



NATIONAL
FFA ORGANIZATION

Environmental and Natural Resources Handbook

2017-2021

Purpose

To foster cooperation and teamwork and provide a natural resource education experience for participants. Five member teams are tested on their basic knowledge in soils, aquatics, wildlife, forestry, plus a current topic, which changes each year. Additionally, the purpose of the event is to promote natural resource education in a manner that succeeding generations will be more environmentally literate, with the skills and knowledge to make informed decisions regarding the environment.

Objectives

Participant will demonstrate their knowledge of:

- The effect individual actions have on environmental problems.
- The interactions and interdependencies of our environment.
- Current environmental issues.
- The agencies available to assist in resource protection matters.
- The need to become environmentally aware and action orientated adults.

Event Rules

1. A chapter team consists of four members. All four members will be scored individually and the top three scores will count towards the total team score. The total team score is comprised of the three top members' exam and practicum scores.
2. Under no circumstance will any participant be allowed to handle any of the items in the identification portion of the practicum. Any infraction of this rule will be sufficient to eliminate the entire team from the event.
3. Participants will be assigned to a group leader to escort them to various event-staging sites. Each participant is to stay with his or her assigned group leader throughout the event or until told to change by the event superintendent.
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. All written material will be furnished for the event. No written materials such as tests, problems and worksheets shall be removed from the site.

Event Format

1. Objective Written Exam General Knowledge Examination (100 pts.)
 - Fifty objective-type multiple-choice questions will be written that cover the areas the in the event objectives. This phase of the event will test participants' knowledge and understanding of basic biological and scientific principles of environmental science and natural resource management. Each participant will be allowed 45 minutes to complete this phase of the event. Each answer has a value of two points.
2. Identification of Material Identification of Plant Materials (90 pts.)
 - Thirty specimens from the Identification List (included with the scorecard) will be displayed for participants to identify. Each specimen will be designated by a number. Three points will be awarded for each specimen that is correctly identified. Each participant will be allowed 45 minutes to complete this phase of the event.
3. Individual Practicums (300 points)
 - Each participant will be allowed 30 minutes to complete each of the three selected practicums.

EQUIPMENT

Materials student must provide - Each participant must have a clean, free of notes clipboard, two sharpened No. 2 pencils, and an electronic calculator. Calculators used in this event should be battery operated, non-programmable, and silent with large keys and large displays. Calculators should have only these functions- addition, subtraction, multiplication, division, equals, percent, square root, +/- key, and one memory register. No other calculators are allowed to be used during the event.

Equipment provided - All other tools and equipment will be furnished for the event. Participants must use the tools and equipment furnished at the event.

PRACTICUMS

Rotational Practicums - Students will participate in three of the four of the following practicums each year. Practicums may vary from year to year. Water Practicums will be used on even years and Soil Practicums on odd years. GPS Locations and Site Analysis will be used every year.

a. Water Analysis - (100 points)

1. Using measuring devices provided at the event, each participant will measure a sample of water for quality analysis. Four of the following categories will be tested each year: dissolved oxygen, nitrates, nitrites, pH, temperature, phosphates, water hardness, chlorine and ammonia.
2. Analyze the results of measurements and determine if it is suitable for a specific use.
3. Answer questions using the data collected about water quality and limiting factors.

b. Soil Nutrient Test - (100 points)

1. Students will be furnished with a scorecard, an interpretation guide and a pre-dug soil pit or core/monolith to judge. The participants will identify soil horizons, textures, percentage coarse fragments, pH, horizon colors, slope, geologic origin, soil permeability, irrigation suitability and soil structure types of the soil present in the given example.
2. Using the information from the scorecard and interpretation guide, the student will then identify the most appropriate use for the given area and the erosion control practice that best fits the designated use for the land.

c. GPS Locations - (100 points)

1. Students will be furnished with a Global Positioning System (GPS) unit and a map with points identified in longitude and latitude.
2. Using the GPS unit, participant will be required to walk and locate certain points.
3. Participants will then record a predetermined identification mark located at each point.
4. Participants shall know how to read longitude and latitude numbers, how to use a GPS unit and understand differential corrections.

d. Environmental Analysis - (100 points) - Students will address the following five aspects:

1. Living Organisms - students will identify and list as many living organisms (both native and invader) as they can find within the marked boundaries of the site. Additional species may be artificially introduced as mounted or preserved specimens.
2. Non-living components (shelter, nutrients) – students will inventory resources such as water, shelter, etc. upon which resident species depend for survival.
3. Food Web - students will define relationships among the plants and animal species that are found or introduced in the study area.
4. Ecological Succession - students will identify the stages of succession of various grasses, shrubs and trees. They will also identify causes of changes in succession patterns.
5. Situation Analysis - students will determine whether a healthy balance exists between the environment and the native species that depend upon it. They will also check remediation practices where needed.

TIEBREAKER

1. Team with the highest individual score
2. Individual on the highest team,
3. Total practicum scores
4. Identification practicum

References

This list of references is not intended to be all-inclusive.

Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The following list contains references that may prove helpful during event preparation.

- For past materials and preparation documents log onto [FFA.org](https://www.ffa.org)
- Managing Our Natural Resources. Camp and Daughtery. Delmar Publishers, Inc. 2009. Albany NY.
- Land Judging in Oklahoma. J.H. Stiegler, 4-H Member's Guide, Oklahoma Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources, Oklahoma State University. 4H.HPS.101
- Environmental Science: Fundamentals and Applications. Cengage learning. 2007
- Applied Environmental Science: <https://www.ffa.org/thecouncil/resources>

Identification List

Equipment

Water Quality

1. refractometer
2. secchi disk
3. thermometer
4. water bottle samplers
5. water meter for physical/chemical parameters (pH, conductivity, and/or DO)

Aquatic

6. aquatic net
7. bottom dredges
8. fish measuring board
9. plankton net
10. seines
11. sieves
12. stream bottom sampler

Wildlife

13. binoculars
14. mammal traps
15. snake/reptile stick
16. radiotelemetry unit
17. animal tags/bands

Geographical

18. GPS unit

Weather

19. barometer
20. sling psychrometer
21. rain gauge
22. wind speed meter

Forestry

23. biltmore stick
24. diameter tape
25. prism
26. tree increment borer

Native Species

Wildlife

27. bighorn sheep
28. badger
29. beaver
30. bison
31. black bear

32. bobcat
33. chipmunk
34. cottontail
35. coyote
36. elk
37. Columbia ground squirrel
38. gray squirrel
39. gray wolf
40. grizzly bear
41. jack rabbit
42. mole
43. moose
44. mountain goat
45. mountain lion
46. muskrat
47. opossum
48. porcupine
49. pronghorn
50. raccoon
51. red fox
52. skunk
53. weasel
54. whitetail deer
55. yellow bellied marmot
56. mule deer

Birds

1. bald eagle
2. blue jay
3. Canada goose
4. Cooper's hawk
5. great horned owl
6. great blue heron
7. golden eagle
8. kestrel
9. mallard duck
10. sage grouse
11. sharptail grouse
12. ruffed grouse
13. blue grouse
14. morning dove
15. mountain bluebird
16. osprey
17. purple martin
18. quail
19. red-tailed hawk
20. turkey
21. white pelican
22. wood duck

Reptiles/Amphibians

22. bullfrog
23. collared lizard
24. fence lizard
25. garter snake
26. rubber boa snake
27. rattlesnake

Fish & Other Aquatic Animals

28. bream/bluegill
29. channel catfish
30. crappie
31. crayfish
32. bull trout
33. largemouth bass
34. Chinook salmon
35. smallmouth bass
36. sturgeon
37. rainbow trout
38. walleye
39. bullhead catfish
40. brook trout

41. cutthroat trout
42. grayling

Invasive/Non-Native Species*Plants*

43. rush skeletonweed
44. spotted knapweed
45. eurasian milfoil
46. yellow starthistle
47. leafy spurge
48. purple loosestrife

Animals

49. brown trout
50. carp
51. chukkar
52. English sparrow
53. European starling
54. ring neck pheasant
55. zebra mussel
56. Eurasian collared dove

**ENVIRONMENTAL AND NATURAL RESOURCES
CAREER DEVELOPMENT EVENT SCORECARDS**

ENVIRONMENTAL AND NATURAL RESOURCES IDENTIFICATION SCORECARD

PARTICIPANT NUMBER _____

Directions: Identify plant specimens by matching the correct plant number from list provided to the sample spaces below.

1.	16.
2.	17.
3.	18.
4.	19.
5.	20.
6.	21.
7.	22.
8.	23.
9.	24.
10.	25.
11.	26.
12.	27.
13.	28.
14.	29.
15.	30.

SCORING DIRECTIONS:

Each identification is worth 3 points. Deduct the total incorrect from 90 points possible and record the final score at the bottom of the card.

SCORE: _____

SOIL NUTRIENT TEST SCORECARD

Your job today is to take a soil sample from the given area. You will need to run an analysis to determine the levels of nitrogen, phosphorus, potassium and pH. Using these results you will also need to use the given Extension Service crop sheet and make a recommendation for the amount and type of fertilizer that should be added to grow the designated crop.

Category	Level	Possible Points	Score
Nitrogen		25	
Potassium		25	
pH		20	
Fertilizer Recommendations:		30	
	Total Score:	100	

WATER ANALYSIS SCORECARD

Your job today is to analyze the given water sample. You will need to find the given levels of dissolved oxygen, nitrates, pH and the current temperature. Using this information you will need to describe the effects on the environment, limiting factors and discuss ways that water quality can be improved.

CATEGORY	ANSWERS	POSSIBLE POINTS	SCORE
PH		10	
Dissolved Oxygen		10	
Nitrates		10	
Temperature		10	
Effects on the Environment:	XXXXXXXXXXXXXXXXXXXX XX	20	
Limiting Factors:	XXXXXXXXXXXXXXXXXXXX XX	20	
How can Water Quality be improved?		20	
	Total Score:	100	

GPS LOCATION SCORECARD

List your numbers for each location point following the latitude and longitude given. Note: Variance for differential corrections are noted on condition sheet.			
LOCATION POINT	POINT NUMBER	POSSIBLE POINT	SCORE
1		20	
2		20	
3		20	
4		20	
5		20	
		<i>Total Points: 100</i>	

ENVIRONMENTAL ANALYSIS SCORECARD

Your assignment is to analyze the given ecosystem with the following four aspects in mind:

QUESTION	POSSIBLE POINTS	SCORE
Identify and list as many organisms (both native and invader) that can be found within the marked boundaries of this site.	20	
Identify and list all non-living components found with the marked site.	20	
Describe the food web presented in this marked ecosystem.	20	
Identify the stages of succession of various grasses, shrubs and trees.	20	
Determine whether a healthy balance exists and recommend remediation where needed.	20	
Total Score:	100	

