Michigan FFA Environmental Skills Career Development Event Handbook

(Effective October 4, 2022)

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Michigan FFA
Environmental Skills
Career Development Event Handbook

Environmental Skills CDE Purpose

The Environmental Skills Contest is designed to frame the most important aspects of the environment (soil, water, and air quality). The purpose of the Environmental Skills Career Development Event is to stimulate student interest, promote environmental and natural resources skills in agricultural education curriculum and provide recognition for those who have demonstrated skills in this area.

Environmental Skills CDE Event Rules

1. No team, team member or team coach shall visit the event location to observe materials and facilities after March 1st. If any team, team member or coach is reported and proven to do so, the team will be eliminated and not allowed to compete in the State FFA Environmental and Natural Resources Career Development Event.
2. Teams will be assigned to group leaders who will escort them to various event-staging sites. Each team is to stay with his or her assigned group leader throughout the event or until told to change locations by the event superintendent.
3. All teams will be given an identification number by which they will be designated throughout the event.
4. Participants must come to the event prepared to work in adverse weather conditions. The event will be conducted regardless of the weather. Participants should have rainwear, warm clothes and appropriate footwear.
5. Written Materials: All written materials will be furnished for the event. No part of the contest written materials will be available before team registration on the day of the contest. Any team acquiring a copy of such materials and/or filling out contest materials prior to the actual start of the contest will be disqualified. No written materials such as tests, problems and worksheets shall be removed from the site.
6. The event will include the following 9 stations:
    1. Water Quality
    2. Soils Analysis
    3. Environmental Tools and Invasive Species Identification
    4. Ecosystem Analysis
    5. GPS
    6. Fish and Aquatic Organism Identification
    7. Plant and Tree Identification
    8. Animal and Bird Identification
    9. Reptile and Amphibian Identification

7. Teams will consist of 3-5 individuals and will be scored as a team event.

Environmental Skills CDE Event Format

A. Equipment Provided

Students will be provided with a series of nine test stations. All necessary Scantron scoresheets, maps, directions, questions, and GPS units will be provided.

B. Equipment Not Provided

Suggested materials for students to bring - each team should bring a clipboard and at least two pencils. Teams will also have access to writing materials at the contest site if needed.

C. Optional Equipment

Teams may use their own GPS unit and clinometer during the event.

D. Contest Scoring and Tie Breakers

The comprehensive list of species that will be used at the various stations is located in the back of this handbook. IMPORTANT NOTE: The three-digit number assigned to each species and answers in the water quality section will be used during the contest to fill in the correct responses on the Scantron score sheet. This will be explained to students on the day of the contest to eliminate errors.

This contest has a total of 442 possible points. The tie break will be as follows: To break a tie the contest chair will examine the total points scored by each team in the Ecosystem Analysis (Section 4). The team with the highest points will be the State winner. If a tie remains, the team with the highest score in the Reptiles, and Amphibians (Section 9) section will win. As a final tie breaker, the total score in the Soils Analysis (Section 2) section will determine which team will win the State Environmental Skills Contest.

E. Contest Overview

All resources from this contest can be found on the MI FFA website, including photos of all environmental tools and invasive species, fish and aquatic organisms, plants and trees, animals and birds, and reptiles and amphibians used in this contest. This is a team event. Teams are required to stay together as they rotate through nine stations. The contest superintendent will notify teams when to move to the next station. Each team will be allowed fifteen minutes per station. All answers are to be recorded on the Scantron multi-purpose form B. GPS questions can be found on a separate sheet of paper. At the end of the competition teams will turn in all materials to the contest chair. Teams will be required to submit all contest materials prior to departing the site.

Environmental Skills Station Information

Section 1: Soils Analysis (50 Points)

- Physical Properties
- Soil Erosion
- Soil Analysis
- Environmental Impact of Soil Degradation

For training, please refer to the Land Conservation Contest guidelines found on the Michigan FFA web site. Students will be instructed to use a sound environmental perspective as they evaluate a soil pit. They will be provided all of the information about soil test data at the site. Students **MUST** fill out the soil portion of this contest as instructed on the Scantron answer sheet. See the soil analysis questions located in **Section 2: Soils Analysis Questions (Part I) and (Part II).** The Michigan Land Judging Card will be used at this site. This section is worth 50 points (***Scantron Sheet is numbered 1-50 for this section***). See the Michigan FFA website for resources.

Section 2: Environmental Tools and Invasive Species (50 Points)

- Identify Common Environmental Tools
- Identify Invasive Species in Michigan

In this section, students will identify a combination of 25 Environmental Tools and Invasive Species found in the contest guide on the Michigan FFA website. There may be actual tools, specimens, or photos provided for the contest. Students will record their answers using the resources available that reference the questions in the Environmental Tools and Invasive Species questions below. Note: ***The Scantron Sheet is numbered 61-85 for this section***. This section is worth 50 points. See the Michigan FFA website for resources.

Section 3 Ecosystem Analysis (62 Points)

- Site Overview
- Products of Environmental Site
- Signs of Environmental Quality

Students will use the question sheet provided in the contest packet to assess the site. Instructions will be given to help students understand how to mark their responses. Responses will be recorded on the contest Scantron bubble sheet. See the Michigan FFA website for resources. Note: ***The Scantron Sheet is numbered 91-121 for this section***.

Section 4: GPS (20 Points)

- Using a GPS Unit, students will answer various questions located at a series of marked location

At this station, students will answer a series of questions using a provided GPS unit. Questions may be asked to determine the latitude and longitude coordinates, directional

aspects and other relevant questions about a marked location using provided GPS units. Students will record the 3-digit number of each species onto the score sheet. Note: ***The Scantron Sheet is numbered 151-180 for this section***.

Section 5: Water Quality (60 Points)

- Water Quality Resource (www.waterontheweb.org)

In this section, teams will analyze a set of data provided and answer questions about the water quality at the site location. Answers will be placed in the appropriate location on the Scantron sheet provided. Students can use the resource cited above to assist with training purposes for the Water Quality section. Students will record the 3-digit number corresponding to the answer onto the score sheet (Raw Scr). This section is worth 60 points. See the Michigan FFA website for resources.

Section 6: Fish and Aquatic Organisms (50 Points)

- Identify Common Fish
- Identify Common Aquatic Organisms

In this section, students will identify a combination of 25 fish and aquatic organisms found in the contest guide on the Michigan FFA website. Actual specimens or photos may be used for identification purposes. Students will record the 3-digit number of each species onto the score sheet. Note: ***The Scantron Sheet is numbered 1-25 for this section***. This section is worth 50 points. See the Michigan FFA website for resources.

Section 7: Plants and Trees: (50 Points)

- Identify Common Plants
- Identify Common Trees

In this section, students will identify a combination of 25 plant and tree species. On-site specimens and photos will be used for identification purposes. On-site plants/trees will be flagged for identification. If available, there will be plants and trees that are marked at the actual site or photos/samples (including bark and leaves) will be provided. The students will record the 3-digit number of each species onto the scoresheet. Note: ***The Scantron Sheet is numbered 26-50 for this sectio***n. This section is worth 50 points. See the Michigan FFA website for resources.

Section 8: Animals and Birds (50 Points)

- Identify Common Animals
- Identify Common Birds

In this section, students will identify a combination of 25 animals and bird species found in the contest guide on the Michigan FFA website. Actual specimens of skulls and pelts or photos may be used for identification purposes. ALL responses will be recorded on the contest Scantron bubble sheet. Students will record the 3-digit number of each species onto

the scoresheet. Note: ***The Scantron Sheet is numbered 51-75 for this section***. This section is worth 50 points. See the Michigan FFA website for resources.

Section 9: Reptiles, and Amphibians (50 Points)

- Identify Common Reptiles
- Identify Common Amphibians

In this section, students will identify a combination of 25 reptiles and amphibian species found in the contest guide on the Michigan FFA website. Actual specimens or photos may be used for identification purposes. Students will record the 3-digit number of each species onto the score sheet. Note: ***The Scantron Sheet is numbered 76-100 for this section***. This section is worth 50 points. See the Michigan FFA website for resources.

Section 1: Soils Analysis Questions (Part I)

This section of the soils analysis (Part I) is worth 17 points (1 Point per question). Record all answers on the Scantron scoresheet.

<table>
<tr><th colspan="3">Soil Factors – Part I – Interpretation of Soil Factors</th></tr>
<tr><td>1. Surface Texture
A. Coarse
B. Moderately Coarse
C. Medium
D. Moderately Fine
E. Fine</td><td colspan="2">5. Slope
A. Nearly Level (0-1%)
B. Gently Sloping (1-3%)
C. Moderate Sloping (3-5%)
D. Strongly Sloping (5-8%)
E. Steep (8-15%)</td></tr>
<tr><td>2. Subsoil Texture
A. Coarse
B. Moderately Coarse
C. Medium
D. Moderately Fine
E. Fine</td><td colspan="2">6. Erosion – Wind & Water
A. None to Slight
B. Moderate
C. Severe
D. Very Severe</td></tr>
<tr><td>3. Color of Surface Layer
A. Dark
B. Medium
C. Light</td><td rowspan="2">Problems affecting this site and management
All answers are Yes=A and No=B
7. Soil Structure
8. Droughty
9. Stony
10. Drainage
11. Wet Spots
12. Seasonal Flooding
13. Slope
14. Wind Erosion
15. Water Erosion
16. Organic Matter
17. Permeability</td><td rowspan="2">

Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B
Y=A, N=B</td></tr>
<tr><td>4. Color of Subsoil
A. Bright
B. Mottled
C. Dull</td></tr>
</table>

Section 1: Soils Analysis Questions (Part II)

This section of the soils analysis (Part II) is worth 33 points (1 Point per question). Record all answers on the Scantron scoresheet. All answers in Part II are Yes=A and No=B.

Part II – Recommended Management	
18. Grass waterways	Y=A, N=B
19. Contour tillage	Y=A, N=B
20. Strip cropping	Y=A, N=B
21. Conservation tillage	Y=A, N=B
22. Windbreaks	Y=A, N=B
23. Install and/or maintain artificial drainage	Y=A, N=B
24. Barnyard manure if available	Y=A, N=B
25. Liming materials	Y=A, N=B
26. Apply potassium fertilizer	Y=A, N=B
27. Apply phosphorus fertilizer	Y=A, N=B
28. Cover and green manure crops	Y=A, N=B
29. Return all crop residues to the soil	Y=A, N=B
30. Establish recommended grass or grasses and legumes	Y=A, N=B
31. Protect from burning	Y=A, N=B
32. Managed grazing of pasture for erosion control	Y=A, N=B
33. Top dress established legumes with phosphorus	Y=A, N=B
34. Top dress established legumes with potassium	Y=A, N=B
35. Top dress permanent grass vegetation with commercial nitrogen	Y=A, N=B
36. Eradicate brush	Y=A, N=B
37. Special plantings for wildlife food and cover	Y=A, N=B
38. Plant adapted species of trees	Y=A, N=B
39. Protect trees and shrub areas from grazing	Y=A, N=B
40. Manage woods	Y=A, N=B
Suitability for Alternative Uses	Y=A, N=B
41. Septic tank disposal field	Y=A, N=B
42. Residential development without sanitary or storm sewers	Y=A, N=B
43. Residential development with sanitary or storm sewers	Y=A, N=B
44. Streets and roads	Y=A, N=B
45. Playgrounds	Y=A, N=B
46. Paths and trails or golf courses	Y=A, N=B
47. Woodlands and wildlife area	Y=A, N=B
48. Open land wildlife area	Y=A, N=B
49. Wetland wildlife area	Y=A, N=B
50. Excavated pond	Y=A, N=B

Section 2: Environmental Tools and Invasive Species

Environmental Tools	Invasive Species
Animal Identification Tags	Asian Longhorned Beetle
Aquatic Net	Beech Leaf Disease/Beech Bark Disease
Biltmore Stick	Emerald Ash Borer
Binoculars	Eurasian Milfoil
Bird Identification Bands	Giant Hogweed
Bottom Dredges	Garlic Mustard
Breast Height Diameter Tape	Oak Wilt Disease
Fish Measuring Board	Phragmites
GPS Unit	Purple Loosestrife
Increment Tree Borer	Ruffe
Mammal Traps	Round Goby
Minnow Seine Net	Rusty Crayfish
Plankton Net	Sea Lamprey
Secchi Disk	Spiny Water Flea
Thermometer	Thousand Cankers Disease
Water Bottle Samplers	Woolly Adelgid
Water Meter for pH and D.O.	Zebra Mussel

Answer the questions below as they relate to the specimen provided (picture or sample).

Questions 61-65. This environmental tool is an example of a: **A:** Secchi Disk, **B:** Thermometer, **C:** Water Bottle Sampler, **D:** Water Meter for pH and D.O., **E:** Aquatic Net

Questions 66-70. This environmental tool is an example of a: **A:** Bottom Dredge, **B:** Fish Measuring Board, **C:** Plankton Net, **D:** Minnow Seine Net, **E:** Binoculars

Questions 71-75. This environmental tool is an example of a: **A:** Mammal Trap, **B:** Animal Identification Tag, **C:** Bird Identification Tag, **D:** GPS Unit, **E:** Biltmore Stick

Questions 76-80. This environmental tool is an example of a: **A:** Breast Height Diameter Tape, **B:** Increment Tree Borer, **C:** GPS Unit, **D:** Biltmore Stick, **E:** Plankton Net

81. This invasive specimen is an example of: **A:** Giant Hogweed, **B:** Garlic Mustard, **C:** Phragmites, **D:** Purple Loosestrife, **E:** Eurasian Milfoil

82. This invasive specimen is an example of: **A:** Giant Hogweed, **B:** Garlic Mustard, **C:** Phragmites, **D:** Purple Loosestrife, **E:** Eurasian Milfoil

83. This invasive specimen is an example of: **A:** Ruffe, **B:** Round Goby, **C:** Rusty Crayfish, **D:** Spiney Water Flea, **E:** Oak Wilt Disease

84. This invasive specimen is an example of: **A:** Ruffe, **B:** Round Goby, **C:** Rusty Crayfish, **D:** Spiney Water Flea, **E:** Thousand Cankers Disease

85. This invasive specimen is an example of: **A:** Ruffe, **B:** Round Goby, **C:** Rusty Crayfish, **D:** Beech Leaf Disease/Beach Bark Disease, **E:** Zebra Mussel

Section 3: Ecosystem Analysis Questions

Ecosystem Analysis	
A. Characteristics of the Site (Take the entire site into consideration)	
91. The site is more…	A=rural, B=urban
92. The site shows signs of environmental degradation due to human population pressure.	A=true, B=false
93. Does the natural environment appear to be A, complex (diverse) or B simple (fragile)?	A=complex, B=simple
94. In terms of biodiversity, is the site A, productive (much life and growth, both flora and fauna) or B, low (life and growth appear to be thin, sparse, or weak)?	A=productive, B=low
95. Land use demands by people (on the site, around the site nearby, or in approximation to the site) is A, heavy or B, light.	A=heavy, B=light
96. Present land use is A, more agriculture or B, more natural (non-agricultural).	A=agriculture, B=natural
97. The primary function of the site appears to be A, protective (no development for people) or B, multiple use.	A=protective, B=multiple use
B. Site Production or Potential	
98. Food and feed (agricultural, for human or livestock)	A=yes, B=no
99. Wood (for lumber or fuel)	A=yes, B=no
100. Mining or drilling (for minerals, coal or oil)	A=yes, B=no
101. Wildlife habitat (from some or all of it)	A=yes, B=no
102. Erosion control (evidence of erosion control intentionally put into place to conserve soil)	A=yes, B=no
103. Watershed management (controlling brush and vegetation, dredging, expanding, or developing)	A=yes, B=no
104. Should this site be greenbelt zoned	A=yes, B=no
105. Aesthetic value	A=yes, B=no
106. Waste disposal	A=yes, B=no
107. Transportation	A=yes, B=no
108. Industrial production (Industrial)	A=yes, B=no
109. Supply and service (e.g., Park)	A=yes, B=no
110. Water Supply	A=yes, B=no
111. Landfill	A=yes, B=no
C. Signs of Environmental Quality	
112. Soil erosion evident	A=yes, B=no
113. Plant life sickly and sparse	A=yes, B=no
114. Air pollution noticeable	A=yes, B=no
115. Evidence of animal's present (wildlife, mammals or birds)	A=yes, B=no
116. Water pollution noticeable	A=yes, B=no
117. Storm sewers or ditches overloaded	A=yes, B=no
118. Swamp areas maintained (left alone or unaltered, not filled in)	A=yes, B=no
119. Solid waste is a problem (litter)	A=yes, B=no
120. People pressure is heavy (crowded, heavily used)	A=yes, B=no
121. The color of the site has the potential to be mostly green	A=yes, B=no

Section 4: GPS

See the GPS question document provided as part of the packet of materials. ***Start with question 151 on the Scantron***. Note that the questions may NOT go to 180.

Section 5: Water Quality Questions

Given the location of the water source provided on your map and at the contest location, students will answer the following questions. This section is worth 60 points.

Raw Scr 1. What type of surface water is most consistent at this site (10 Points)?

100 - Lake or pond; **101** - River or stream; **102** - Swamp or bog; **103** – Drainage Ditch; or **104** – Groundwater

Given the following characteristics of stream location, answer the following questions.

Parameter	Sample 1	Sample 2	Sample 3	Sample 4
Temperature	15°C	10°C	23°C	14°C
Alkalinity	30 mg/L	150 mg/L	150 mg/L	125 mg/L
Total Phosphate	.03 mg/L	.06 mg/L	.08 mg/L	.1 mg/L
Dissolved Oxygen	6 mg/L	2.5 mg/L	8.1 mg/L	8.7 mg/L
pH	4.2	8.2	8.8	7.0

Raw Scr 2. Based on the table above, which sample most likely came from groundwater?

201. Sample 1
202. Sample 2
203. Sample 3
204. Sample 4
205. None of the above

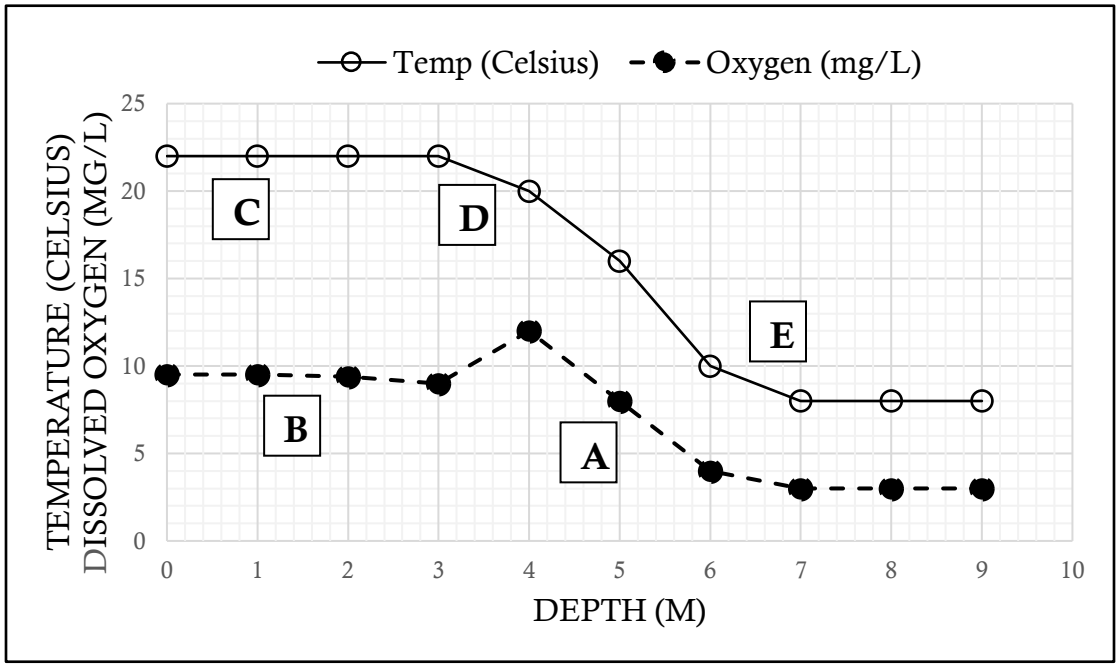
Raw Scr 3. The pH of Sample 1, would most likely be considered? (10 Points)

301. A neutral pH
302. An alkaline pH
303. An acidic pH

Raw Scr 4. Which sample could support a healthy coldwater fish population?

401. Sample 1
402. Sample 2
403. Sample 3
404. Sample 4
405. None of the above

Given the following graph of a lake profile in Michigan:



Raw Scr 5. The change in temperature between letters ____ and ____ meters is about ____degrees in Fahrenheit (note: temperature on graph is in Celsius)? (10 Points)

501. 11
502. 14
503. 18
504. 25
505. 28

Raw Scr 6. Which letter above represents the hypolimnion in this stratified lake (10 Points)?

601. A
602. B
603. C
604. D
605. E

Section 6: Fish and Aquatic Organism List

Choose the answer and record the 3-digit number that corresponds to that answer in the appropriate place on the Scantron Scoresheet (***Questions 1-25***).

Aquatic Insects	**Fish**
101. Amphipod (Scud)	201. Blue Catfish
102. Caddisfly Larva	202. Bluegill/Sunfish
103. Cranefly Larva	203. Brook Trout
104. Crayfish	204. Brown Trout
105. Dobsonfly Larva	205. Channel Catfish
106. Dragonfly Larva	206. Crappie
107. Giant Water Bug	207. Flathead Catfish
108. Leech	208. Largemouth Bass
109. Mayfly Larva	209. Muskie
110. Midge Larva	210. Northern Pike
111. Pill Clam (Fingernail Clam)	211. Perch
112. Pouch Snail	212. Salmon
113. Predaceous Diving Beetle	213. Smallmouth Bass
114. Predaceous Diving Beetle Larva	214. Sturgeon
115. Riffle Beetle	215. Walleye
116. Stonefly Larva	216. Yellow Bullhead Catfish
117. Water Boatman	
118. Water Penny	
119. Water Scorpion	
120. Water Strider	

Section 7: Plant and Tree List

Choose the answer and record the 3-digit number that corresponds to that answer in the appropriate place on the Scantron Scoresheet (***Questions 26-50***).

Plants	**Trees**
301. Black Nightshade	401. Ash
302. Bracken Fern	402. Aspen
303. Burdock	403. Balsam Fir
304. Cattails	404. Black Cherry
305. Clover	405. Box Elder
306. Crabgrass	406. Eastern Red Cedar
307. Dandelions	407. Elm
308. Giant Foxtail	408. Hemlock
309. Golden Rod	409. Jack Pine
310. Johnson's Grass	410. Maple
311. Lambs quarter	411. Red Oak
312. Milkweed	412. Shagbark Hickory
313. Mullein	413. Sycamore
314. Nettles	414. Tamarack
315. Poison Ivy	415. Walnut
316. Poison Sumac	416. White Birch
317. Pond Lily	417. White Cedar
318. Switchgrass	418. White Pine
319. Thistles	419. White Oak
320. Velvet Leaf	420. White Spruce
321. Wild Raspberries	421. Willow
322. Wild Strawberries	422. Yellow Birch

Section 8: Animal and Bird List

Choose the answer and record the 3-digit number that corresponds to that answer in the appropriate place on the Scantron Scoresheet (***Questions 51-75***).

Wildlife	**Birds**
501. Badger	601. Bald Eagle
502. Beaver	602. Belted Kingfisher
503. Black Bear	603. Blue Jay
504. Bobcat	604. Canadian Goose
505. Chipmunk	605. Cardinal
506. Cottontail	606. Common Loon
507. Coyote	607. Cooper's Hawk
508. Deer Mouse	608. Eastern Bluebird
509. Elk	609. Evening Grosbeak
510. Fisher	610. Goldfinch
511. Fox Squirrel	611. Great Blue Heron
512. Gray Fox	612. Great Horned Owl
513. Gray Squirrel	613. Kestrel
514. Gray Wolf	614. Kirtland Warbler
515. Kangaroo Mouse	615. Mallard Duck
516. Mink	616. Mute Swan
517. Mole	617. Osprey
518. Moose	618. Pileated Woodpecker
519. Muskrat	619. Piping Plover
520. Opossum	620. Purple Martin
521. Otter	621. Quail
522. Pine Martin	622. Red-Tailed Hawk
523. Porcupine	623. Red-Winged Blackbird
524. Raccoon	624. Ring-Necked Pheasant
525. Red Fox	625. Ruffled Grouse
526. Snowshoe Hare	626. Sand Hill Crane
527. Skunk	627. Sharp-tailed Grouse
528. Weasel	628. Trumpeter Swan
529. White-tailed Deer	629. Wild Turkey
530. Woodchuck	630. Wood Duck

Section 9: Reptile and Amphibian List

Choose the answer and record the 3-digit number that corresponds to that answer in the appropriate place on the Scantron Scoresheet (***Questions 76-100***).

Reptiles and Amphibians	
701. Black Rat Snake	722. Green Frog
702. Blanchard's Cricket frog	723. Green Snake
703. Blanding's Turtle	724. Gray Tree Frog
704. Blue Racer	725. Kirtland's Snake
705. Blue Spotted Salamander	726. Marbled Salamander
706. Box Turtle	727. Mink Frog
707. Brown Snake	728. Mudpuppy
708. Bull Frog	729. Northern Leopard Frog
709. Butler's Garter Snake	730. Northern Red Bellied Snake
710. Common Map Turtle	731. Northern Spring Peeper
711. Common Musk Turtle	732. Painted Turtle
712. Common Snapping Turtle	733. Queen Snake
713. Eastern American Toad	734. Western Lesser Siren
714. Eastern Garter Snake	735. Red-Backed Salamander
715. Eastern Hog-Nosed Snake	736. Red-Eared Slider
716. Eastern Milk Snake	737. Small-Mouth Salamander
717. Eastern Massasauga Rattlesnake	738. Spiny Soft-Shelled Turtle
718. Eastern Newt	739. Spotted Salamander
719. Eastern Tiger Salamander	740. Spotted Turtle
720. Four Toed Salamander	741. Western Chorus Frog
721. Fowler's Toad	742. Wood Turtle

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