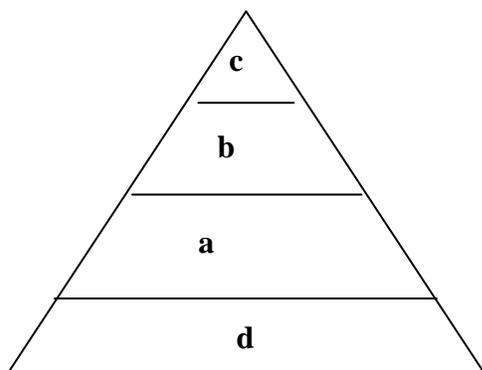


1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"ON THE BOARDWALK"

1 - 1. What is the ultimate energy source in aquatic ecosystems? **Sunlight** _____ /1

1 - 2. Place the organisms from the list on the right into the appropriate box in the food chain pyramid on the left.



- a. Mayflies
- b. Fathead minnows
- c. Northern pike
- d. Diatoms

_____ /4

ISPUTINAW SOIL PIT

1 - 3. Based on your observations of the soil pit and the samples provided.

a. Describe the colour at 80-cm depth. _____ /2

b. What does this colour indicate? _____ /2

c. Based on the soils, landscape and surrounding area, would this site be a good location for a house? List two reasons as to why or why not.

 _____ /2

1 - 4. Soil nitrates (an available form of nitrogen for plants) are prone to leaching. Why? _____ /1

Anion, soluble in water...

MARKER #2

1 - 5. Using the key provided in your trail bag, identify the two prominent tree species in this area and name two distinguishing characteristics for each.

 _____ /6

/18

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

1 - 6. a. Which Manitoba vegetation type is represented in this area? /1

b. In order to support your choice; name two shrubs and two herb species found here.

_____ /4

BRIDGE

1 - 7. The small spring fed stream beneath this footbridge flows at the rate of 0.03 cubic metres per second all year round. What is the source of its water?

- a. glacier
- b. Kiche Manitou
- c. The Assiniboine Delta Aquifer
- d. Assiniboine River
- e. Souris River

/1

C

1 - 8. The nearby oxbow lake in the adjacent campground named Kiche Manitou is approximately 2250 metres long, 80 metres wide and 1 metre deep. How many days would it take to fill the Lake with this streamflow mentioned in the question above?

- f. 5
- g. 15
- h. 35
- i. 70
- j. 115

/2

D

"MOUNTAIN TOP"

1 - 9. Given a ruler and aerial photographs of this area of such a scale that 1-mm on the photos represents 15,840 mm on the landscape.

a. What is the distance in kilometres from where you are now standing to the centre of the nearby highway bridge over the Assiniboine River? /2

A measurement of 100 mm on the air photo converts to 1.584 kilometres

b. Where it joins the Assiniboine River valley, what is the width in metres of the landscape erosion feature that the Isputinaw Trail travels around? /2

A measurement of 15mm on the air photo converts to 237.6 metres.

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"MOUNTAIN TOP-*con't*"

- 1 - 10. What was once a small oxbow 30 years ago is now a shallow marsh. The process best illustrates the concept of:
- a. Symbiosis
 - b. Biological magnification
 - c. A dynamic equilibrium
 - d. Succession
 - e. None of the above
- D** /1

- 1 - 11. A 'patchwork' mosaic of forest offers improved wildlife habitat by providing stands of different,
- a. shape
 - b. age
 - c. size
 - d. species
 - e. all of the above
- _____ /1

"OVERLOOK"

- 1 - 12. The hillside below the walking path is similar in degree of slope throughout the top portion of this trail. Why is it lacking in woody vegetation cover in this vicinity?
- /1
- Too hot and dry an environment for trees & shrubs due to degree of slope, aspect and sandy soil.
Active soil slippage zone. Downslope soil creep prevents establishment of permanent soil.**

- 1 - 13. The Isputinaw Trail loop circumnavigates a landscape erosion feature on the side of the Assiniboine River valley. What geomorphic agent eroded this feature?
- a. the spring fed streams
 - b. wind
 - c. the current Assiniboine River
 - d. an earlier glacial meltwater-fed Assiniboine River
 - e. glaciation
- A** /1

- 1 - 14. a. Name two characteristics of a forest that determine the number of layers in a stand. /2
- _____

- b. What are the four layers that make up the vertical structure of a forest stand? /4
- _____

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"GLENN'S SITE BY THE OLD TREE"

- 1 - 15. Aquifers whose upper surface is bounded by the water table are called?
a. fractured aquifers
b. porous media aquifers
c. confined aquifers
d. piezometric surface aquifers /1
e. unconfined aquifers _____
- 1 - 16. Examine the moss specimen on display...
a. What stage or alternation of generation does this specimen represent? /1

- b. What is its chromosome state? /1

- c. How is this plant more primitive than a grass plant? /1

- d. Name one way this plant is well adapted to the habitat in which it grows. /1

OPEN MARSH

- 1 - 17. Give two reasons why there are more trees to the north of the beaver lodge? /2

- 1 - 18. Is there a beaver dam near the beaver lodge? /1
a. Yes _____
b. No _____
- 1 - 19. Name four features that make a marsh area productive? /4

- 1 - 20. a. Is the vegetation community to the north of the beaver lodge more stable than the vegetation community to the south of the lodge? _____
b. If yes, why? /2

/14

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

OPEN MARSH-*con't*

1 - 21. List three factors that affect plant growth.

/3

1 - 22. Why is climate important in the formation of a soil?

/2

1 - 23. More species of plants and animals to the left of the beaver lodge. Why?

/1

/6

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"ASSEMBLING AREA PART I"

2 - 1. What is the approximate height and age of tree A *or* B? Circle tree chosen.

/2

2 - 2. Draw and label four parts of hydrologic cycle.

/4

"ASSEMBLING AREA PART II"

2 - 3. Name three components of biodiversity.

/3

Genetics, species, landscape

2 - 4. How does habitat fragmentation threaten biodiversity?

/1

isolating populations, inhibiting genetic flow among populations.

2 - 5. If a sewage treatment plant were established and discharged into "Kiche Manitou", what two macronutrients would likely be present in the greatest quantity?

/1

Nitrogen & phosphorous

2 - 6. An Oligotrophic Lake is

- a. Geologically old, very basic in pH, highly turbid, highly productive
- b. Geologically young, basic in pH, low turbid, low productivity
- c. Geologically middle aged, acidic in pH, moderate turbid, moderate productivity
- d. None of the above

/1

B

/12

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"ASSEMBLING AREA PART II – con't"

- 2 - 7. What percent of the world's total water supply is fresh surface water in a liquid state?
- a. 91%
 - b. 51%
 - c. 21%
 - d. 1%
 - e. 0.01%
- /1
E

"PINE FORT TABLE"

- 2 - 8. Juvenile suckers feed on tiny aquatic organisms. They also feed on decaying organic matter. These fish are categorized as:
- a. Predators
 - b. Carnivores
 - c. Scavengers
 - d. Omnivores
- /1
D

- 2 - 9. List three ways plants stabilize the stream banks? /3

Streamside vegetation reduces velocity during flooding which reduces erosion & increases sediment & nutrient deposition; roots from vegetation bind soil particles together & retain water in the soil;

- 2 - 10. List four reasons why healthy riparian habitats are valuable? /2
Breeding, travel corridor, feeding, rearing, aquatic component, cover & shade, water quality, habitat diversity, soil moisture, fertility, nutrient filter, erosion control & temperature control.

- 2 - 11. a. Why does too much phosphorus negatively affect freshwater ecosystems? /1
Phosphorous is frequently the factor that limits primary production in lakes. Increases in phosphorous without an increase in nitrogen, can result in nitrogen to phosphorous ratio which favours the growth of blue-green algae. This is because these algae can use elemental nitrogen available from the atmosphere.

- b. List two sources of phosphorous. /1
Fertilizer, detergent, natural elements

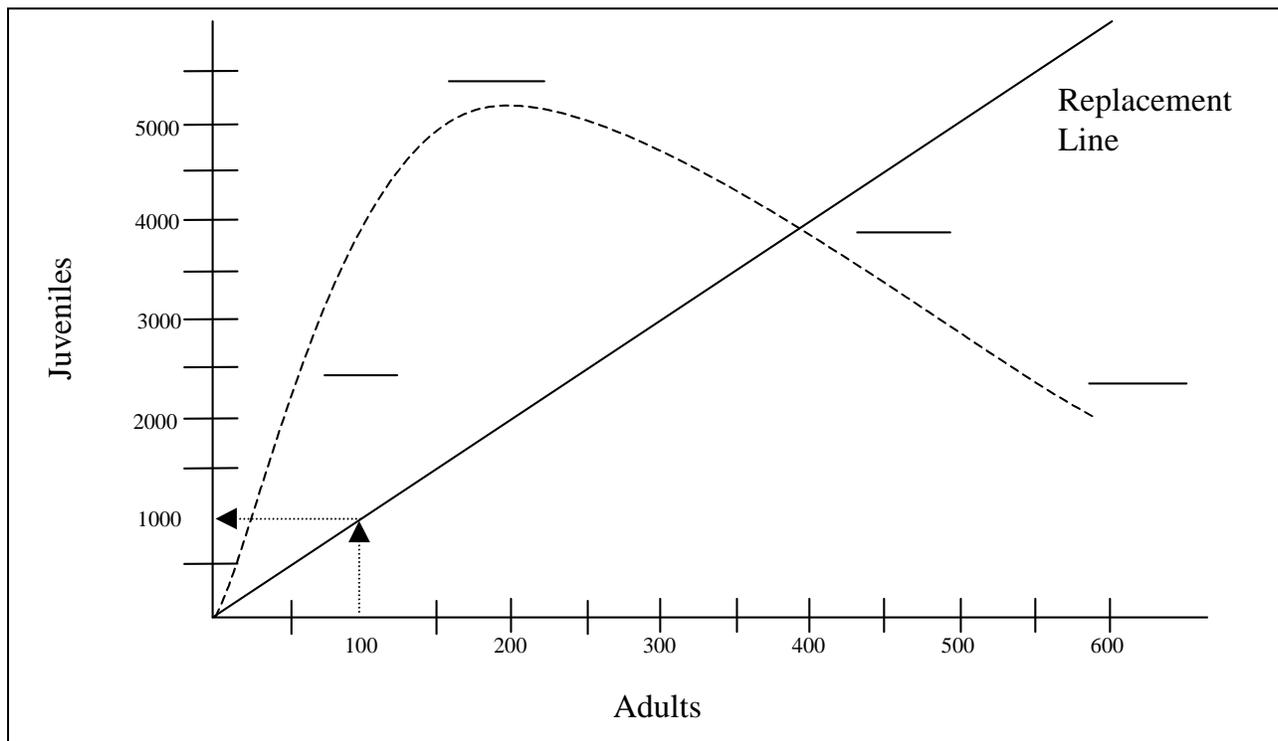
- c. Why is there phosphorous in dishwasher detergent? /1
For spot free dishes!

/10

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"SITTING ON THE DOCK..."

2 - 12. The replacement line (solid line) in the graph below shows the number of adult walleyes required to produce a sufficient number of fry that would eventually replace the original adults. E.g.: 100 adults produce 1,000 fry (dotted line). 90% or 900 fry die before becoming adults resulting in 100 new adults.



~ Label the graph on spaces provided above on the graph, to indicate where the following would occur along the dashed line.

- a. Number of adults producing the maximum number of juveniles. /3
- b. Number of juveniles replacing the number of adults.
- d. Number of juveniles that do not replace the number of adults.

2 - 13. a. Is the organism under the microscope phytoplankton or zooplankton? /½

phytoplankton

b. Is the organism under the microscope phytoplankton or zooplankton? /½

zooplankton

c. To say that this organism is a filter feeder, an important trophic level in aquatic food chains and often the most important herbivore in ponds and lakes would describe it's

- i) trophic status
- ii) niche
- iii) biomass
- iv) commensal feeding relationship

/1

ii

/5

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

d. This mayfly was collected from the vegetation growing in Kiche Manitou Lake. Mayflies have hooks on each foot, gills on their abdomen, gills and tail move strongly, brownish-green colour. List one advantage to mayflies of each of these adaptations.

- | | | | |
|------|--------|----------------------------|----|
| i) | hooks | climb on vegetation | |
| ii) | gills | remain submerged | |
| iii) | tail | strong swimmer | |
| iv) | colour | camouflaged | /2 |

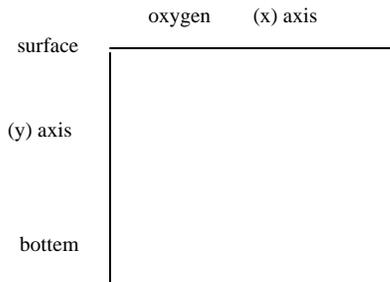
2 - 14. a. Using the key provided, key out this fish. **fathead minnow** /2

b. Would you expect to find this fish in a lake like Kiche Manitou? **Yes** /1

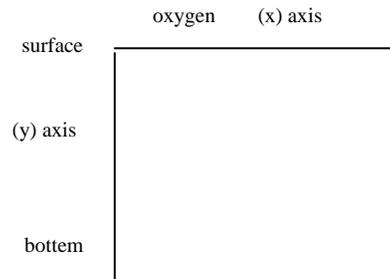
2 - 15. Give three species of mammals that may use this habitat. /1½
Raccoon, muskrat, beaver, mink, water shrew

2 - 16. List three adaptations you would expect to find in resident fish from this oxbow. /1½
Eye size/position, presence of barbels, body shape, fin shape/location

2 - 17. Draw two graphs, showing the relationship you would expect to see between oxygen and depth during summer in a eutrophic lake and a river.



Summer eutrophic lake



Summer river

/4

2 - 18. Measure and record the pH of Kiche Manitou. /2

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

/14

"OLD CUT TREE BY THE BRIDGE - TABLE"

- 2 - 19. Which of the following best completes this sentence; energy flow in ecosystems is:
- a. Uphill
 - b. Symbiotic
 - c. Negative
 - d. One way
- D** /1
- 2 - 20. The littoral zone refers to the...
- a. vegetated area along a stream bank
 - b. deep part of a lake below the thermocline
 - c. shallow part of a waterbody along a shoreline where light penetrates to bottom
 - d. synonym for hypolimnion
- C** /1
- 2 - 21. Which is true? Alkalinity is
- a. The ability to neutralize acids
 - b. The sum of all bases (pH scale)
 - c. Due mainly to carbonates and bicarbonates
 - d. All of the above
- D** /1
- 2 - 22. Which is true about nitrogen?
- a. Present in all proteins
 - b. "Fixed" in soil by all plants
 - c. Occurs in ecosystems as ammonia & nitrite
 - d. All of the above
- A** /1
- 2 - 23. Which one of the following sectors uses the largest amount of water in Canada?
- a. Thermal Power Generation
 - b. Manufacturing
 - c. Municipal
 - d. Agriculture
 - e. Mining
- A** /1

"KICHE MANITOU SOIL PIT"

- 2 - 24. What four components make up a soil? /2
- Mineral, air, water, organic matter**
- 2 - 25. What is a soil profile? /1
- A vertical section of the soil in which layers or horizons can be distinguished.**

/8

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

2 - 26. A. Using the Soil Landscape of Canada Map that is provided. What is the rating for agriculture of SW 15-02-04 E1

- a. Class 1
 - b. Class 2
 - c. Class 3
 - d. Class 4
 - e. Class 5
- /2
-

B. What is the limiting factor to agriculture?

- a. adverse topography
 - b. excess water
 - c. erosion damage
 - d. adverse climate
- /1
-

C. What would be the best land use for this site?

- a. forage production
 - b. cereal production
 - c. town site
 - d. lagoon
 - e. potato production
- /1
-

2 - 27. a. Using a hand-texturing guide provided, determine the texture of samples A & B.

Sample A

- a. clay loam
 - b. loamy sand
 - c. clay
 - d. clay loam
- /1
-

Sample B

- a. clay loam
 - b. loamy sand
 - c. clay
 - d. clay loam
- /1
-

b. Based on texture, what sample would have the greatest pore space volume? _____ /2

2 - 28. Using the measuring tape provided.

- a. What is the thickness of the A horizon? _____
 - b. At what depth does the C horizon begin? _____
- /1

B. The texture of the surface layer is:

- a. Course (sand)
 - b. Moderately course (loamy sand, sandy loam)
 - c. Medium (loam, silt loam)
 - d. Fine (clay loam, silty clay loam, sandy clay loam, clay, silty clay, sandy clay)
 - e. Organic (muck, peat)
- /1
-

/10

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"FARM SITE"

- 2 - 29. List two soil characteristics that should be assessed and considered when planning to irrigate a field.
Internal drainage, texture, topography & salinity
/1
- 2 - 30. Soil compaction reduces crop yields. Why?
Reduces water holding capacity, reduced pore space, reduced aeration, structure
/1
- 2 - 31. a. Organic farming means growing crops without using manufactured chemicals or pesticides. List two advantages of organic farming.
Reduced chemicals, improved return, reduced production costs.
- b. List two disadvantages of organic farming.
Lower yields, increased tillage & potential erosion, more acres required to feed populations.
- 2 - 32. Livestock production is expanding in Manitoba. With increased production comes an increase in manure. Manure can be a valuable source of nutrients for crop production. If more manure is applied than a crop can use there is potential for ground water contamination.

List three things you would do to ensure that manure is applied at the proper rate.
Soil test to determine what nutrients are already in the soil; analyze the manure to determine its nutrients content; determine nutrient requirements for the crop being planted; ensure that the area is large enough to handle the amount of manure being spread.
/3
- 2 - 33. Excessive tillage reduces the amount of organic matter in the soil. Why?
Aerates the soil leading to rapid break down of organic matter, tilled soils are more prone to erosion
/1
- 2 - 34. Why do farmers use pesticides? List two reasons.
Weed control, insects, disease, low cost.
/2
- 2 - 35. What is sustainable agriculture?
A method of farming that uses resources so that current needs can be met without endangering future needs.
/2
- 2 - 36. a. What is crop rotation?
Rotating a field with different crops from one year to the next
/1
- b. Why do farmers use crop rotation?
Weed control, disease control, economics, soil management
/1

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

2 - 37. Soil originated from the action of glacial ice which ground u the underlying bedrock, leaving deposits when the glacier retreated.

- a. lacustrine
- b. alluvial
- c. fluvial
- d. morainal

/1

D

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

"LITTLE CABIN"

- 3 – 1. A. 'Defensible Space' refers to?
a. a room where the occupants can hide from a fire
b. a debris free area around a house
c. a fenced property
d. the area a fire department can protect
e. all of the above /1
- B**
- B. Does this cabin have sufficient "defensible space?" /1
- C. Explain your answer for "B." /1
-

"AN OLD FIRE SITE"

- 3 - 2. List three types of animals that may benefit from fire in this area. /3
Wood boring insects, cavity nesting birds, sand or open area species, ground feeding birds, decomposers, pioneering species.
- 3 - 3. Describe two ways in which fire improves area food resources for ground dwelling animals? /2
It brings the terminal down to where it can be used, stimulates growth as shade is reduced, nutrients are available that were tied up in fibre, pioneer plants species invade (seed producers)
- 3 - 4. List three similar impacts of clearcutting and fire to a forest. /3
Increased sunlight reaches ground, both can result in some level of erosion & runoff, both will generally regenerate a new forest
- 3 - 5. List three different impacts of clearcutting and fire to a forest. /3
generally numerous dead standing trees after a fire, amount of above ground material differs – more on a burn left as ash (harvested material is removed from cutover), logging leaves for soil material on the site than fire, heat from fire contributes to the breakdown of rock into soil, fires often remove or reduce insect and fungi – including pathogens, logging generally requires roads which result in other impacts.
- 3 - 6. Name two groups of animals that are adversely impacted by fires in this habitat community. /2
Animals that feed on seeds & cones of mature trees, tree dwelling animals, animals of closed forest communities, animals which require thermal protection.
- 3 - 7. a. Would this burn area be used more in winter or summer by large ungulates? **Summer**
- b. Why? /2
The abundance of herbaceous plant growth after the fire

/18

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

- 3 - 8. Fire dependent species such as jack pine and black spruce in Manitoba were historically subjected to stand killing fires every,
- a. 30-74 years
 - b. 75-125 years
 - c. 100-175 years
 - d. 175-300 years
 - e. 300+ years
- B** /1
- 3 - 9. a. What is a snag? **A dead standing tree** /1
- b. Give one benefit associated with snags. /1
Used by wildlife for cover, feeding, reproduction, preening, lookouts, bridgeways & hibernating.
- c. Give one problem associated with snags. /1
May topple onto loggers, other trees & wildlife.
- 3 - 10. The type of fire that spreads most rapidly and is therefore the most difficult to control is?
- a. surface fire
 - b. creeping ground fire
 - c. intermittent crown fire
 - d. crown fire
 - e. torching fire
- D** /1
- 3 - 11. 'Dry-lightning' refers to?
- a. lightning which strikes dry ground or objects
 - b. lightning with no associated rain
 - c. lightning which is only intense enough to dry the wet ground
 - d. the only lightning which starts fires
- B** /1
- 3 - 12. Which type of area usually receives the most lightning strikes?
- a. deep soils
 - b. sedimentary rocks
 - c. exposed bed rock
 - d. granitic rock
 - e. steep slopes
- D** /1
- 3 - 13. Which factors affect the tree species that grow after a fire?
- a. the species that occurred before the fire
 - b. the fire severity and size
 - c. the period between fires
 - d. the ground moisture
 - e. all of the above
- E** /1
- 3 - 14. 'Modified' suppression refers to?
- a. fires are prioritized on the basis of values-at-risk

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

- b. only certain tools are used like water bombers
 c. suppression is stopped when a certain amount of money is spent
 d. only certain parts of the fire are controlled **A** /1
- 3 - 15. Which of the following species is *not* a 'pioneer' disturbance-dependent species?
 a. aspen (*Populus tremuloides* Michx.)
 b. jack pine (*Pinus banksiana* Lamb.)
 c. balsam fir (*Abies balsamifera* (L.) Mill.)
 d. black spruce (*Picea mariana* (Mill.) BSP. **C** /1
- 3 - 16. Which methods are used in studying wildfire history?
 a. interpreting fire scars
 b. drilling for pollen in swamps
 c. dating soils carbon traces
 d. interpreting records and maps
 e. all of the above **E** /1
-

"EPINETTE SOIL PIT"

- 3 - 17. What situation would be most prone to wind erosion?
 a. Moist sandy soil
 b. Dry clay soil
 c. Dry sandy soil
 d. Wet clay soil **C** /1
- 3 - 18. The way soil particles cling together to form aggregates is called?
 a. Soil erosion
 b. Soil fertility
 c. Soil structure
 d. Soil topography **C** /1
- 3 - 19. What type of soil has the largest water holding capacity?
 a. Sand
 b. Silt
 c. Clay **C** /1
- 3 - 20. Soil salinity refers to?
 a. Soil with a pH below 5
 b. Soil that is continuously wet
 c. Soil with a high concentration of soluble salts
 d. Soil with organic matter less than 5% **C** /1
- 3 - 21. Based on your observations of the soil pit, soil sample provided and the surrounding area
 a. Would this be a suitable site for construction of a sewage lagoon? Why?
 b. What soil characteristics would limit this site to grain production. (eg. Wheat, barley...)
-
- /1
/2

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

A mild amount of Hydrochloric acid can be used to detect carbonates in the soil. Carbonates are formed from natural chemical reactions in the soil and are soluble. When the acid comes into contact with carbonates a reaction occurs. At this site, apply the acid to the soil at 10, 30 and 60 cm.

a. What information does this test provide?

Drainage, if carbonates are found at the surface then the soil is poorly drained, if no reaction, or increases as move down, the drainage is improved.

/2

3 - 23. Soil pH is important for plant growth. List one reason.

/1

Influences the solubility of nutrients, microbiologic activity

3 - 24. Soil degradation is a decrease in the productive capability of the soil brought about primarily by human activity. List two types of soil degradation.

/1

Wind erosion, water erosion, salinity, organic matter loss, soil compaction, acidification, urbanization.

"NATIVE FORB, GRASS & WILDLIFE STOP"

3 - 25. Natural Disturbances (including forest fires and pests) affect how much more forestland than harvesting?

- a. -20%
- b. 0%
- c. 20%
- d. 40%
- e. 40+%

/1

E

3 - 26. How much mixed-grass prairie is left in Canada?

- a. 1%
- b. 10%
- c. 25%
- d. 65%
- e. none

/1

A

3 - 27. Name three major threats to mixed-grass prairie?

/1½

Overgrazing, woody encroachment, exotic species, cultivation

3 - 28. Name this grass.

/2

3 - 29. Name this forb.

/11½

/2

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

3 - 30. A lichen is made up of what two organisms?

/2

3 - 31. What type of lichen is this?

/2

3 - 32. Which element is considered one of the six macro nutrients required for plant growth?

- f. Copper
- g. Magnesium
- h. Chloride
- i. Phosphorous
- j. Zinc

/1

D

3 - 33. Hognose snakes occur in sandy areas of Spruce Woods Provincial Park. Is this species a habitat specialist or generalist?

/1

Why?

/1

3 - 34. Photosynthesis is the process by which green plants use energy from light and converts these (three elements) into food for plant growth.

- a. Sulphur, nitrogen, oxygen
- b. Carbon, oxygen, hydrogen
- c. Nitrogen, sulphur, oxygen
- d. Oxygen, nitrogen, carbon

/1

B

3 - 35. Which forest dwelling mammal is not found on COSEWIC's endangered species list?

- a. Eastern cougar
- b. Canada lynx
- c. Vancouver Island marmot
- d. Wolverine

/1

3 - 36. How would you classify skulls A-D, do they belong to a carnivore, herbivore or rodent?

A

B

C

D

E

/2½

/11½

1999 Envirothon Questions with Answers
AREA 1: ISPUTINAW INTERPRETIVE TRAIL

- 3 - 37. What are some attributes of Wildlife Management Areas?
- e. tracts of crown land
 - f. land set aside for the preservation of wildlife & habitat
 - g. areas available to the public for a variety of uses, including hunting, hiking and scientific research.
 - h. two of the above
 - i. all of the above
- _____ /1

- 3 - 38. What is the nutrient that is the “Basic Building Block” of all living things?
- a. Hydrogen
 - b. Oxygen
 - c. Carbon
 - d. Nitrogen
 - e. Phosphorus
- C** /1