

Environmental and Natural Resources CDE

(rev. March-2023)

Purpose

The purpose of the environmental and natural resource career development event is to foster student interest, promote environmental and natural resource instruction in the agricultural education curriculum and provide recognition for those who have demonstrated skills and competencies as a result of environmental and natural resource instruction.

Eligibility

This event is open to all high school FFA chapters and FFA members in good standing. Members that have participated in a previous national event or previous state winning teams in this area are ineligible.

This event will be held during the Delaware Envirothon.

Event Procedures

- A. Each team for Delaware Envirothon will be comprised of five members. Four of those members must be declared ahead of time as the FFA team. All four scores will be used to determine the total team score.
- B. **Final team registration** must be made by the **predetermined date selected for that year. See the current date on the website (www.delawareenvirothon.org)**. This will require the naming of five (5) team members and alternates. Teams not registered by this deadline cannot participate in the *State Competition*. *The registration form should be type-written or printed to prevent misspelling of names, etc.* Your Team name must include “FFA” in along with the school name.
- C. 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.
- D. Participants will be assigned to group leaders who will 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 leaders by the event superintendent.
- E. All participants will follow the rules of the Delaware Envirothon. Upon completion of the Envirothon event, a separate testing time will given for the FFA specific section of the Environmental and Natural Resources CDE.
- F. All written material will be furnished for the event. No written materials such as tests, problems and worksheets shall be removed from the site.
- G. Any participant in possession of any electronic device in the preparation room or in the CDE event area is subject to disqualification.
- H. During the State Challenge, only one test per team will be provided at each testing station.
- I. There will be a total possible 100 points scored for each discipline at each Ecostation. Scores will be in “whole” numbers.

J. Alternates are NOT be allowed to come to the Envirothon unless they are replacing a team member. If a team member becomes ill the day of the event, the team will be allowed to fully participate with only four members.

Event Format

- A. **EQUIPMENT PROVIDED:** Any special materials needed for the competition, such as identification keys or maps, will be provided by testing station coordinators. The Delaware Envirothon Planning Committee will provide participating teams with clipboards, writing implements, and calculators, if needed, during the State Challenge. Students are not to bring any of these devices, including backpacks, to the testing sites. Students may bring their oral presentation note cards with them.
- B. Delaware Envirothon Ecostation KSA’s :
 1. **Aquatic Ecology:**
 - Identify the processes/phases of the water cycle: evaporation, transpiration, condensation, precipitation, surface runoff and percolation
 - Analyze water supply issues, including the inter-action of competing human uses for drinking, agri-culture, industry, waste treatment, hydropower, navigation and recreation
 - Collect and interpret data from basic water quality tests, including: dissolved oxygen, pH, alkalinity, nitrates, turbidity and temperature, and understand how these parameters can influence aquatic community composition
 - Describe the effects of physical changes in water on the content of suspended gases (oxygen and carbon dioxide), and pH, and how this in turn im-pacts aquatic life
 - Understand the difference between surface water and groundwater, and issues relating to the quality and quantity of each available for use in Delaware
 - Contrast the locations, characteristics, and life forms typical of the following Delaware aquatic habitat types: Piedmont vs. Coastal Plain streams; tidal vs. nontidal marshes; Del-marva Bays vs. In-land Bays; Delaware River vs. Delaware Bay, and marine/estuarine/freshwater
 - Given a description of a type of aquatic habitat (i.e. polluted/non-polluted), identify kinds of organisms most likely to live there
 - Identify common fishes, amphibians, benthic macro-invertebrates and aquatic plants found in Delaware
 - Know what “anadromous” fish are, and the kinds of these that are important to Delaware’s fisher-ies
 - Describe the life cycle, ecological significance and human uses of Delaware Bay horseshoe crabs
 - Define what an Estuary is, and what makes it such a special/important part of our environment
 - Understand the concept of a watershed, how to delineate them on topographic maps, and the water quality/land use connections to which they relate
 - Distinguish between point and non-point source pollution, identify examples and sources of each, and describe strategies for their control
 - Describe the characteristics, functions and values of wet-lands, and how human activities relate to them

- Know the characteristics that distinguish a swamp from a marsh from a bog, and which of these and other wetland types are prominent in Delaware
- Understand the ecosystem concept as it applies to the aquatic realm and its important components (producers, consumers, decomposers, and plankton)
- Describe the process of biomagnification of pollutants, and be able to relate this to fish/ shellfish consumption bans and advisories
- Explain and give examples to show why we have regulations on the harvesting of fish and shellfish
- Identify the principal agencies, regulations, and laws responsible for protecting and managing our aquatic resources

2. Forestry:

- Understand the basic natural history of Delaware’s forests, including:
 - forest land use and ownership
 - the major forest type groups
 - forest products and productivity
- Be able to identify primary Delaware trees and shrubs without keys and with and without leaves
- Understand and use forest inventory techniques, including:
 - use of maps, aerial photographs, and compass
 - stand volume calculations
 - basal area calculations
- Understand forest ecology concepts and factors affecting them, including:
 - the relationship of soil and forest types
 - forest community associations
 - regeneration
 - competition
 - succession
- Understand basic forest management objectives and concepts, such as:
 - management of forests for multiple resources, including wildlife, forest products, and watershed protection
 - differences between clearcuts, shelterwood cuts, and group selection cuts
 - Forestry Best Management Practices
- Identify major pests (insects and diseases) of forests and understand their impact on the forest community
- Identify products that are derived from forests
- Understand the value of trees in urban communities and the factors affecting their health and survival
- Recognize local, state, and federal regulations that govern forest operations

3. Soil/Land-use:

- Recognize soil as an important dynamic resource
- Describe basic soil properties and soil formation factors
- Understand the importance of sedimentation in the formation of most Delaware soils
- Use the USDA Soil Survey to locate soil types and soil descriptions and understand what they mean
- Understand soil drainage classes and know how wetlands are defined by soil class in Delaware
- Determine basic soil properties and limitations such as mottling and permeability, by observing a soil pit or soil profile

- Identify types of soil erosion and discuss methods for reducing erosion
- Identify tools used by a soil scientist
- Utilize soils information in land use planning discussions
- Discuss how soil is a factor in or is impacted by nonpoint source pollution

4. Wildlife:

- Identify common wildlife species from mounted specimens, silhouettes, or pictures (Part of an animal may be shown instead of the whole animal.) Keys will be used for more extensive identification
- Identify common wildlife species based on wildlife sign. Sign can include animal fur, hair, feathers, gnawings, rubbings, pellets, and scat
- Answer questions concerning the natural history of wildlife species occurring in Delaware
- Identify wildlife species from natural history information
- Identify basic wildlife survival needs
- Describe specific adaptations of wildlife to their environment and role in the ecosystem
- Describe food chains and food webs and be able to identify examples
- Describe predator/prey relationships and be able to identify examples
- Describe factors that limit or enhance population growth
- Identify habitat requirement for specific species
- Evaluate a given habitat and select or list species most likely to live there
- Describe ways habitat can be improved for specific species by knowing their requirements
- Discuss concepts of carrying capacity and limiting factors
- Discuss how forestry practices can enhance or impact wildlife habitat
- Answer questions concerning hunting regulations and how they pertain to wildlife management
- Describe various ways people can help in the protection, conservation, management, and enhancement of wildlife populations
- Identify agencies responsible for providing the protection and management of wildlife resources
- Identify wildlife species that are listed as endangered or threatened and describe the main causes that have led to the depleted populations
- Describe major consequences of wetland destruction on wildlife
- Identify non-native wildlife species that have been introduced into Delaware accidentally and purposely
- Identify the most common carriers of rabies and lyme disease
- Describe the cause, transmission, and symptom of rabies and Lyme’s disease in people and wildlife

5. Air Quality:

- Define mobile sources and be familiar with the terms commonly used in mobile sources emissions discussions;
- Identify the categories of mobile sources and specific pollutants emitted from these sources;

- Explain the health and environmental impact of mobile source emissions;
- Calculate the CO₂ (Greenhouse Gas emissions) from mobile sources;
- Describe the characteristics and challenges of implementing local, regional and national mass transportation systems and smart growth strategies;
- Explain the ongoing development of alternate fuels and green vehicle technologies;
- Be aware of the career opportunities in transportation and green vehicle technologies; and
- Outline with the ongoing efforts of governments and the individual citizen to help control and reduce mobile source emissions.

6. Current Environmental Issue: Adapting to Climate Change

- Each year an additional topic is selected. This topic is covered in that year's specific Envirothon handbook and is also covered at the Envirothon Statewide trainings put on by the Delaware Association of Conservation Districts.

C. Rules for Team Presentation:

1. Index cards used as notes for the presentation are allowed, but may only be the small size (3" x 5"). The cards must be rubber banded with a top index card identifying the team name. The index cards must be turned in at registration along with the poster.
2. The length of the presentation should be between 7 and 10 minutes.
3. All team members must participate in the oral part of the presentation.

D. FFA Written Test:

A 50 question multiple choice test will be administered following all FFA teams completion of the Delaware Envirothon. The test is comprised of questions from the past 3 available years of National FFA Environmental and Natural Resources tests. An industry professional will select the questions and provide them to the Delaware FFA Association state staff at least 3 weeks prior to the event for review and preparation.

Scoring

FFA Team Score: Identified Rotation Scores + Individual Exam Scores+ team presentation scores)

-Must Identify students as one of the following rotations:

- A. Wildlife, Soils, Aquatics (Must include all three)
- B. Air Quality or 6th Topic (must select 1 or the other)

FFA Individual Score (Identified Rotation Score + FFA Test Score)

-FFA Test: 50 questions @ 4 points each with a maximum of 200 points earned

Tiebreakers

1. Team: If there is a tie score between two or more teams for first place, the Delaware Envirothon Planning Committee will use the Aquatic Ecology score as the tie-breaker and then the Forestry score, if further needed.
2. Individual:
 - Individual Exam
 - Wildlife Identification
 - Annual Topic: Oral Presentation
 - Random question picked off of exam

Awards

Awards will be presented to individuals and/or teams based upon their rankings at the State Fair FFA Awards Breakfast. The first place team will represent Delaware at National Convention.

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.

National FFA Core Catalog - CDE Questions and Answers
<http://shop.ffa.org/cde-qas-c1413.aspx>

Wildlife Science Manual Instructional CD-ROM: The Core Catalog, National FFA Organization product number CAERT-WSM. 888-332-2668 fax orders to 800-366-6556 or on line at <http://shop.ffa.org/wildlife-science-manual-cd-rom-p39980.aspx>

Environmental Science and Technology. Porter, Lee, Turner and Hillan. Interstate Publishers, Inc. 1997. PO Box 50 Danville, IL 61834-0050

Managing Our Natural Resources. Camp and Daughtery. Delmar Publishers, Inc. 1988. Albany NY.

Wildlife Management, Stutzenbaker, Scheil, Swan, Lee and Mattics, Interstate Publishers, Inc. 1999.

Natural Resources and Environmental Technology, Lee, Interstate Publishers, Inc. 2000.

Environmental Science for Agriculture and the Life Sciences. Albany, NY. Delmar Publishers 1994.

Our Natural Resources and Their Conservation. Kircher, H.B., Wallace, D.L., & Gore, D.J. Danville, IL. Interstate Publishers, Inc. 1992.

Soil Science: Evaluation, Interpretation, and Management of Soil. Columbia, MO. Instructional Materials Laboratory, University of Missouri, phone: 800-669-2465.

The Global Ecology Handbook. What You Can Do About the Environmental Crisis. Courson, W.H. (Ed.). Boston, MA. Beacon Press 1990.

Biological Science, an Ecological Approach. Dubuque, IA. Kendall Hunt Publishers, 1992

Introduction to Forestry Science. L.DeVere Burton. Delmar Publishers, 2000.

Agriscience & Technology. L. DeVere Burton. Delmar Publishers, 1992.

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

Delaware Envirothon. <http://www.delawareenvirothon.org/>