benefits to the soil as well as the vegetation when implemented. Pick the two (2) most likely benefits from the list below. (2 pts – 1 pt ea)

2

- ___ Improved soil texture
- ___ Uniform nutrient distribution from manure
- ___ Reduced soil erosion
- ___ Increased moisture holding capacity
- ___ Decreased soil acidity

TABLE:	0
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Stop Attendant:	0, forestry person
Equipment:	
Answer:	the two correct answers are: Uniform nutrient distribution from manure and reduced soil erosion; one mark each for a total of two marks
Reference:	Agriculture Outlook 2006-2010

Wildlife - 2 points

Define the term "Carrying Capacity" with respect to wildlife species.

2

TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	
Answer:	2 points - The number of animals that an area will support without damage to the habitat or the species is called the carrying capacity.
Reference:	Wildlife binder - Ecology and Wildlife Management, page 13

Theme - 2 points

Climate change is predicted to reduce precipitation and increase temperature during the summer months. List two (2) possible impacts on groundwater as a result of these conditions. (2 pts – 1 pt ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1) less precipitation to supply surface for groundwater recharge 2) higher temperatures increase evaporation and reduce surface water supplies for ground water recharge.
Reference:	Ontario Envirothon 2009-2010: Protection of Groundwater page 12

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STOP 3

Aquatic Ecology - 2 points

A) What is an integrated watershed management plan? (0.5 pts)

2

B) Using the map provided, list three (3) partners that would be included in discussions related to the development of an integrated watershed plan for Lake Winnipeg. (1.5 pts – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	Map of Lake Winnipeg Watershed
Answer:	A) An integrated watershed management plan describes the actions needed, over time, to achieve a sustainable, healthy watershed. B) United States (0.5) Saskatchewan/Alberta (0.5) Conservation Districts/Cities/Government of Manitoba/Non Profit Groups/Federal Government (0.5)
Reference:	A and B): IWMP Brochure

Forestry - 2 points

Using the Field Guide provided or your own general knowledge, please identify these native tree species, using either the common or scientific name: (2 pts – 1 pt ea)

2

A) _____

B) _____

TABLE:	1
Stop Attendant:	1, forestry person
Equipment:	native tree species branch samples, Native Trees of Manitoba
Answer:	tbd, at stop are WS, WB, CW, SCOTSP
Reference:	Native Tree Guide

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Soils and Land Use - 2 points

Name four (4) micronutrients essential for balanced plant nutrition. (2 pts – 1 pt ea)

2

TABLE:	0
Stop Attendant:	0, forestry person
Equipment:	
Answer:	Four of the following: zinc, boron, chloride, copper, iron, manganese, molybdenum, sulfur, magnesium (two points total for the four elements)
Reference:	Soil & Plant Ecology Teacher's Manual pg 32

Wildlife - 2 points

A) Spruce Woods Provincial Park is part of which terrestrial ecozone? (1 pt)

2

B) Circle the best answer. (1 pt)

How many square kilometres does this ecozone span?

- i) 5.2 square kilometres
- ii) 5,200 square kilometres
- iii) 520,000 square kilometres
- iv) 5,200,000 square kilometres

TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	
Answer:	(1 point each) A) Prairie B) iii
Reference:	Wildlife binder - Environment Canada – An Introduction to Ecozones, page 52

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Theme - 10 points

Pour water into the cylinders as directed by the stop attendant

<hr/> 10

A) List the materials from the highest porosity to lowest. (4 pts – 1 pt ea)

1) _____

2) _____

3) _____

4) _____

B) Rank the permeability of the materials from highest to lowest. (4 pts - 1 pt ea)

1) _____

2) _____

3) _____

4) _____

C) Explain the relationship between porosity and permeability (2 pts)

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	4 Cylinders of materials for water infiltration tests
Answer:	A) clay, silts, sand, gravel B) gravel, sand, silts, clay C) Porosity is the percentage pore space. Higher porosity materials allow greater infiltration than soils with little structure. Permeability - large pore spaces between soil particles, allowing water to quickly percolate to the ground water.
Reference:	Ontario Theme A) 36-37 B)40-41 C) 40-41

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STOP 4

Aquatic Ecology - 2 points

Wetlands provide a number of valuable functions, identify four (4) of these functions. (2 pts – 0.5 pts ea).

2

TABLE:	1
Stop Attendant:	0,
Equipment:	
Answer:	A water filtration system...removing contaminants, suspended particles and excessive nutrients, improving water quality and renewing water supplies.(water purification and sinks for pollutants) An irreplaceable habitat...nesting, feeding and staging ground for several species of waterfowl and other wildlife such as reptiles and amphibians, and also for many species at risk. A high quality spawning and nursery area for many species of fish. Natural shoreline protection...protecting coastal areas from erosion. A reservoir...helping to control and reduce flooding through water storage and retention. (flood peak modification in watershed and shoreline protection A source of oxygen and water vapour...playing a vital role in the natural atmospheric and climatic cycles. Recreational activities...hiking, bird watching, hunting and fishing. Economic Values - forestry (peatlands softwood and wetlands hardwood); wild rice; hay harvesting; commercial and native harvesting of mink, muskrat and beaver and other wetland dependent game; commercial fisheries non-consumptive recreation (photography, bird-watching and education)
Reference:	Aquatic Ecology: Wetlands Answers

Forestry - 2 points

A) Circle the best response. (1 pt)

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

2

- i) is based on an open process
- ii) includes continual improvement
- iii) produces repeatable and consistent independent audits
- iv) scientifically supported
- v) all of the above

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B) What does the term TSP stand for (1 point)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1. v) all the above, B. Temporary Sample Plot
Reference:	Sources – Forestry handouts, Forest Certification Resource Centre

Soils and Land Use - 10 points

Refer to the soil pit found at this stop.

10

- A) Using the hand texturing guide provided, what is the soil texture of the A horizon? (1 pt)
- B) Using a ruler, what is the soil depth of the A horizon? (1 pt)
- C) Are there carbonates present within the soil profile, and if so, at what depth? (1 pt)
- D) Using the Munsell colour chart, what is the colour of the parent material? (1 pt)
- E) Using the Canadian System of Soil Classification, key out the soil to the subgroup level; (Hint: Not a Podzol) (6 pts – 2 pts ea)
 - i) Soil Order: _____
 - ii) Great Group: _____
 - iii) Subgroup: _____

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	hand texturing guide, ruler, dilute acid for carbonate test, Munsell colour chart, & the Canadian System of Soil Classification & THE SOIL PIT
Answer:	This is a 10 mark question, broken down accordingly; a-d are TBA, for one mark each & e-g are TBA for two marks each
Reference:	The Canadian System of Soil Classification handbook

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Wildlife - 2 points

Use the 2009 Manitoba Hunting Guide at this stop to answer the following questions.

2

- A) Determine which game hunting area (GHA) or Zone the Spruce Woods Provincial Park is located. (1 pt)
- B) What are the season dates for the "First Deer" in the white-tailed deer season using a muzzleloader? (1 pt)

TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	2009 Hunting Guide
Answer:	(1 point each) A) GHA 30 or Zone E B) Oct. 19 to Nov. 8
Reference:	Wildlife binder – PDF Attachment

Theme - 2 points

- A) Indicate two (2) forms of groundwater contamination that could occur at this site location. (1 pt – 0.5 pts ea)

2

1) _____

2) _____

- B) Indicate two (2) factors that impact the vulnerability of groundwater contamination from agriculture. (1 pt – 0.5 pts ea)

1) _____

2) _____

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Part A 1) fertilizer 2) pesticides Part B permeability, depth to bedrock, depth to groundwater

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Reference:	Ontario Theme document page 40
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STOP 5

Aquatic Ecology - 2 points

A) What are the two (2) methods for measuring the area of a watershed? (1 pt – 0.5 pts ea)

2

B) Using the acetate provided at this stop, estimate the area of the watershed marked on the topographic map. (1 pt)

TABLE:	1
Stop Attendant:	0,
Equipment:	Topographical Map, Acetate
Answer:	a) Dot Grid, Planimeter b) TBD
Reference:	A and B): Envirothon Resources - Information Sheet: How to read a topographic map and delineate a watershed?

Forestry - 2 points

A) Circle the best answer. (1 pt)

Which greenhouse gas is sequestered by trees as they grow?

- i) methane
- ii) carbon dioxide
- iii) carbon monoxide
- iv) nitrous oxide
- v) all of the above

2

Fishy Fort Trail [Stops 1-10]

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B) Circle the best answer (1 pt)

What is the one best forest practice to increase carbon sequestration?

- i) reforestation
- ii) deforestation
- iii) afforestation
- iv) harvesting
- v) preservation

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1. ii – carbon dioxide, 2. iii – afforestation
Reference:	Resource: "What Trees Can Do to Reduce Atmospheric CO2" pages 2 & 3

Soils and Land Use - 10 points

10

- A) What two (2) things would one look for to distinguish a horizontal change when examining a soil profile? (2 pts – 1 ea)
- B) Determine the soil texture of a soil that has 30% clay, 60% sand, 10% silt and 3% organic matter using the textural triangle. (2 pts)
- C) Explain the presence of stones within the profile found at this stop. (2 pts)
- D) What type of profile would this be considered? (2 pts)
- E) Using the Canadian System of Soil Classification, what order would this soil fall into? (2 pts)

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Soil textural triangle, the Canadian System of Soil Classification, and a soil pit
Answer:	a. change in colour & structure / b. Sandy clay loam /c. water deposition of stones due to flooding /d. Cumulic/ e. Regosol (Each worth 2 marks for a total of 10)
Reference:	a. &b April workshop the rest from the Canadian system of soil classification

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Wildlife - 2 points

- A) Name the animal you find evidence of (flagged) at this stop? (1 pt)
- B) Why is it important for this animal to gnaw trees? (1 pt)

2

TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	
Answer:	(1 point each) A) Beaver B) Beaver's teeth constantly grow; helps to keep their teeth worn down; grinds to sharpen them
Reference:	Wildlife binder - Fur Bearers of Canada, page 1

Theme - 2 points

List the four (4) Physiographic regions of Manitoba (2 pts – 0.5 pts ea)

- 1) _____
- 2) _____
- 3) _____
- 4) _____

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1) Hudson Bay Lowland 2) Precambrian Shield 3) Manitoba Lowland 4) Manitoba
Reference:	Ground water in Manitoba page-3

Fishy Fort Trail [Stops 1-10]

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STOP 6

Aquatic Ecology - 10 points

Along with biological and chemical measurements, it is important to determine certain physical parameters of a water body. As a fisheries biologist you are here to determine the cross sectional channel area, flow, and discharge of this creek. **Show your work, equations used, and the correct units where appropriate.**

<hr style="width: 50%; margin: auto;"/> 10

CIRCLE WHICH SAMPLING STATION YOU TOOK MEASUREMENTS AT: 1 or 2

- A) To determine the cross sectional area of this creek's channel you need to measure depth at various widths. The number of measurements typically depends on the size of the stream. If there is insufficient water then a "hypothetical" water surface will be provided (blue flagging tape). Take depth measurements where noted (with green flagging tape) on the measuring tape and record on the sheet provided to you at this stop. Make sure to put your team number on this sheet and include it with the rest of your test. (1 pts)
- B) Plot the data collected from A on the same sheet provided to you for A. Remember to label the x and y axis. (5 pts)
- C) Determine the cross sectional area of the channel using the data from A. (Show the equation and include the units). (2 pts)
- D) Determine the creek flow (velocity) by using the flow meter provided at the site. Place the instrument in front of the yellow flagging tape OR if not enough flow use the velocity figure provided by the Stop Attendant. Note your measurement below. Using the velocity measurement you just took, calculate the creek's discharge (Q). (2 pts)

Velocity (v): _____

Discharge (Q): _____

TABLE:	1
Stop Attendant:	1, experienced envirothon volunteer
Equipment:	measuring tape (x2); metre ruler (x2); stakes; blue, green and yellow flagging tape; Flow meter (x2); sheet with graph /student;
Answer:	A) TBD, need to develop two sets of answer keys (for upstream and downstream stations) with a range
Reference:	Provincial Training Prior to the Field Test - Aquatics Training and handouts

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Forestry - 2 points

A) Circle the best answer. (1 pt)

While harvesting using a clearcutting system, it is possible to ensure conservation of wildlife habitat, natural beauty and other uses such as recreation.

True

False

2

B) Circle the best answer. (1 pt)

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

i) 25%

ii) 35%

iii) 65%

iv) 75%

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1. True, 2. iv
Reference:	1. Forestry Resource Guide – Tomorrow's Forests, Today's Challenge (Page 8) 2. Forestry Resource Guide – Manitoba's Forests

Soils and Land Use - 2 points

A) What are the three (3) mineral horizon designations of soil? (1.5 pts – 0.5 pts ea)

2

B) What is one (1) of the organic horizon designations? (0.5 pts)

TABLE:	0
Stop Attendant:	0, forestry person??
Equipment:	
Answer:	A-surface or topsoil; B-middle or subsoil; C-parent material. B. organic horizons

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	include O, Of, Om, Oh, LFH.
Reference:	Soil Management Guide pg 13.

Wildlife - 2 points

Using the animal scat key provided, identify the two (2) scat samples found in the jars at this stop. (2 pts – 1 pt ea)

2

Sample A: _____

Sample B: _____

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Two types of scat and scat key/rulers
Answer:	TBD
Reference:	Common knowledge for using keys

Theme - 2 points

Describe the process of soil salinization related to groundwater. (2 points)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Salinization occurs when conditions of low rainfall, high evaporation, high water table, and the presence of soluble salts in the soil co-occur. In poorly drained soils, where the water table is 3 m or less from the surface of the soil, water is unable to leach down , and instead rises to the surface by capillary action. In hot dry regions, this water leaves the surface of the soil through evaporation. Ground water contains naturally dissolved salts as the water evaporates, the salts are left behind.
Reference:	Ontario Envirothon 2009-2010 Current Issue Module: Protection of Groundwater. page 39

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STOP 7

Aquatic Ecology - 2 points

2

The nearby Assiniboine River and its tributaries drain a significant portion of southeastern Saskatchewan and southern Manitoba. However, this region is experiences relatively low precipitation and high summer evaporation rates. Flows in the Assiniboine River are often low and this limited water supply is in demand for various purposes. List four (4) major competing needs/uses of Assiniboine River water. (2 pts – 0.5 pts ea)

- 1) _____
- 2) _____
- 3) _____
- 4) _____

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	<p>Possible answers include the following: (Each correct answer is worth 1/2 pt to a maximum of 2 pt)</p> <ul style="list-style-type: none"> - maintenance of habitat for fish and other aquatic organisms - canoeing, swimming and other recreational use - sport fishing - watering livestock - irrigation - municipal water use - industrial water use - waste disposal
Reference:	Water Use

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Forestry - 10 points

Forestry: Tree measurements. (10 Pts – as indicated)

Using the equipment provided, please measure the marked trees in this “Permanent Sample Plot” which was last measured in 1999 when the Manitoba Envirothon last used this site.

Record the information gathered in the correct places on the tally sheet and perform the calculations required. **Please ensure your team number is marked on the tally sheet and it is returned with the rest of your test!**

10

TABLE:	0
Stop Attendant:	1, forestry person
Equipment:	diameter tape, suunto clinometer, volume table, tally sheets for each team
Answer:	TBD, should develop a marking range where half points are given for "close" answers,
Reference:	Forestry Equipment demonstration at Regional Workshop

Soils and Land Use - 2 points

Using the soil capability for agriculture map provided, what is the agriculture capability rating of the predominant soil found in N1/2 of NW 1/4 12-8-14 W? (2 pts)

2

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Soil Capability for Agriculture map.
Answer:	50% class 2I and 50% class 3WS (two marks for complete answer)

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Reference:	Source: Understanding Western Canada's Dominion Land Survey System.
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Wildlife - 2 points

Name two (2) of the three main strategies all animals use to survive cold winters.
(2 pts – 1 pt ea)

- 1) _____
- 2) _____

2

TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	
Answer:	1 point for any of the following: migration, dormancy and toughing it out
Reference:	Wildlife binder - Animal Adaptations, page 32

Theme - 2 points

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

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

C) Your GPS unit gives you the coordinates 14U 0480902 5500711. How many kilometres are you from the equator? (1 pt)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A) Universal Transverse Mercator (UTM) (0.5 points) B) Global Positioning System (GPS) (0.5 points) C) 5500.711 km (1 point)
Reference:	Training

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STOP 8

Aquatic Ecology - 2 points

At this stop use the Key to Manitoba's Sport Fish and, if necessary, the Freshwater Fishes of Manitoba book to identify the four (4) fish to **species** (common name). (2 pts – 0.5 pts ea)

<hr/> 2

A) _____

B) _____

C) _____

D) _____

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Either four fish (x2) or 2 fish
Answer:	A. Carp; B. Rock Bass; C. White sucker; D. Walleye
Reference:	Aquatic Ecology Resource Manual: Key to Manitoba's Sport Fish; Training and additional keys provided

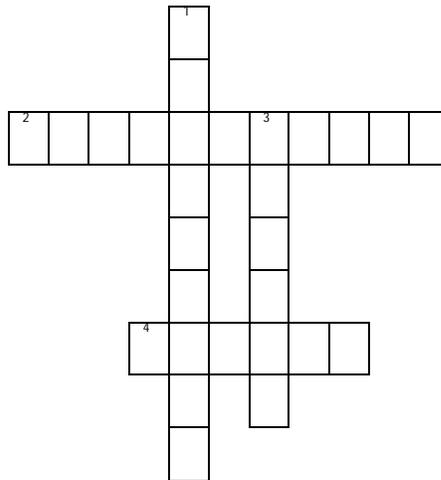
Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Forestry - 2 points

Complete the following crosswords using the clues below. (2 pts – 0.5 pts ea)

<hr/> 2



Across

- 2. A stand of a single species, generally even-aged
- 4. Northern coniferous forest type

Down

- 1. Tree that loses all its leaves in autumn
- 3. Name of main shoot growing from the top of a tree with a single main trunk

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	(across) 2. MONOCULTURE 4. BOREAL (down) 1. DECIDUOUS 3. LEADER (also see word file for answer key)
Reference:	forestry binder - glossary - pages 23-25

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Soils and Land Use - 2 points

 2

A) Circle the best answer. (1 pt)

Detailed soil survey maps are much more accurate and reliable for making decisions at what scale level?

- i) 1:1,000,000
- ii) 1:125,000
- iii) 1:50,000
- iv) 1:20,000

B) Of the map scales listed above, which would be the most useful for Land Use Planning by municipalities? (1 pt)

TABLE:	0
Stop Attendant:	0, forestry person
Equipment:	
Answer:	A. iv. or 1:20,000/ B. iv or 1:20,000
Reference:	Soil Management guide pg 24

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Wildlife - 10 points

Matching. Match the following Species at Risk (Column A) listed below with the cause of its decline (Column B). Only one species per answer.

10

Column A - Species at Risk

Column B - Cause of decline

- | | |
|--|--|
| <p>___ A. Piping Plover</p> <p>___ B. Peregrine falcon</p> <p>___ C. Burrowing owl</p> <p>___ D. Western Silvery Aster</p> <p>___ E. Small white lady's-slipper</p> <p>___ F. Western prairie fringed-orchid</p> <p>___ G. Western spiderwort</p> <p>___ H. Great Plains toad</p> <p>___ I. Baird's sparrow</p> <p>___ J. Ferruginous hawk</p> | <ol style="list-style-type: none"> 1. Illegal collection of plants and hybridization with a closely related species 2. Loss of habitat due to agricultural and urban expansion, and decreased prey abundance due to pest control 3. Human use of beaches 4. Drainage of temporary pools for breeding 5. Susceptible to pesticides (DDT) 6. Loss and degradation of native prairie habitat due to human settlement, agricultural expansion and resource extraction 7. Loss of native prairie habitat, particularly wet meadows from draining 8. Loss of native prairie grasslands, decreased prey abundance from insecticide use and nest parasitism 9. Gravel extraction, encroachment of woody species and invasion of non-native plants 10. Changes to land management practices (burning and grazing) |
|--|--|

TABLE:	0
Stop Attendant:	0, no volunteer needed

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Equipment:	
Answer:	1 point each - A-3, B-5, C-2, D-9, E-1, F-7, G-10, H-4, I-8, J-6
Reference:	Wildlife binder - Species at Risk fact Sheets (PDF)

Theme - 2 points

List four (4) possible point sources of contamination to groundwater. (2 pts – 0.5 ea)

<hr/> 2

- 1) _____
- 2) _____
- 3) _____
- 4) _____

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1) septic tanks 2) fluid storage tanks 3) landfills 4) industrial lagoons
Reference:	Ground water and Surface Water: U.S. Geological Survey Circular 1139 page-66

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 9

Aquatic Ecology - 2 points

Examine the photos on display at this stop. They illustrate a variety of different species belonging to a large group of mainly microscopic animals living in lakes and ponds, and feeding on phytoplankton or each other.

2

- A) To what important lake biological group do these all belong? (1 pt)
- B) In which part of the lake would they normally be living? (0.5 pts)
- C) What do many of the members of this group do on a diurnal (daily) schedule? (0.5 pts)

TABLE:	1
Stop Attendant:	0,
Equipment:	Sets of laminated photos of several zooplankters (daphnid, copepod, chaoborid, rotifer) for each table
Answer:	a) Zooplankton or invertebrates (1 pt) Plankton (1/2 pt) b) Open water or offshore region or limnetic zone (1/2 pt) c) Many migrate vertically within the water column (1/2 pt)
Reference:	Freshwater Productivity Limnology, Plankton, Zooplankton of Fresh Water, Vertical Migration

Forestry - 2 points

What are two (2) potential local positive effects on forest growth which could result from climate change? (2 pts – 1 pt ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Longer growing season, increased growth due to increased CO2, changes to precipitation patterns, increased efficiency of water use in plants
Reference:	Source: CC I &A

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Soils and Land Use - 10 points

<hr/> 10

The Assiniboine Delta Aquifer is the largest area of irrigated potato production in Manitoba, with the McCains processing plant at Carberry supplying most of the french fries for McDonald's across Canada. The combination of quality groundwater and well drained, stone-free soil is the reason for this centralized production.

A) Matching. Match the definition to its term. (4 pts – 1 pt ea)

DEFINITION	TERM
a. ____ The maximum amount of water held in a soil, measured a few days after it has been thoroughly soaked and allowed to drain freely.	1. Field Capacity 2. Permanent wilting point 3. Air dry
b. ____ The amount of water held in the soil that plants can use, based largely on soil texture.	4. Available water holding capacity 5. Saturation
c. ____ The amount of water remaining in the soil after drying at room temperature for several hours.	6. Gravimetric soil moisture content 7. Volumetric soil moisture content
d. ____ Soil moisture content which is calculated based only on the weight of water and the weight of soil.	

B) The Stockton Fine Sand at field capacity has a 14% moisture content by weight. At the permanent wilting point it has a 4% moisture content by weight.

- i) What is the percent available water it can hold? (2 pts)
- ii) A Red River Clay at field capacity holds 68% moisture by weight. If the available moisture percent is 50%, what is the permanent wilting point? (2 pts)

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

- iii) What are two (2) reasons why Stockton sands may be preferred to Red River Clays for irrigated potato production? (2 pts – 1 pt ea)

TABLE:	0
Stop Attendant:	0, forestry person??
Equipment:	
Answer:	Part A//a. (#1) or field capacity /b. (#4) or available water holding capacity / c. (#3) or air dry / d. (#6) or gravimetric moisture content {each answer worth one mark} ///Part B. a. 10% /b. 18%/ c.any two of the following would do; sandy loams warm up faster; sandy loams have better drainage; sandy loams do not stick to potatoes as much, making it easier to harvest;Better structure for tillage; easier to control soil moisutre content than on the clays; fewer plant diseases; better soil aeration; and each of the two answers is worth one mark each.....ignore the rest as the form had me stumped.....[each is worth one mark]
Reference:	Soil Management guide pg 42.

Wildlife - 2 points

Using the field guide provided, identify the bird species in the pictures at the stop.
(2 pts – 0.5 pts ea)

2

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

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Bird field guide and pictures
Answer:	(.5 points for each answer) TBD
Reference:	Common knowledge for using field guides

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Theme - 2 points

Indicate the top two (2) uses of groundwater and the approximate percentage of each compared to total use. (2 pts – 0.5 pts ea)

<hr/> 2

1) _____, _____%

2) _____, _____%

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Agriculture - 44%, Industry - 22%
Reference:	MB Eco-network, Groundwater in MB, page 1

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 10

Aquatic Ecology - 2 points

Most climate change predictions anticipate major changes across the Canadian prairies. List four (4) possible impacts on Lake Kitche Manitou and other similar prairie lakes, if these predictions are accurate. (2 pts – 0.5 pts ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	<p>Possible answers include the following: (Each correct answer is worth 1/2 pt to a maximum of 2 pts)</p> <ul style="list-style-type: none"> - warmer water temperatures - lower water levels - more algal blooms - higher concentrations of dissolved chemicals - changes in food web composition - changes in hydrological regimes - longer ice-free seasons - more frequent floods and droughts
Reference:	Climate Change and Aquatic Ecosystems

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Forestry - 10 points

<hr/> 10

A) What does NTFP stand for? (1 pt)

B) List four 4 examples of NTFP's (4 pts – 1 pts ea)

C) Does NTFP need to have forest certification? (1 pt)

D) Please list four historic uses that aboriginal peoples had for the White Spruce and the part(s) of the tree used for that purpose. (4 pts – 0.5 ea)

Historic uses of White Spruce:	Part of the tree used for that purpose:

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A. Non-Timber Forest Products, B. Answer: Edible berries Wild mushrooms Medicinal plants Maple products Christmas trees Syrup Jams, jellies,ciders Furniture Wood crafts Teas, C. Answer: no, consumers of NTFP don't demand certification D. sap\resin for canoes, arrowheads; roots for sewing; bark for pots and containers; boughs for bedding; rottenwood for smoking hides; pitch for treating skin irritations; resin, sap needles, twigs for vitamin C for other medical treatments.

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Reference:	Source: Forestry handouts/ training
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Soils and Land Use - 2 points

- A) On a fertilizer bag, there are at least three numbers given, showing the nutrient content (example 15-30-17). Give the correct nutrients in the correct order for the three number sequence. (1 pt)
- B) What is the correct term for the piling and turning of manure to make it into a product which is easier to handle as a soil amendment? (1 pt)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	a. (N-P-K) for one mark/ b. Composting (one mark).
Reference:	Soil Management Guide.

Wildlife - 2 points (0.5 pts ea)

- A) Each level of consumption in the food chain is called _____.
- B) Organisms that cannot produce their own food are called _____.
- C) Organisms that produce their own food are called _____.
- D) Circle the best answer.

2

The diet of a elk is an example of a:

- i) herbivore
- ii) carnivore
- iii) omnivore

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	(.5 points for each answer) A) Trophic level B) Heterotrophs C) Autotrophs D) i - herbivore

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Reference:	Wildlife binder - Food Chains, page 26
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Theme - 2 points

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

2

TABLE:	1
Stop Attendant:	1, Allen Tyrchniewicz or Steven Hills
Equipment:	Garmin GPS Units (2) Flagged Stake
Answer:	TBD
Reference:	Training

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 11

Aquatic Ecology - 2 points

The diagram at this stop shows dissolved oxygen concentrations in a pond over a 24 hour period. What causes this fluctuation known as the diurnal oxygen cycle? (2 pts)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	diagram
Answer:	Dissolved oxygen increases during daylight hours when photosynthesis is occurring and decreases at night when respiration continues but photosynthesis does not.
Reference:	Aquatic Ecology Resource Material

Forestry - 2 points

List the four (4) highest growing stock volume of Manitoba's Forests. (2 pts - 0.5 pts ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Trembling aspen, White Spruce, Jack Pine, Black Spruce
Reference:	Source Manitoba's Forest Page 3

Wildlife - 10 points

10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

In Column A write the number of the picture from the species key found at this stop that corresponds to the statement. In Column B write the name of the species. (10 pts – 0.5 pts ea)

STATEMENT	A	B
A) This plant signify's spring in North America and is Manitoba's Floral emblem. It is usually found in the mixed-grass prairie.		
B) This plant has lanced-shaped leaves that are densely covered with silky hair, giving it a silvery appearance. It is listed as a Threatened wildflower in Manitoba.		
C) This plant is listed provincially and nationally as Endangered. It grows in clumps and has a "pouch-like" flower.		
D) This bird has a prominent thick coned-shaped bill, which is remarkable for a bird of its size. It has an appetite for the forest pest, spruce budworm.		
E) This bird frequents open places such as fields, pastures, and dry uplands. When intruders are too close to its nest, it will perform a distraction called a broken-wing act.		
F) This bird nests on sandy shores of larger prairie lakes and its eggs are well camouflaged. It is provincially and nationally listed as Endangered.		
G) This animal uses sticks, trees and mud to build its lodge. Its teeth are constantly growing. This animal is also the symbol for the National Parks system in Canada.		
H) This animal has long legs to help it move through snow and a long, dense winter coat that provides effective insulation . It is the only animal where both male and females have antlers.		
I) This animal is the largest land mammal in North America. It has a keen sense of smell and hearing; it can distinguish smells from 3 kilometres away.		
J) This animal has very large antlers that are grown new each year. It is highly vocal and uses grunts and squeals to keep in touch with each other.		

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Picture Key binder

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Answer:	(.5 point for matching and .5 point for the name of the species) A) Picture - 2 - Name of Species - Crocus B) Picture - 3 - Name of Species - Western Silvery Aster C) Picture - 5 - Name of Species - Small White Lady's-slipper D) Picture - 10 - Name of Species - Evening Grosbeak E) Picture - 8 - Name of Species - Killdeer F) Picture - 12 - Name of Species - Piping Plover G) Picture - 14 - Name of Species - Beaver H) Picture - 18 - Name of Species - Caribou I) Picture - 15 - Name of Species - North America Bison J) Picture - 19 - Name of Species - Elk
Reference:	Wildlife binder - Species at Risk fact Sheets (PDF)

Theme - 2 points

Complete the following table indicating the potential for groundwater contamination (very low, low, moderate, high) for A, B, C and D. (2 pts – 0.5 pts ea)

2

Hydrologic Soil Group (Soil Texture)	Depth to Groundwater			
	Less than 0.9 m (3 ft)	0.9 - 4.5 m (3 – 15 ft)	4.6 – 13.5 m (16 – 45 ft)	Greater than 13.5 m (45 ft)
Bedrock (within 0.9 m) (3 ft)	high	high	high	A
Muck / Organic	high	---	---	---
Rapid (sand)	high	high	high	D
Moderate (loam)	high	high	moderate	low
Slow (clay loam)	high	moderate	C	very low
Very Slow (clay)	B	low	very low	very low

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

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	In Word document (Table 1)
Reference:	Ontario Envirothon 2009-2010 Current Issue Module: Protection of Groundwater. p 41-42

STOP 12

Aquatic Ecology - 2 points

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

A) What type of aquatic plant might you find wrapped around your anchor line? (0.5 pts)

B) Fill in the blank. (0.5 pts)

The depth at which these plants are found is limited only by _____.

C) Provide the common name for the aquatic plant depicted at this stop. (0.5 pts)

D) Muskrats and geese commonly feed on a part of the aquatic plant shown here. Name this plant part. (0.5 pts) **(need sample info and labelling info)**

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Pictures/specimens
Answer:	A) submergent B) light C) Pondweed D) rhizomes
Reference:	A and B and C and D): Envirothon Resource - Through the Looking Glass - Pages 6, 67

Forestry - 2 points

Provide four (4) examples of "stakeholders" that offer various perspectives on forest management when involved with Model Forest or certification processes. (2 pts – 0.5 pts ea)

<hr/> 2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	stakeholder types include: forest companies, Aboriginal communities, private citizens, parks, environmental groups, governments and universities
Reference:	http://www.modelforest.net/cmfn/en/ under: "About Model Forests" and "communities" Certification and Canada's forests pages 3, 9, and 15

Wildlife - 2 points

Name four (4) adaptations or features of how a snowshoe hare has adapted to its environment.
(2 pts – 0.5 pts ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	0.5 point for any of the following: a. Large, generously furred hind feet b. Four long toes that spread widely in soft snow to increase the size of their feet c. Turns grey-brown in summer and pure white in midwinter d. The coat is comprised of three layers: dense, silky slate grey underfur; longer, buff-tipped hairs; and long coarser guard hairs e. Moults twice a year f. Have smaller ears than most hares' g. Females are often slightly larger than males
Reference:	Wildlife binder - Hinterland Who's Who - Snowshoe Hare fact sheet

Theme - 10 points

A well was constructed at this location.

A) Multiple choice. Select the best answer. (1 pt)

How deep did the well have to be dug to find water?

10

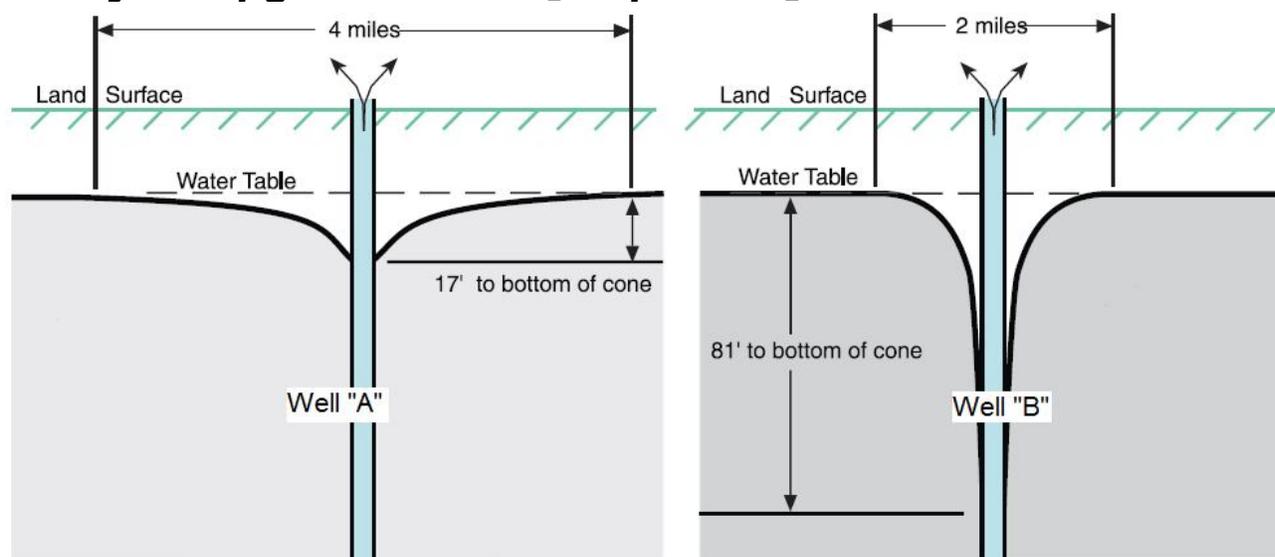
Fishy Fort Trail [Stops 1-10]***Conky Campground Trail [Stops 11-20]***

- i) 10 feet (metric too??)
 - ii) 2 feet
 - iii) 50 feet
 - iv) 150 feet
- B) Using the fluid conductivity probe, measure the conductivity of a water sample taken from the well at this stop. (1 pt)
- C) Using the provided chart, indicate whether the sample is fresh, brackish or saline. (1 pt)
- D) Examine the pipe sample found at this stop?. What is the purpose of the screen? (1 pt)
- E) Is the water from a confined or unconfined source? (1 pt)

Refer to the following Well Table Depression Cones Diagrams below. Each well is withdrawing water at the rate of 2600 litres per minute.

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]



- F) Which well (A or B) best describes this location? (1 pt)
- G) What two (2) factors are the width and depth of the cone dependent on? (1 pt – 0.5 pts ea)
- H) Describe the difference between the hydraulic head of a well supplied by an unconfined aquifer and the hydraulic head of a well supplied by a confined aquifer. (2 pts)

TABLE:	0
Stop Attendant:	1, Bob Betcher or assistant
Equipment:	2" well, water probe, Salinity chart
Answer:	A) ii-2ft B) TBD C) fresh D) keep aquifer material out of well E) unconfined F) – Well "A" G) Transmissivity (rate that the aquifer materials transmit water), pumping rate H) ???
Reference:	A-E) - ADA Management plan F-G) ADA Management plan page 15 H) Groundwater Monitoring - page 3-4

STOP 13

Aquatic Ecology - 2 points

- A) Fill in the blank. (1 pt)

2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

The following site is showing degradation of an important area (flagged at this stop?).

This area is typically referred to as the _____ zone.

- B) If this zone is in an ideal state, it would assist with which some important ecological functions. List two (2) of these function. (1 pt – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	Site where riparian area is degraded.
Answer:	A) riparian B) Trap sediment, Build and maintain streambanks, Store floodwater and energy, Filter and buffer water (only 2 required)
Reference:	A and B): Managing the Water's Edge: Manitoba Field Guide (Page 9)

Forestry - 2 points

List four (4) elements of a Pre Harvest Assessment. (2 pts – 0.5 pts ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Mensural data Vegetation communities(v – types) Soils Understory trees Competitive plants Special concern, threaten and endanger species Forest health Wildlife evidence (sign) Geographic physical features Heritage resources Forest and other resource values Waterways and wetlands
Reference:	Source: Forest Resources – Pre Harvest Survey Guidelines

Soils and Land Use - 10 points

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

Of the three general soil textures (sand, silt & clay) which one is more susceptible to

- i) wind erosion: _____

10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

ii) water erosion: _____

B) True or False. Circle the best answer. (8 pts – 1 pt ea)

- | | | |
|------|-------|---|
| TRUE | FALSE | i) The maximum tolerable soil loss is 20 tons/acre/year. |
| TRUE | FALSE | ii) Potato crops produce enough leaf material that after harvest of the crop, there is enough left on the field to protect against erosion. |
| TRUE | FALSE | iii) A 30 mph wind has more than three times the erosive power than a 20 mph wind. |
| TRUE | FALSE | iv) Wind erosion increases as the soil dries, given the same surface cover conditions. |
| TRUE | FALSE | v) Standing stubble is more effective at preventing water erosion than flat stubble. |
| TRUE | FALSE | vi) The most susceptible time for field water erosion is when the crop is growing. |
| TRUE | FALSE | vii) The amount of crop cover or residue left after harvest should be decreased on sloping land as compared to flat fields. |
| TRUE | FALSE | vii) Erosion risk increases with increased soil organic matter content. |

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A) i. sand (one mark) i i. clay (one mark) B. (one mark each) i. False ii. False iii. True iv. True v. False vi. False vii. False viii. False
Reference:	Soil Managment Guide, pages 84-97

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Wildlife - 2 points

Using the photo, name four (4) adaptations or features that reflect the typical anatomy of a shorebird. (2 pts – 0.5 pt ea)

2

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Photo of shorebird
Answer:	0.5 point for each: long legs for wading, long bills for stabbing food or picking of food, long wings, web-less feet for scratching up food
Reference:	Wildlife binder - Hinterland Who's Who - Shorebirds fact sheet

Theme - 2 points

A) Circle the best answer. (1 pt)

Would you expect to find seeps in this area? YES NO

2

B) What is required for seep to occur at this location? (1 pt)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	a) Yes, b) ?? the water table is high and could reach levels higher than the water level of the oxbow.
Reference:	ADA Management plan - page 11

STOP 14

Aquatic Ecology - 2 points

The pail of water at this stop has been taken from a nearby lake.

A) If you are interested in making sure the water is safe to swim in, which water quality parameter might you be most interested in? (0.5 pts)

2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

- B) If you are interested in making sure this water can sustain a healthy fishery, which water quality parameter might you be most interested in? (0.5 pts)
- C) You will notice that the water is quite turbid. What are two effects on a system with highly turbid water? (0.5 pts each)

TABLE:	0
Stop Attendant:	1, Envirothon volunteer
Equipment:	Pail of water from a nearby lake.
Answer:	A) bacteria/E. coli/coliforms B) Dissolved oxygen C) Light will not reach through the water column and many reactions, especially photosynthesis, will be limited; floating particles absorb heat from the sun, raising water temperature and lowering dissolved oxygen levels; particles can also kill fish and aquatic invertebrates by clogging their gills and smothering their habitat.
Reference:	A and B and C): Envirothon Resource - Chemical Monitoring - Page 54

Forestry - 2 points

- A) Multiple choice. Circle the best answer. (1 pt)

What invasive forest pest, which has the potential to decimate Manitoba's forests, has been recently discovered in St. Paul Minnesota?

- i) Brown Spruce Beetle
- ii) Mountain Pine Beetle
- iii) Emerald Ash Borer

2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

iv) Texas Longhorn Beetle

B) Multiple choice. Circle the best answer. (1 pt)

What invasive forest pest, which has the potential to decimate Manitoba's forests, was recently discovered around Winnipeg and resulted in an aerial spraying control program in the summer of 2009?

- i) Banded Elm Bark Beetle
- ii) Eastern Larch Beetle
- iii) Gypsy Moth
- iv) Two-lined Chestnut Borer

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A) iii) Emerald Ash Borer B) iii) Gypsy Moth
Reference:	workshop training, invasive pest and MC websites

Soils and Land Use - 2 points

A) A mild solution of hydrochloric acid is used to detect what mineral in the soil? (1 pt)

2

B) What are two types of carbonates most commonly found in agricultural soils in Manitoba ? (1 pt – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Answer:	A) Lime or carbonate (one mark)/B. Calcium and magnesium (one mark for both combined)
Reference:	The Soil Management guide page 12.

Wildlife - 2 points

Some mammals such moose, caribou, deer and elk , grow antlers, while other mammals such as Muskoxen, Dall sheep and mountain goat, grow horns.

2

A) Explain the difference between antlers and horns. (1 pt – 0.5 pts ea)

i) antlers:

ii) horns:

B) Give two (2) examples of how antlers or horns are used by these mammals.
(1 pt – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	A i) antlers are shed and grow back each year ii) horns are not shed B) Used in mating displays, defense and protection from predators and in foraging for food.
Reference:	Wildlife binder - page 38 - Antlers, Horns and Teeth or page 43 - Skulls in Education

Theme - 10 points

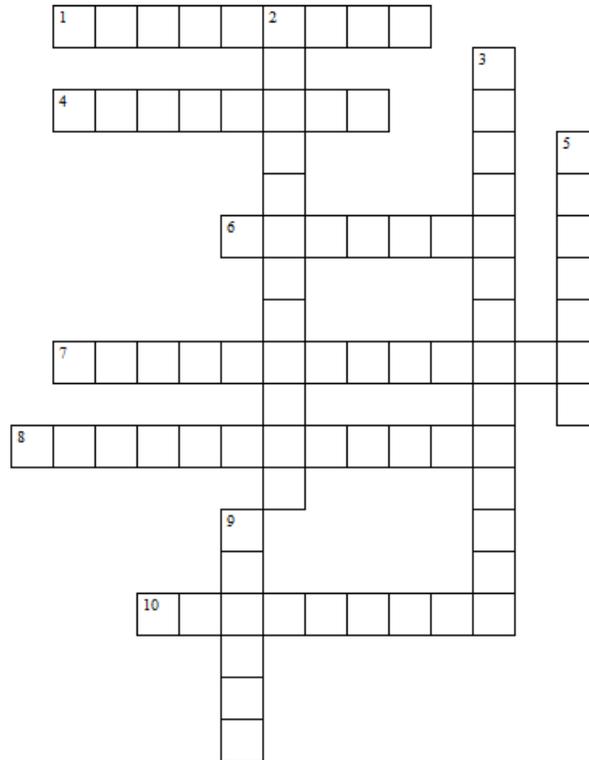
Fill in the following crossword puzzle (10 pts – 1 pt ea)

10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Groundwater



ACROSS

- 1 The entire geographical area drained by a river and its tributaries.
- 4 The ratio of the total volume of open pore space in a geologic deposit to the total volume of the deposit.
- 6 Water that is safe to drink.
- 7 The amount of time that it takes for groundwater to flow underground from recharge areas to discharge areas (2 words).
- 8 The process where water on the surface of the ground enters into the soil.
- 10 The process by which water leaves an aquifer.

DOWN

- 2 Water occurring in the unsaturated zone that is bound to soil particles by adhesive forces (2 words).
- 3 The drawdown of the water table around a pumping well that is greatest close to the well and gets smaller in all directions as the distance from the well increase (2 words).
- 5 A geologic formation of porous rock or loose material that can hold and transmit significant quantities of water.
- 9 A stream that recharges groundwater by seepage through the stream bed.

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	On crossword file in Word
Reference:	Ontario glossary

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 15

Aquatic Ecology - 2 points

Examine the piece of sampling equipment on display at this stop.

A) What region of the nearby lake ecosystem would it be used to sample?

B) List two (2) kinds of organisms that one might expect to capture with this device.

2

TABLE:	1
Stop Attendant:	0,
Equipment:	Ekman dredge for display (one for each team would be preferable, if available).
Answer:	<p>Answers:</p> <p>a) lake bottom or soft sediments (1 pt)</p> <p>b) Possible answers include the following: benthic invertebrates, crustaceans, insect larvae, chironomids, worms, etc. (1/2 pt each for a total of 1 pt)</p>
Reference:	<p>Aquatic Sampling Techniques</p> <p>Site Training Workshops</p> <p>Limnology, Freshwater Benthic Ecology</p>

Forestry - 10 points

10

Fishy Fort Trail [Stops 1-10]***Conky Campground Trail [Stops 11-20]***

The tree samples provided at this stop were harvested in the winter of 2009 near Piney Manitoba.

A) Using the samples and equipment provided at this stop please determine the age of this tree when it was harvested. (2 pts)

B) Multiple choice. Circle the best answer. (1 pt)

How would you define the trees growth rate during the period 1985-1989 as shown by the annual rings?

- i) slow
- ii) average
- iii) fast
- iv) cannot tell

C) Referring to the graph provided at this stop, name one (1) factor which could explain your answer in B). (2 pts)

D) Trees can be aged using the piece of forestry equipment provided at this stop. What is the name of this piece of equipment? (2 pts)

E) Multiple choice. Circle the best answer. (1 pt)

Dendrochronology refers to:

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

- i) the time of year that leaves form on trees
- ii) the study of plant evolution
- iii) the analysis of tree growth ring patterns in science
- iv) the difference in plant growth from one area to another

F) Multiple choice. Circle the best answer. (1 pt)

Dendrochronological timelines can be used by researchers to:

- i) calculate the age of buildings or structures
- ii) calculate the age of archeological sites
- iii) study the effects of climatic factors on tree growth
- iv) all of the above

G) True or False. Circle the best answer. (1 pt)

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

TRUE FALSE

TABLE:	0
Stop Attendant:	1, forestry person
Equipment:	tree cookie samples, magnifying glass, tooth picks, precip chart, increment borer
Answer:	A) 29 years, marking range for "close" answers; +/- 3 years - 2 pts, +/- 5 years - 1 Pt. B) i (slow), C) Piney precip chart shows significant drought during that time period, D) increment borer, E) iii) analysis of tree growth ring patterns

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

	F) iv) all over the above, G) true
Reference:	A, B, C, D: Forestry Equipment demonstration at Regional Workshop, E, F, G: Henri D. Grissino-Mayer's Ultimate Tree-Ring website, Virg Tech, Md Enviro websites

Soils and Land Use - 2 points

A) What does fluvial mean? (1 pt)

2

B) Give an example of where you would find soils formed under this mode of deposition. (1 pt)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	a. Fluvial refers to river or stream-deposited material. it is a mode of deposition under which parent materials were formed. Examples provided in the SMG are Assiniboine River Valley or Pembina valley but any river valley listed or simply a river valley is correct.
Reference:	Soil Management Guide pg 4.

Wildlife - 2 points

A) What term is used to describe the food habits of the skull provided at this stop? (1 pt)

2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

B) How can you tell? (1 pt)

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Skull
Answer:	(1 point each) 1) TBD 2) TBD
Reference:	Wildlife binder - Skulls in Education, page 39

Theme - 2 points

The flag at this stop represents a septic system.

2

A) Given the location of the septic system, which direction would the effluent flow from the septic field? (1 pt)

B) Name two (2) possible contaminants from a septic system (1pt – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	Flag
Answer:	Part A - towards the oxbow, Part B - nitrates and pathogens
Reference:	Ontario Envirothon 2009-2010: Protection of Groundwater page-42

STOP 16

Aquatic Ecology - 2 points

Examine the images on display at this stop. One is a satellite view of nearby Kitche Manitou Lake (dark shape with white line down its centre) and the surrounding area includes Provincial

2

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Highway 5 and the Assiniboine River. The other is a map of the same general area, with the lake and river shown.

A) How was Kitch Manitou Lake originally created? (1 pt)

B) What is the general name given to this type of lake? (1 pt)

TABLE:	1
Stop Attendant:	0,
Equipment:	Sets of laminated Google Earth photo and scanned map of Kitch Manitou Lake and surrounding area for display at each table.
Answer:	a) A large bend in the river was cut off by erosion and left as a separate water body. b) Oxbow lake (1 pt)
Reference:	On-site observation and reasoning How to Read a Topographic Map

Forestry - 2 points

A) Pioneer species are ideal for clearcut harvest and management that simulates forest fires. Circle two (2) trees from the list below that are pioneer species. (1 pt - 0.5 pts ea)

- Jack Pine Black Spruce White Spruce
- Red Cedar Trembling Aspen Basswood
- Bur Oak

<hr style="width: 50%; margin: 0 auto;"/> <p>2</p>
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B) List two ways that clear cut harvesting imitates fire ecology (1 pt – 0.5 pts ea)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1. Any two of Jack Pine, Black Spruce, or Trembling Aspen 2. large area, monoculture, evenaged, scarification of the soil
Reference:	pages 7, 8, 9, and 12 of MFA "Clearcutting in Manitoba" the clearcut silviculture system as related to vegetation management.

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Soils and Land Use - 2 points

Inundation (I) is one of the limitations described by the "Dryland Agriculture Capability Guidelines for Manitoba" rating systems. Explain how the river might affect the soil near its edge. (2 pts)

 2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	The river may periodically flood causing soils near its edge to become inundated. As a result, soils may be wet for longer periods in the springtime. This may delay seeding or may drown out crops that were seeded if the flooding occurs later in the season. The river may also deposit nutrient rich sediments making the soil more productive.
Reference:	Soil Management Guide Pg 27-31

Wildlife - 10 points

Using the field guides and samples provided at this stop, identify the following:

A) Scat

1) _____

2) _____

 10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

3) _____

4) _____

B) Tracks

1) _____

2) _____

3) _____

4) _____

C) Furs

1) _____

2) _____

TABLE:	1
Stop Attendant:	1, An Envirothon volunteer
Equipment:	Field guides, scat, tracks and furs
Answer:	1 point each: TBD
Reference:	Common understanding of using field guides

Theme - 2 points

Several management plans have been developed for aquifers in Manitoba. What are two (2) key elements to ensure a successful planning process? (2 pts – 1 pt ea)

<hr/> 2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1) take account of the land, water and related resources 2) include the interests and participation of all stakeholders

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Reference:	ADA Management Plan page-6
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Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 17

Aquatic Ecology - 10 points

10

A) Circle the best answer. (2 pts – 0.5 pts ea)

Classify the fish species listed below. Indicate whether it is a species of Special Concern (SC) or Threatened (T) or currently being considered as Endangered (E)

bigmouth buffalo	SC	T	E
carmine shiner (formerly roseyface shiner)	SC	T	E
chestnut lamprey	SC	T	E
sturgeon	SC	T	E

B) Degradation/loss of fish habitat affects fish populations. Identify what the implication each of the following has on fish. (3 pts – 1 pt ea)

i) Poorly set culverts and ford crossings, low head dams and weirs:

ii) Stream channelization:

iii) Thermal Effluent:

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Refer to the 2010 Angling Guide provided at this stop to answer the following questions.

C) Interested in doing your part to conserve fish species you purchase the Conservation Licence. Under the General Limits how many northern pike are you allowed to keep with a Conservation Licence? (0.5 pts)

D) You want to head to do Northwest Manitoba to do some fishing. When does the fishing season open? (0.5 pts)

E) Wow! What a catch you've landed at this stop. What is the total length of the fish provided at this stop? (1 pt)

_____ cm

F) Circle the correct answer. (0.5 pts)

Does it qualify as a Master Angler? YES NO

G) Circle the correct answer. (1 pt – 0.5 pts ea)

Are you allowed to collect, transport or possess live fish? YES NO

If no, why not? If yes, under what circumstances? **[I added this – ok?]**

H) Matching. Match the description to the most appropriate word. (1.5 pts – 0.5 pts ea)

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

- | WORD | DESCRIPTION |
|---------------|--|
| 1) carbon | _____ This element is often the most limiting nutrient for plant growth. |
| 2) phosphorus | _____ Basic building block of all living things. |
| 3) nitrogen | _____ Essential element found in the ground. |

TABLE:	1
Stop Attendant:	0,
Equipment:	2 sets of the 2010 Angling Guide: measuring board or rulers; couple of catfish
Answer:	A) BB=SC; CS=T; CL=SC; S=E Bi) barriers to upstream feeding, spawning and overwintering areas; Bii) removes diverse instream habitats such as riffles and pools; removes streambank vegetation; moves water downstream faster (increases runoff and peak) as a result may cease to flow later in the year. Biii) heated, warms water which holds less oxygen; in winter can attract fish and cause thermal shock if it shuts down suddenly C) 4; D) May 22; E) TBD; F) TBD G)YES - only under the authorization of a permit issued by Fisheries Branch H) 3,1,2 (in that order)
Reference:	Aquatic Ecology Resource Material: Nutrients; Species at Risk pdf; 2010 Angling Guide

Forestry - 2 points

Please list 2 (two) features you notice around this stop which would lead you to the conclusion that the forests here are overmature and decadent. (2 pts – 1 pt ea)

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Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	conks and mushrooms, standing dead trees and snags, evidence of cavity nesters and woodpeckers
Reference:	workshop training

Soils and Land Use - 2 points

Why is groundwater contamination a greater risk under coarse textured soils? (2 pts)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Coarse and very coarse textured soils in higher landscape positions have rapid internal drainage, so water moves through them quickly and easily. Any nutrients or other contaminants on or in the soil can be easily transported through the soil and into the groundwater with heavy rainfall events. (two marks)
Reference:	Soil Management Guide Pg 11.

Wildlife - 2 points

Besides arrangement, name the four (4) basic habitat needs of all living things. (2 pts – 0.5 pts ea)

2

- 1) _____
- 2) _____
- 3) _____
- 4) _____

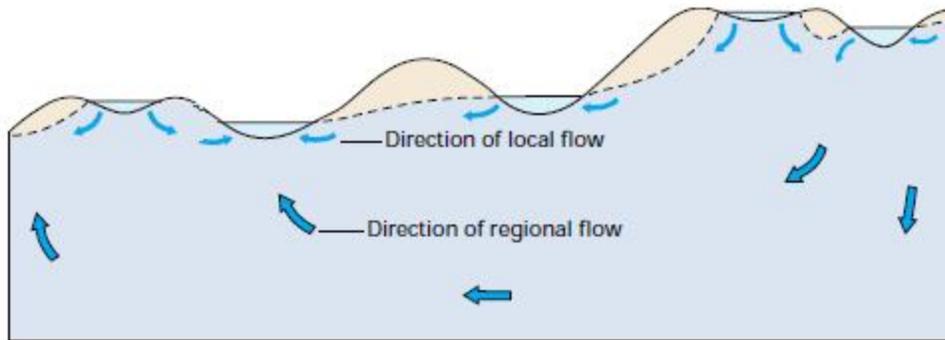
TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	0.5 points each: 1. Food 2. Water 3. Cover 4. Space
Reference:	Wildlife binder - Ecology and Wildlife Management, page 11

Fishy Fort Trail [Stops 1-10]
Conky Campground Trail [Stops 11-20]

Theme - 2 points

On the diagram below, label the following: (2 pts – as assigned below)

2



- A) Recharge area (0.5 pts)
- B) Discharge area (0.5 pts)
- C) Seepage face (1 pt)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Answer on Chart 3 in word format
Reference:	Ground water and Surface Water: U.S. Geological Survey Circular 1139 page-34,46

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 18

Aquatic Ecology - 2 points

2

A) Identify the two (2) aquatic invasive species provided at this stop by their common name. No points will be given for partial names. (1 pt - 0.5 pts ea)

1) _____

2) _____

B) Aquatic invasive species threaten aquatic habitat, fisheries and valuable recreational resources. Individuals need to act responsibly to prevent and/or slow the spread of invasive species. Choose two (2) of the four words below and complete the statement to reflect the action necessary to ensure water users do not transport invasive species. (1 pt - 0.5 pts ea)

CLEAN:

DRAIN:

DRY:

DISPOSE:

TABLE:	1
--------	---

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Stop Attendant:	1, An Envirothon volunteer
Equipment:	AIS samples: rusty crayfish; spiny waterflea; round goby; zebra mussel
Answer:	A) 1) spiny waterflea 2) round goby B) CLEAN and inspect watercraft, trailer and gear. Remove all plants, animals and mud. Rinse using high pressure , hot tap water 50oC (120oF). DRAIN all water from watercraft including the motor, livewell, bilge and bait buckets. DRY water craft for at least 5 days in the hot sun (if rinsing is not available) DISPOSE of unwanted live bait and worms in the trash, and dump bait bucket water on land. Never release aquarium pets, plants or water into our lakes, rivers or wetlands.
Reference:	Aquatics Ecology Resource Manual

Forestry - 2 points

Using the diameter tape provided please measure the diameter of the large cottonwood at this stop as directed by the stop volunteer. (2 pts)

<hr style="width: 50%; margin: 0 auto;"/> 2

TABLE:	0
Stop Attendant:	1, An Envirothon volunteer
Equipment:	diameter tape
Answer:	tbd about; 93 cm
Reference:	site specific

Wildlife - 10 points

<hr style="width: 50%; margin: 0 auto;"/> 10
--

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Background: Tunnel Town for the Richardson's Ground Squirrel.

This grassy area is prime habitat for the Richardson's ground squirrel. The ground squirrel is part of the rodent family. Currently, this one square kilometre area has 80 ground squirrels. The area can support up to 100 ground squirrels.

Assumptions:

The current ground squirrel population is 60 per cent females and all the females have babies. Ground squirrels give birth to an average of seven babies per litter per year; of which 60 per cent are females. In each litter, one male does not survive after birth.

Every time an animal is born, it is added to the population. When a ground squirrel dies, it's subtracted from the population.

Question:

In order to maintain the Richardson's ground squirrel population of 100 for this one square kilometre area after the first year, how many would either have to move out of the area or be consumed by predators? **Show your work?** (10 pts)

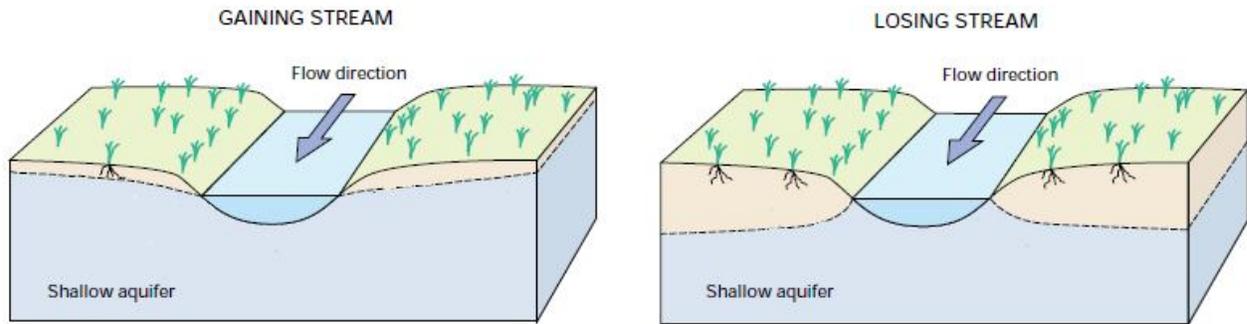
TABLE:	0
Stop Attendant:	0, An Envirothon volunteer
Equipment:	
Answer:	268
Reference:	Wildlife binder - Chapter 1-Wildlife populations attachment

Theme - 2 points

On both of the diagrams below, indicate the following: (2 pts – as assigned below)

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]



- 1) Water table on both diagrams (1/2 point)
- 2) Unsaturated area on both diagrams (1/2 point)
- 3) The direction of water movement on both diagrams (1 point)

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	Answer on Chart 2 in word format
Reference:	Ground water and Surface Water: U.S. Geological Survey Circular 1139 page-9

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

STOP 19

Aquatic Ecology - 2 points

Examine the photos of *Anabaena* spp.? provided at this stop.

- A) To what major taxonomic group does this species belong? (0.5 pts)
- B) List two (2) advantageous features that enable this organism to dominate its habitat when phosphorus is plentiful in a lake. (1 pt – 0.5 pts ea)
- C) What do we call the resulting condition in a lake or pond? (0.5 pts)

2

TABLE:	1
Stop Attendant:	0,
Equipment:	2 sets of laminated photos of <i>Anabaena</i> , a filamentous Cyanophyte.
Answer:	a) Cyanophyta or Cyanobacteria or Blue-green algae (1/2 pt) b) Ability to fix nitrogen for use in its metabolism (1/2 pt) Ability to float near surface and monopolize solar radiation (1/2 pt) c) A surface bloom or eutrophication (1 pt)
Reference:	Freshwater Productivity Limnology, A Treatise on Eutrophication Limnology, Plankton, Blue-green Algae (Cyaobacteria)

Wildlife - 2 points

In Manitoba, what two (2) animals disappeared due to the lack of hunting laws in North America? (2 pts – 1 pt ea)

2

TABLE:	0
Stop Attendant:	0,
Equipment:	
Answer:	1 point for any of the following: 1. Passenger pigeon 2. Bison 3. Plains grizzly 4. Swift fox etc.
Reference:	Wildlife binder - Wildlife Conservation and Management, page 5

Theme - 10 points

10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Use the map provided at this stop to answer the following questions.

A) Determine the UTM Location of the following dots on the map. (6 pts -1 pt ea)

	Northing	Easting
Green Dot		
Blue Dot		
Yellow Dot		

B) Determine the distance (in meters) between the Yellow Dot and the Blue Dot. (2 pts)

C) Determine the distance (in kilometres) between the Green Dot and the Blue Dot. (2 pts)

TABLE:	1
Stop Attendant:	1, One of Steven's assistants
Equipment:	NTS map, ruler
Answer:	Question 1: Determine the UTM Location of : Northing Easting Red Star 5493000 496000 Blue Star 5504000 477000 Gold Star 5490500 476500 [6 marks] Question 2: A) Determine the distance (in meters) between the Gold Star and the Blue Star [2 marks] 27 cm measured = 13500 meters B) Determine the distance (in kilometres) between the Red Star and the Blue Star [2 marks] 43 cm measured = 21.5 km
Reference:	Training

Fishy Fort Trail [Stops 1-10]***Conky Campground Trail [Stops 11-20]*****STOP 20****Aquatic Ecology - 10 points**

A) Multiple choice. Circle the best answer. (1 pt)

Note the piece of equipment on display at this stop. Which of the following is it designed to measure?

- i) Penetration of solar radiation into the water column
- ii) Depth of the water in a lake
- iii) Sinking rates of particles in the water column

B) List three (3) things that can affect the magnitude of the measurement obtained by the equipment on display at this stop. (3 pts – 1 pt ea)

C) Note the organisms shown in the photograph on display at this stop. To what large group of organisms do they belong? (1 pt)

D) Multiple choice. Circle the best answer. (1 pt)

Which of the following best describes the linkage of the organisms in the photo to the equipment on display?

- i) The depth to which solar radiation penetrates determines the availability of energy for photosynthesis.
- ii) Deeper water means more water volume in which the organisms can live.
- iii) If these organisms sink rapidly, they will have less time to survive.

E) Multiple choice. Circle the best answer. (1 pt)

10

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

Which of the following trophic terms describes the role played by the organisms in the photo in this lake ecosystem?

- i) primary producer
- ii) primary consumer
- iii) secondary consumer
- iv) decomposers

F) The following organisms listed below can be found in a lake such as the one at this stop. Write the name of the trophic level (as listed in part E, above) to which each belongs. (3 pts – 1 pt ea)

- i) Bacterium: _____
- ii) Daphnia: _____
- iii) Dragonfly nymph: _____

TABLE:	1
Stop Attendant:	0,
Equipment:	2 sets of the following displayed on tables: Secchi disk, laminated photo of mixed algae
Answer:	Total: 10 points a) (i) (1 pt) b) Possible answers include: suspended clay or silt particles, natural colour from plant decay (humic or fulvic acids), cloud cover, time of day (solar angle), operator's visual acuity, wave action, surface reflection c) algae or phytoplankton (1 pt) d) (i) depth solar radiation (1 pt) e) (i) primary producer (1 pt) f) (i) decomposer (ii) primary consumer (iii) secondary consumer
Reference:	Aquatic Sampling Techniques; Limnology, Eutrophication, Secchi Disk Limnology, Plankton, Phytoplankton

Wildlife - 2 points

Fishy Fort Trail [Stops 1-10]

Conky Campground Trail [Stops 11-20]

- A) An important part of setting furbearer seasons is when the pelts are at their prime. Between what months is a marten's fur in its prime? (1 pt)

- B) The Registered Trapline (RTL) System is a unique conservation method whereby a person, the "lineholder," is granted the exclusive opportunity to harvest furbearing animals in a certain area, the "RTL line." Why is this system so important? (1 pt)

TABLE:	0
Stop Attendant:	0
Equipment:	2009-2010 Trapping Guide??
Answer:	A) mid- November to mid-January B) - The system ensures sustainable furbearer populations by controlling the number of trappers in that area and making the lineholder the steward of the resource. - trapping was out of control and furbearing animal numbers had been depleted - animals were taken without regard of seasons and populations - local people (mostly First Nations) who had been trapping on the land for generations saw their traditional livelihoods threatened
Reference:	Trapping Guide

Theme - 2 points

2

Using the supplied GPS, input the following coordinates:

14U 0479784 5489979

With this information, determine the distance from your current position (by the flag at this stop) to the inputted coordinates. (2 pts)

TABLE:	1
Stop Attendant:	1, Allen Tyrchniewicz or Steven Hills
Equipment:	Garmin GPS Unit Flagged Stake
Answer:	TBD
Reference:	Training