



Environmental and Natural Resources Handbook

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

Participants 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 students 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 for use 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, participants 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*
- *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>

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

Environmental & Natural Resources CDE

Material Identification List

| Equipment | | Wildlife | | Reptiles/Amphibians | |
|-----------|--|---|--------------------------|------------------------------------|------------------------|
| | | 136 | Bighorn sheep | 186 | Bullfrog |
| | Water Quality | 137 | Badger | 187 | Collared Lizard |
| 100 | Refractometer | 138 | Beaver | 188 | Fence Lizard |
| 101 | Secchi Disk | 139 | Bison | 189 | Garter Snake |
| 102 | Thermometer | 140 | Black bear | 190 | Rubber Boa Snake |
| 103 | Turbidity Tube (for stream turbidity) | 141 | Bobcat | 191 | Rattle Snake |
| 104 | Water Bottle Samplers | 142 | Chipmunk | | |
| 105 | Water Meter for physical/chemical parameters (pH, conductivity, and/or DO) | 143 | Cottontail | | |
| | | 144 | Coyote | Birds | |
| | Aquatic | 145 | Columbia Ground Squirrel | 192 | Bald Eagle |
| 106 | Aquatic Net | 146 | Elk | 193 | Blue Jay |
| 107 | Bottom Dredges | 147 | Gray Squirrel | 194 | Blue Grouse |
| 108 | Fish Measuring Board | 148 | Gray Wolf | 195 | Canada Goose |
| 109 | Plankton Net | 149 | Grizzly Bear | 196 | Cooper's Hawk |
| 110 | Seines | 150 | Jackrabbit | 197 | Crow |
| 111 | Sieves | 151 | Mole | 198 | Great Horned Owl |
| 112 | Stream Bottom Sampler | 152 | Moose | 199 | Great Blue Heron |
| | | 153 | Mountain Goat | 200 | Golden Eagle |
| | Wildlife | 154 | Mountain Lion | 201 | Kestrel |
| 113 | Animal Tags/Bands | 155 | Mule Deer | 202 | Magpie |
| 114 | Mammal Traps | 156 | Muskrat | 203 | Mallard Duck |
| 115 | Snake/Reptile Stick | 157 | Opossum | 204 | Mourning Dove |
| 116 | Radio Telemetry Unit | 158 | Pine Martin | 205 | Mountain Bluebird |
| | | 159 | Porcupine | 206 | Osprey |
| | Geographical | 160 | Pronghorn | 207 | Pintail Duck |
| 117 | GPS unit | 161 | Raccoon | 208 | Purple Martin |
| | | 162 | Red fox | 209 | Quail |
| | Weather | 163 | River otter | 210 | Raven |
| 118 | Barometer | 164 | Skunk | 211 | Red Tailed Hawk |
| 119 | Rain Gauge | 165 | Weasel | 212 | Ruffed Grouse |
| 120 | Sling Psychomotor | 166 | Whitetail Deer | 213 | Sage-Grouse |
| 121 | Wind Speed Meter | 167 | Yellow Bellied Marmot | 214 | Sharp-Tail Grouse |
| | | | | 215 | Turkey |
| | Forestry | Fish & Other Aquatic Animals | | 216 | White Pelican |
| 122 | Biltmore Stick | 168 | Bream/Bluegill | 217 | Wood Duck |
| 123 | Diameter Tape | 169 | Brook Trout | | |
| 124 | Prism | 170 | Bull Trout | Invasive/Non-Native Species | |
| 125 | Tree Increment Borer | 171 | Bullhead Catfish | Plants | |
| | | 172 | Channel Catfish | 218 | Eurasian Milfoil |
| | Native Species | 173 | Chinook Salmon | 219 | Leafy Spurge |
| | | 174 | Crappie | 220 | Purple Loosestrife |
| | Plants | 175 | Crayfish | 221 | Rush Skeleton Weed |
| 126 | Big Sagebrush | 176 | Cutthroat Trout | 222 | Spotted Knapweed |
| 127 | Arrowleaf Balsamroot | 177 | Grayling | 223 | Yellow Star-thistle |
| 128 | Bluebunch Wheatgrass | 178 | Kokanee Salmon | | |
| 129 | Coyote Willow | 179 | Largemouth Bass | Animals | |
| 130 | Nebraska Sedge | 180 | Mountain White Fish | 224 | Asiatic Clams |
| 131 | Smooth Brome | 181 | Rainbow Trout | 225 | Brown Trout |
| 132 | Downy Brome (aka cheatgrass) | 182 | Smallmouth Bass | 226 | Carp |
| 133 | Rabbitbrush (rubber or green rabbitbrush) | 183 | Sturgeon | 227 | Chukar |
| 134 | Antelope Bitterbrush | 184 | Walleye | 228 | English Sparrow |
| 135 | Baltic Rush | 185 | Yellow Perch | 229 | European Starling |
| | | | | 230 | Eurasian Collared Dove |
| | | | | 231 | Ring Neck Pheasant |
| | | | | 232 | Zebra Mussel |

Environmental & Natural Resources CDE

Participant Name: _____ Chapter: _____

Participant Number: _____ Team Number: _____

Material Identification Optional Worksheet

Directions: This worksheet is to assist participants to track identification of material items at 30 stations. Identify each item and enter the name and number from the Material Identification List in the spaces below. Enter final answers on the bubble scoresheet provided for the event.

| | |
|-----|-----|
| 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: _____

Environmental & Natural Resources CDE

Participant Name: _____ Chapter: _____

Participant Number: _____ Team Number: _____

Water Quality Score Card

Your job today is analyzing the given water sample. You will need to determine the concentration of oxygen, turbidity, pH, and determine the temperature. Using this information indicate if the water quality is suitable for _____ (this will be provided on day of analysis). Indicate the potentially limiting factor(s) and explain ways the water quality can be improved. (Each year, four of the categories listed in the National handbook will be tested).

| Category | Answer | Possible Points | Score |
|------------------------------------|--------|-----------------|-------|
| pH | | 10 | |
| Dissolved Oxygen | | 10 | |
| Turbidity | | 10 | |
| Temperature | | 10 | |
| Effect on Specific Setting | | 20 | |
| Limiting Factors | | 20 | |
| How can Water Quality be Improved? | | 20 | |
| Total Score | | 100 | |

Environmental & Natural Resources CDE

Participant Name: _____ Chapter: _____

Participant Number: _____ Team Number: _____

Soil Practicum Score Card – Part 1

| PART 1 (80 POINTS) | | | |
|--------------------------------------|---|--------------------------------------|---|
| Soil Factors (Check Appropriate Box) | | Soil Factors (Check Appropriate Box) | |
| Points | | Points | |
| | <p>Location in Landscape</p> <ul style="list-style-type: none"> <input type="checkbox"/> Mountain/Hill <input type="checkbox"/> Alluvial fan <input type="checkbox"/> Terrace <input type="checkbox"/> Flood Plain/Basin <input type="checkbox"/> Flat/Low Rolling Plain <input type="checkbox"/> Playa <input type="checkbox"/> Dunes <p>% Bare Ground on soil surface</p> <ul style="list-style-type: none"> <input type="checkbox"/> Little (0-25%) <input type="checkbox"/> Significant (26-50%) <input type="checkbox"/> Abundant (51-75%) <input type="checkbox"/> Dominant (76-100%) <p>Slope</p> <ul style="list-style-type: none"> <input type="checkbox"/> Nearly Level 0-1% <input type="checkbox"/> Gently Sloping..... 1-3% <input type="checkbox"/> Moderate Sloping ... 3-5% <input type="checkbox"/> Strongly Sloping 5-8% <input type="checkbox"/> Steep..... 8-15% <input type="checkbox"/> Very Steep..... > 15% <p>Depth of Topsoil (O+A Horizon)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Very Shallow (<3 inches) <input type="checkbox"/> Shallow (3 to 6 inches) <input type="checkbox"/> Moderately Deep (6 to 9 inches) <input type="checkbox"/> Deep (> 9 inches) <p>Depth of Soil to restricting layer</p> <ul style="list-style-type: none"> <input type="checkbox"/> Very Shallow (<10 inches) <input type="checkbox"/> Shallow (10 to 20 inches) <input type="checkbox"/> Deep (>20 inches) | | <p>Texture of Topsoil</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sand <input type="checkbox"/> Loamy Sand <input type="checkbox"/> Sandy Loam <input type="checkbox"/> Loam <input type="checkbox"/> Silt Loam <input type="checkbox"/> Clay Loam <input type="checkbox"/> Sandy Clay Loam <input type="checkbox"/> Silty Clay Loam <input type="checkbox"/> Sandy Clay <input type="checkbox"/> Clay and Silty Clay <p>Percent Course Rock Fragment</p> <ul style="list-style-type: none"> <input type="checkbox"/> None to Slight (0-15%) <input type="checkbox"/> Moderate (16-35%) <input type="checkbox"/> Considerable (36-60%) <input type="checkbox"/> Extreme (>60%) <p>Permeability</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rapid <input type="checkbox"/> Moderate <input type="checkbox"/> Slow <input type="checkbox"/> Very slow |

Soil Practicum Score Card – Part 2

| PART 2 (20 POINTS) | |
|--|---|
| Recommended Conservation Treatment – Part 2 (Check Appropriate Box) | |
| Points | |
| | <p>Vegetative</p> <ul style="list-style-type: none"> <input type="checkbox"/> 1. Row crop/occasional soil conserving crop <input type="checkbox"/> 2. Row crop/frequent soil conserving crop <input type="checkbox"/> 3. Row crops not more than 2 out of 4 years <input type="checkbox"/> 4. Row crops not more than 1 out of 5 years <input type="checkbox"/> 5. Return crop residue to the soil <input type="checkbox"/> 6. Practice conservation tillage <input type="checkbox"/> 7. Establish recommended grass or grasses and legumes <input type="checkbox"/> 8. Proper pasture and range management <input type="checkbox"/> 9. Protect from burning <input type="checkbox"/> 10. Control grazing <input type="checkbox"/> 11. Plant recommended trees <input type="checkbox"/> 12. Harvest trees selectively <input type="checkbox"/> 13. Use only for wildlife or recreation area <p>Mechanical</p> <ul style="list-style-type: none"> <input type="checkbox"/> 14. Control brush or trees <input type="checkbox"/> 15. Terrace and farm on contour <input type="checkbox"/> 16. Maintain terraces <input type="checkbox"/> 17. Construction diversion terraces <input type="checkbox"/> 18. Install drainage system <input type="checkbox"/> 19. Control gullies <input type="checkbox"/> 20. No mechanical treatment needed |

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Participant Number: _____ Team Number: _____

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 | |

Environmental & Natural Resources CDE

Participant Name: _____ Chapter: _____

Participant Number: _____ Team Number: _____.

GPS Location Scorecard

| List your numbered findings for each location point following the latitude and longitude given. | | | | |
|---|------------------------|--|-------------------|-------|
| Location Point | Point (or Flag) Number | | Possible Points | Score |
| | | | 20 | |
| | | | 20 | |
| | | | 20 | |
| | | | 20 | |
| | | | 20 | |
| | | | Total Points= 100 | |

Map of Site - will be distributed at contest stie.

