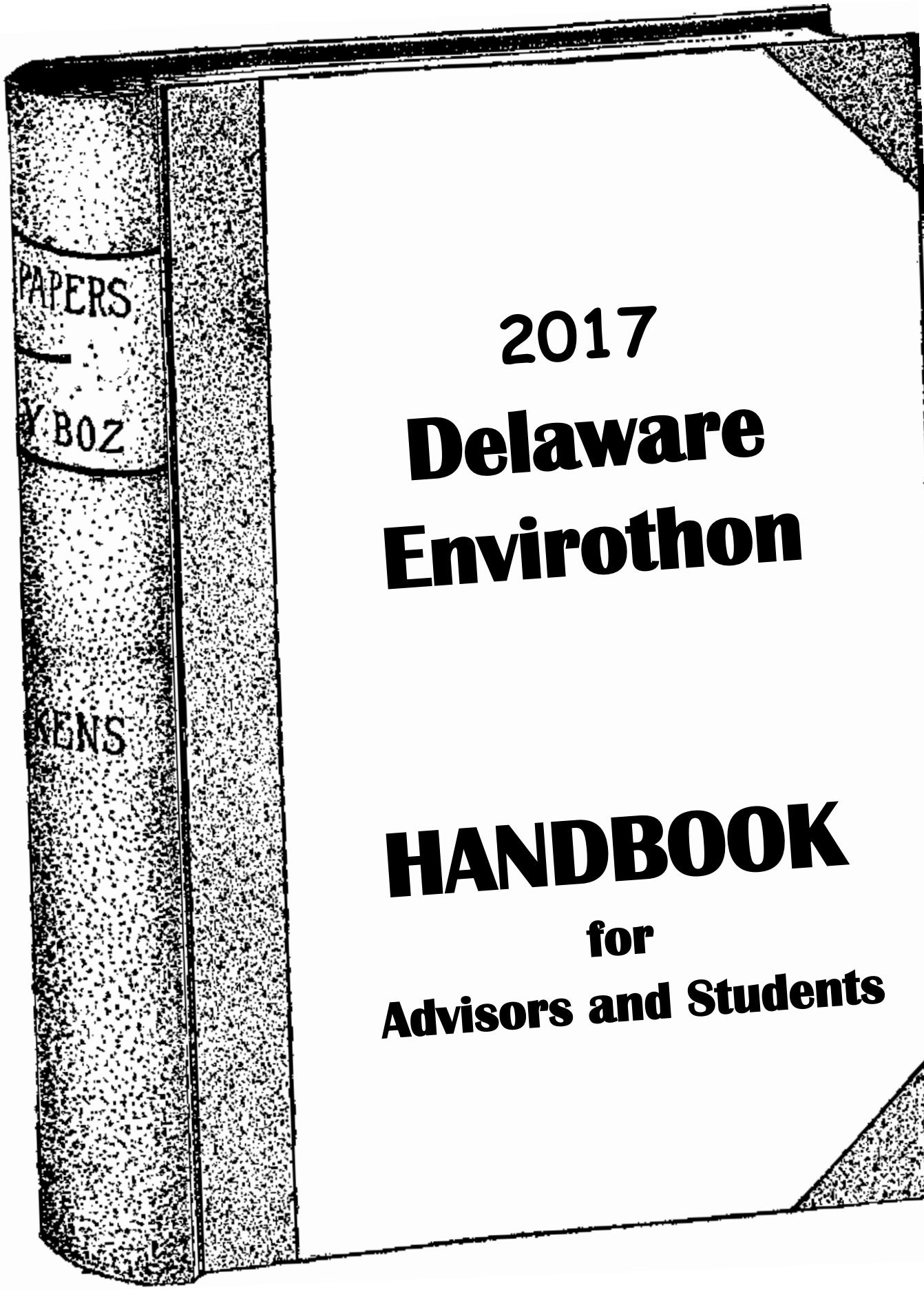

2017 Delaware Envirothon

HANDBOOK

for Advisors and Students

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Revised: March 2016

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INTRODUCTION

WHAT

Envirothon is a problem-solving, natural resource education program for high school-aged students. It provides students with an integrated approach to exploring six natural resource categories and it tests their creativity, analytical thinking, and team-building skills in a competitive format. Envirothon is a 'day -in-the-field' where students are challenged as they answer written questions and conduct hands-on investigations of environmental issues in the following areas: **AIR QUALITY, AQUATIC ECOLOGY, FORESTRY, SOIL/LAND USE, WILDLIFE, PUBLIC SPEAKING, and CURRENT ENVIRONMENTAL ISSUES (topic changes each year).**

WHY

Envirothon stimulates, reinforces, and enhances students' interest in the environment and our state's natural resources. The concept was created by the Pennsylvania Association of Conservation Districts in 1979 as an outdoor hands-on competition. It was called the "Environmental Olympic." Since then, the concept expanded to other states; and when the National Challenge was added in 1988, the name changed to Envirothon.

Envirothon affords a unique approach to teaching environmental education, and it's fun!

The continuing support of the program reflects the participation and support of county conservation districts, environmentally active groups, clubs, various state and federal agencies, as well as private corporations.

HOW

Reference material notebooks for students and advisors are available through local conservation districts and the Delaware Teacher Resource Centers. Envirothon can also be used as a curriculum guide for classroom study. Conservation Districts in conjunction with cooperating agencies, educators, community and interest groups conduct the Delaware Envirothon Challenge in the spring. The winning team is afforded the opportunity to represent Delaware at the NCF Envirothon that same summer.

HISTORY

The Envirothon concept began in Pennsylvania in 1979 as an outgrowth of a vocational agricultural land-judging contest. Conservation Districts felt there was a need for a statewide environmental program highlighting different disciplines within the natural resource field. By the mid-eighties, New York, Ohio, Massachusetts, and Maine had their own state Envirothon programs and interest was spreading to other states. In 1988, the first National Envirothon was held in Pennsylvania with five states participating. Currently the Envirothon is active in over 53 states/Canadian Provinces and is growing each year.

Delaware held its first Envirothon challenge in the Spring of 1996. Organizational plans for this environmental team building and educational experience began back in 1994. Many private, state, and federal agencies and organizations work collectively to prepare advisor and student training workshops. There are Resource Notebooks available as aides in support of the Delaware Envirothon. Also, resource trunks are available in all Conservation District offices for Aquatic Ecology, Forestry, Soil/Land Use, Public Speaking, Wildlife and the current environmental issue. These are loaned out to teams for use in their training. This Handbook is just one example of our commitment to helping secure environmental education throughout Delaware high schools.

MISSION, GOALS & OBJECTIVES

EDUCATION

Solutions to today's natural resources problems may well come from a 'grassroots' concern for nurturing our quality of life. Envirothon can be adopted by local schools to enhance the current environmental curriculum. The challenges facing educators are formidable. Envirothon is a ready-made program to help teach environmental education and are correlated to the State Standards.

FUTURE

Tomorrow's problems will be more challenging, but the solutions will be more apparent if students are encouraged to become environmentally aware, action-oriented adults.

The competitive nature of the program motivates students to expand their knowledge of natural resources and realize their responsibility as stewards of our natural resources.

OUTCOME

Delaware Envirothon goals include:

* Promote environmental awareness and stewardship.
* Develop students' critical thinking, cooperative problem solving, and decision-making skills.
* Present balanced options for management of our renewable and non-renewable natural resources.
* Provide awareness of and accessibility to resource organizations offering assistance in environmental issues.

THE DELAWARE Envirothon CHALLENGE

Themes, written questions and problem-solving tasks will be site specific to that year's event. Each Envirothon will be new and different. When the teams arrive at the event, they will register, confirm pre-registration information, and receive an orientation briefing on contest format, rules, and scoring.

Teams will be assigned a test station rotation. At each station, the category experts or specialists will provide an overview of that particular station. Each team will complete one collective answer sheet for each test station. Cooperative decision making, free exchange of ideas, and information pooling are desirable and give Envirothon much of its unique appeal.

All test stations are staffed by resource specialists who have helped prepare the test challenges in their field of expertise. Each test station requires approximately 25-30 minutes. Completed test sheets are graded either at the station or off-site and scores rechecked.

After the competition and scoring is completed, all participants assemble for results, announcements, and award presentations. The top team is announced and plans begin to send a Delaware representative team to the NCF Envirothon. This is a challenging four-day event. The Delaware Envirothon Planning Committee will work closely with this team to help prepare them for the national contest and for trip arrangements.

RULES & REGULATIONS

Delaware Envirothon

1. The Delaware Envirothon Planning Committee will host an 'Orientation' for prospective teams and advisors during September or October of each year.

2. Only students in grades 9 through 12 are eligible to compete in the Delaware Envirothon.

3. Any organization may host a team (s) whose members are in grades 9-12.

4. Each team competing in the Delaware Envirothon must consist of five students. Schools/groups may provide a list of alternates who are eligible to compete for any of the teams representing their school or group. The total number of alternates registered cannot exceed a maximum of two per the total number of registered teams for that school/group. (For example, XYZ High School has two teams. They may register a total of four alternates, who are then eligible to serve on whichever team needs them.)

   The State Champion team must compete in the NCF Envirothon using the five students on the winning team or, if necessary, a registered alternate. If the first place team cannot be available for the NCF Envirothon, the second-place team from that year would automatically advance to represent Delaware. If the second place team is not available to compete, then the third place team from that year would be eligible to compete in the NCF Envirothon.

5. All advisors must return their Team Registration Forms, listing their team members and any alternates, as directed. Visit www.delawareenvirothon.org for current deadline.

6. A team registration fee may be required for teams intending to compete. The registration fee will be determined by the Delaware Envirothon Planning Committee.

7. Teams must be accompanied to all events by an adult team advisor.

8. The Delaware Envirothon Challenge will reflect an 'Ecostation' testing concept.

9. Resource 'trunks' will be available for each learning objective. Advisors can borrow these 'trunks' from each conservation district office. Chairs of each resource committee are responsible to keep these 'trunks' current.

10. Rules and regulations of the Delaware Envirothon are subject to change. Any and all changes will be explained in advance to all teams and advisors. Any suggestions or improvements to the rules and regulations will be considered by the Delaware Envirothon Planning Committee.

11. Any infraction of any of the Rules and Regulations of the Delaware Envirothon could result in disqualification and dismissal from the event and host site. Refer to the Delaware Envirothon Code of Conduct at the end of this Handbook.

12. Training workshops will be offered to advisors and any team members unless specified during the Orientation. All advisors are encouraged to attend and participate in every training session.

13. Advisors may not travel with their teams during testing. Provisions will be made for advisors to visit test sites, separately from their competing team.

14. Snuff, tobacco, illegal drugs, electronic devices, cell phones and alcohol are **PROHIBITED** during the entire competition. Rules applicable to the local area and sponsoring organization will also be adhered to.

15. Advisors will be responsible for assuring that teams display proper conduct during the competition.

16. Transportation to the Delaware Envirothon will be the responsibility of each participating team.

17. The competition will be conducted by the Delaware Association of Conservation Districts and partnership agencies, groups, and organizations.

18. Any special materials needed for the competition, such as identification keys or maps, will be provided by the testing station coordinators.

19. All volunteers located at each testing Ecostation are to refrain from making disparaging comments about the test and discussions kept quiet to provide the students with a respectable testing atmosphere.

20. Judges decisions are FINAL on all events.

21. The team placement will be determined by the highest cumulative total points.

22. Cooperating agencies, sponsors, advisors, and participants involved in competition will be requested to complete an evaluation of the program following the competition event.

23. Any appeals must be submitted within 10 days of the concern. Final decision will be made by the Delaware Envirothon Planning Committee. Send appeals to Delaware Envirothon at PO Box 242, Dover, DE 19903-0242.

24. Awards for the Delaware Envirothon will be determined by the Delaware Envirothon Planning Committee. An individual award is given to the State Winning Team and this is theirs to keep. Additional awards will be determined by funding.

25. Teams with less than five (5) members on the day of the State Challenge may compete for experience, but the scores will NOT count.

26. During the State Challenge, all participating students will be identified as to their representative team.

27. Prior to the State Challenge, all guides will be informed and trained of all the day's rules and regulations to immediately deal with infractions.

28. The Delaware Envirothon Planning Committee will provide participating teams with clipboards, writing utensils and calculators, if needed, during the State Challenge. Students are not to bring any of these devices (including backpacks, etc.) to the testing sites. Students may bring their oral presentation note cards to the Challenge.

29. During the State Challenge, only one test per team will be provided at each testing station.

30. There will be a total possible 100 points scored for each discipline at each Ecostation. Scores will be in 'whole' numbers only.

31. If there is a tie score between two or more teams for first place, the Delaware Planning Committee will use the Aquatic Ecology score as the tie-breaker and then the Forestry score, if further needed.

32. Starting with the 2007 Delaware Envirothon Challenge, alternates will 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.

33. FFA environmental testing can take place immediately following the Delaware State Envirothon Challenge.

34. Following the State Challenge, final Delaware team scores will be posted and distributed to the advisors. Committee chairs will be available to assist advisors with test questions regarding their team's effort.

35. Team advisors will be provided an opportunity to evaluate the Delaware Envirothon during the State Challenge.

36. If any team member/advisor visits the scoring area during a state competition, that team will be disqualified immediately. (Adopted May 2012)

<u>NCF Envirothon Challenge</u>

37. For the NCF Envirothon , any substitutes other than the registered State team and alternates must be first approved by the Delaware State Committee and CEC representatives.

38. If the team representing the Delaware Envirothon is noted for misbehavior or disqualified from further participation in the NCF Envirothon, that team's advisor and sponsor will be financially responsible for paying all expenses to this particular event.

39. Preparation material for the NCF Envirothon will be offered in metric and imperial measurement systems.

40. The Delaware Envirothon Planning Committee will meet with that year's Delaware Envirothon State Champions, and their advisors, prior to participation in the NCF Envirothon to review traveling procedures, Code of Conduct, etc.

41. Resource chairpersons and the Delaware Envirothon Planning Committee will be responsible to hold an organized training workshop(s) with that year's Delaware State Envirothon State Champions during the months of June and July in preparation for the NCF Envirothon.

PREPARING A TEAM

Advisors will be responsible for training their team

* Workshops for each competitive area will be provided for advisors and their students. A maximum attendance, per team, may be issued depending on the workshop location.

* Resource material will be provided in the form of an Advisor Resource Manual and Resource Trunks containing a collection of specific training tools for each category.

* Resource professionals are available for extra training sessions as per their schedule. Delaware Envirothon Planning Committee members are prohibited from conducting one-on-one training outside scheduled workshops.

* Advisors will be encouraged to participate in independent programs, field trips, as well as other opportunities offered in related areas throughout the state.

Team Registration

Final team registration must be submitted 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 typewritten or printed to prevent misspelling of names, etc.

HELPFUL HINTS

The Envirothon competition is designed to get students involved in learning about many different environmental disciplines. The amount of information provided to Envirothon teams may seem overwhelming to team members and advisors. This handbook is designed to help teams prepare for the Envirothon by encouraging teamwork and a multi-disciplinary approach to environmental problem solving. Below are a few helpful hints:

1. There are five subject areas and five team members. A team could assign each member an area of primary concentration and secondary concentration. This way, each team will have two members knowledgeable about, for example, forestry. Then, share the information with the others in practice sessions. Another way to divide the labor is to have several team members focus on natural history and identification and other members focus on the resource management issues for each section. Assessing the skills of each member will determine which is the best approach for your team. Remember, no resource professional can know everything.

   Teamwork is essential in the real world. Learning how to work as a team is essential to your success in the Envirothon.

2. Make sure all team members are familiar with basic ecology terms and current environmental issues. They should also develop an understanding of the interrelationship between all the topic areas and how the management of one resource may affect another.

3. Map reading is an important skill for natural resource professionals. Learn how to read and interpret a U.S. Geologic Survey topographic map as an introduction to other map resources.

4. This Guide contains sections on each of the five study areas. The introduction gives a rationale for studying the topic. The objectives provide a detailed outline of the kinds of information teams are expected to know. Based on these objectives, students can develop a strategy for studying each topic. Teams should use the practice exercises to strengthen their skills.

5. Each team is provided study materials for the Envirothon. Each section in this material contains an outline and a list of references. There are also lists of resource professionals available to help teams, including those at your local conservation district office. Please visit www.delawareenvirothon.org for more study materials.

6. Advisors are encouraged to use the resource materials to develop environmental units for their classrooms. This will expand the Envirothon Program to include more students than just those on the team.

AQUATIC ECOLOGY

Delaware is fortunate to have an abundance and variety of aquatic resources, including tidal and nontidal streams, ponds, marshes and other wetlands, and one of the busiest river/estuary systems in the country. These resources are vital to the lives and livelihood of Delawareans, and are in turn, affected by us in various ways. To better protect these resources for the future, we must first understand what they are, why they're important, and how we impact them.

Envirothon Students Will Be Able To:

* Identify the processes/phases of the water cycle: evaporation, transpiration, condensation, precipitation, surface runoff and percolation

* Analyze water supply issues, including the interaction of competing human uses for drinking, agriculture, 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 impacts 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; Delmarva Bays vs. Inland 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 fisheries

* 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 wetlands, and how human activities relate to them

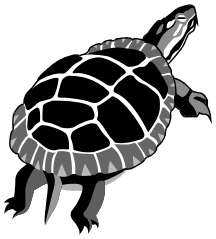
* Know the characteristics that distinguish a swamp from a marsh from a bog, and which of these and other wetland types are prominent in Delaware

* 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



PRACTICE EXERCISE

Locate two contrasting aquatic habitats to investigate (e.g. pool/riffle, pond/stream, tidal/non-tidal, upstream/downstream from pollution source, etc.). Using STREAM WATCH techniques*, gather water quality data and collect samples of macroinvertebrates from the two habitats. Identify the organisms and compare the diversity of life found in the two environments. Draw comparative conclusions from your data about the two habitats.

Visit a wetland in the vicinity of your school. Evaluate it relative to wetland functions and values. Identify what type of wetland you think it is. Make a list of the plant and animal species you can identify from this wetland area. Examine the surrounding land uses for potential human impacts on this wetland.

Using a map of Delaware, locate bodies of water that are most likely to support particular fish and shellfish species of both the fresh and saltwater type. Visit one of those water bodies, seine for fish, and use field guides to identify what you catch. Inland Bays of Delaware are showing high levels of nutrients in the water. Visit a Bay or pond and test nutrient levels* and discuss the possible sources of nutrient enrichment, as it relates to point/non-point pollution types. Consider the potential effects of this on aquatic and human life in that area, and what might be done to help reduce the problem for the future.

Obtain a topographic map that encompasses your school area. Locate your school on the map and the nearest water body to which the land it occupies drains. Trace this connection to larger and larger water bodies, and ultimately to the Delaware Bay, the Chesapeake Bay and Atlantic Ocean.

** Materials needed to complete these and other tasks will be provided through Envirothon Aquatics Resource Trunks, available for loan through each County Conservation District Office.*

SAMPLE QUESTIONS

1. Which of the following Delaware River fish is not an anadromous one?
   a) flounder b) shad c) Striped bass d) sturgeon e) menhaden

2. Which of the following statements about high nitrates levels in a body of water is FALSE?
   a) They might be caused by heavy use of soil fertilizers in that watershed.
   b) They can contribute to high turbidity and low dissolved oxygen levels in the water.
   c) They would tend to result in high biodiversity levels in the macroinvertebrates community.
   d) They can result in soupy-rich blooms of algae and other aquatic plants.

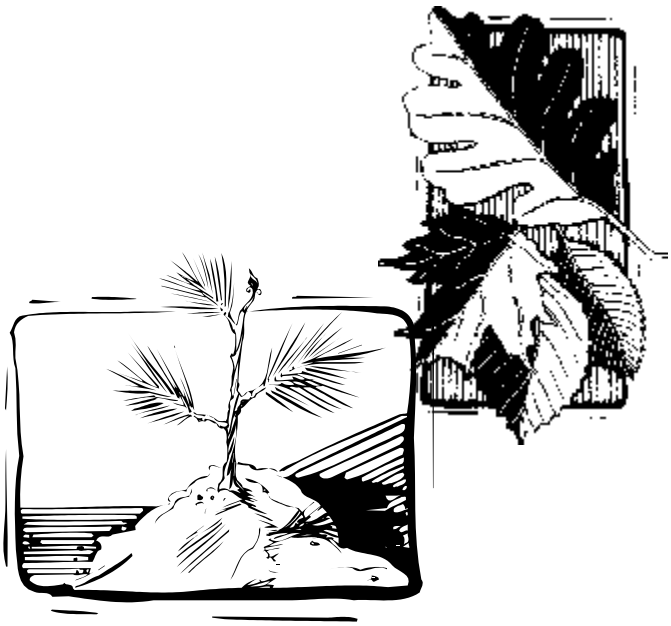
3. The most important piece of legislation for wetland protection at the national level is the _____ Act.

4. The basic idea of biomagnification of pollutants is that the _____ that an aquatic organism is the more it accumulates certain toxic pollutants found in the water.
   a) the lower on the food chain
   b) the higher on the food chain
   c) the lower down in the water
   d) the more complex and developed

5. Regulations often require that a fish be of a certain minimum size before it can be legally harvested. What is the biological basis for such regulation?

FORESTRY

The Science of Forestry is a lot more than just the study of Botany. Forests are dynamic ecosystems, with numerous factors influencing their development. It is important to understand the cause and effect relationships that impact individual trees, as well as the larger forest community. Forest are precious natural resources that support wildlife, influence water quality and provide numerous marketable goods. Forest management is challenging work that requires a clear understanding of forestry dynamics.



Envirothon Students Will Be Able To:

* 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 re sources, 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

PRACTICE EXERCISE

1. Go out to a stand of trees and identify all of them. Practice without using a key, if you can. Measure them and determine as much silvicultural information from them as possible.

2. Identify a local stream that runs through a farm and a stream that runs through an urbanized neighborhood. What kind of vegetative buffer exists there? Describe the resultant effects on the water quality of these streams if vegetative buffer strips are developed or removed from along the streams.

3. Go into a wooded area and identify its stage of development. What benefits does it have for wildlife habitat? What kind of forest products could be derived from this area? If a developer were to come to this area what recommendations would you give for its management?

4. Differentiate between a service forester, a consulting forester, and an industrial forester. You may want to call some foresters to discuss this with them. What kind of information could each of these foresters give you if you were interested in developing a management plan for your 30-acre woodlot?

SAMPLE QUESTIONS

1. The Delaware Seed Tree Law (1989) requires regeneration of the following species:
   _____, _____, _____, and _____.

2. Match the following trees to their shade tolerance:

   a) Loblolly Pine _____Very Tolerant
   b) American Beech _____ Intermediate
   c) Red Oak _____ Intolerant

3. Check all of the following products which are derived from trees:

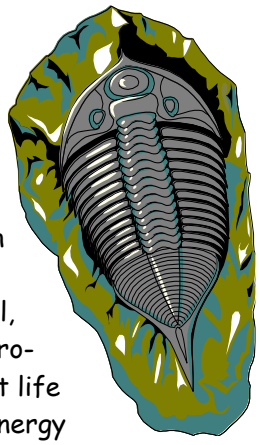
   _____ cork _____ plastic comb _____ latex paint
   _____ rayon _____ chocolate _____ aspirin

4. Why are forest stand volume estimates important? What causes volume estimates to be inaccurate?

5. The organic debris or litter found in a layer on the forest floor, called duff, provides which of the following benefits to the forest?

   a) helps soil moisture retention
   b) increases soil aeration and water absorption capability
   c) increases the amount of organic matter incorporated into the soil
   d) all of the above

SOIL / LAND USE



One of our most important natural resources is soil. This resource is often overlooked by students and teachers interested in environmental issues. Professional conservationists, however, recognize the importance of soil in natural resource management and the interrelationships between soil, water, and other resources. Soil provides a growth medium for all plant life on our planet, including food and energy resources. Soil also provides habitat, filters water, and is used in constructing buildings.

Envirothon Students Will Be Able To:

* 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

PRACTICE EXERCISE

Choose a site. Using a soils map, locate soil types on the site. Color code types by drainage classifications. Discuss soil types in relationship to land use. Determine if the land was modified to accommodate present use or how it might have to be modified for proposed uses. Discuss pros and cons of these modifications.

Dig a soil pit or go to an area where there is evacuation going on (get permission if needed). Look at the soil profile and measure the soil horizons. Determine soil properties and drainage classification. Check your results with a soil survey. What limitations may be apparent in using a soil survey in this small area?

Identify an area in your town that is eroding. Determine what is causing the erosion and develop a proposal to stop the erosion.

Prime farmland is a classification used by the U.S. Department of Agriculture to identify soils which are excellent for crop production. What are the characteristics of prime farmland soils? Research and identify prime farmland soils in Delaware. Determine where most of the prime farmland soils are located. How is this information being used by the State? By farmers?

Land use decision makers need to take soil types into consideration. Discuss the merits of all soil drainage classes as they apply to: 1) on-site septic systems; 2) establishment of a tree farm; 3) underground storage tanks; 4) vegetable production; and 5) construction of new recreation fields.

SAMPLE QUESTIONS

1. The quality of soil that allows air or water to move through it is called:

   a) percolation
   b) permeability
   c) infiltration
   d) structure

2. Which of the following surface features was not deposited by water?

   a) sand dune
   b) silt cap
   c) tidal marsh
   d) mountains

3. Which horizon has the highest percentage of organic matter?

   a) A horizon
   b) B horizon
   c) C horizon
   d) O horizon

4. Gray colors in lower soil horizons are an indication of:

   a) presence of oxygen
   b) absence of oxygen
   c) absence of structure
   d) presence of clay

5. Mulches, temporary seeding, and silt fence are techniques used to:

   a) control flooding
   b) control weeds in landscaping
   c) prevent erosion and control sediment
   d) prevent groundwater contamination on construction sites

6. Answer the following question after examining the test pit. What is the depth to the seasonal high water table in this soil?

   a) 0 to 10 inches
   b) 10 to 20 inches
   c) 20 to 30 inches
   d) no evidence of high water table

7. Answer the following question from the Delaware Soil Survey Reports. The soil is located at the intersection of Routes 6 and 13 on Sheet 16. Would the developer be able to find a source of sand and gravel within 1,000 feet of the intersection? (Check one)

   _____ Yes _____No

WILDLIFE

Diverse wildlife populations are valuable from many standpoints, as indicators of a healthy ecosystem, for recreation, and for aesthetics. Understanding a species' requirements and habits is the first step in ensuring the continuing existence of that particular animal. Proper protection and management of an animal's habitat will encourage optimum populations.

Envirothon Students Will Be Able To:

* 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 disease in people and wildlife

PRACTICE EXERCISE

Using a field guide to birds, identify two raptor species and determine their habitat requirements Do the same for two waterfowl species and two passerine species.

Choose a large mammal and track its food chain down to its lowest possible component.

List the animals likely to be found in a mature forest type.

Name three furbearers found in your area of Delaware. Determine whether there is an open trapping season on them. Check the current hunting regulations. List the maximum number of deer legally allowed by one person in Delaware.

Go to the woodlot nearest your school and list four habitat types found there.

Observe a wetland and discuss the variety of activity visible or likely to be taking place in that area.

SAMPLE QUESTIONS

1. A vernal pool is a special breeding site for fish in the spring. **(TRUE**) or **(FALSE)?**
   Give a reason for your answer.

2. What two fish eating raptor species populations are now recovering from the effects of DDT?

3. Why is the horseshoe crab valuable to migrating shorebirds?

4. The most recently reintroduced wild game species in Delaware is the:

   a) raccoon
   b) opossum
   c) wild turkey
   d) gray fox
   e) Bob-white quail
   f) Delmarva Fox squirrel

5. Sexual dimorphism in wildlife means:

   a) males participate in rearing of young
   b) females do not participate in rearing of young
   c) males and females of a species have different external characteristics
   d) eggs are infertile
   e) this term does not apply to wildlife

CURRENT ENVIRONMENTAL ISSUE

Agricultural Soil and Water Conservation Stewardship

Delaware has many unique qualities that have made the state a leader in the agricultural industry. From fertile soils and abundant access to water, to ideal climate and topography, Delaware has been a prime location for farms in the Mid-Atlantic region, contributing greatly to the growth of the agricultural industry. Today, agriculture is one of the most successful sectors of the U.S. economy. With almost 40% of the Delaware's land use devoted to agriculture production, it is a driving force for the State's economy.

Key Topics:

1. Purpose and implementation of Soil and Water Conservation best management practices.
2. How are soil and water conservation best management practices interrelated to the management of wildlife, forestry, and aquatic systems?
3. How do agriculturists maintain a balance between their quality of life versus the quality of the environment?

Many of the State's waterbodies are polluted and Delaware's Farmers play an important role in the efforts of cleaning up our water. Delaware has been a leader in the implementation of soil and water conservation best management practices to control sediment and improve water quality. Many farmers have focused on best management practices like cover crops, conservation tillage practices, and waste storage structures (to name a few) to reduce nonpoint source pollution, specifically sediment and nutrients, which enter waterways and groundwater.

Participants will learn about Delaware's natural resources and engage in hands-on training and testing. Students will learn the basic concepts of how agricultural Best Management Practices help to reduce nonpoint sources of pollution while also conserving natural resources. Natural resource professionals will use their lifelong learning experiences to educate the students on the importance of maintaining a balance of quality of life versus the quality of the environment from an agriculturalist's perspective. Additionally, students will gain an understanding of the importance of promoting soil and water conservation stewardship.

CURRENT ISSUE — Invasive Species

The 2017 Delaware Envirothon will help participating students:

1. Identify and recommend soil and water conservation best management practices in agriculture.
2. Describe the role of the federal government in conservation programs that benefit both agricultural producers and the environment.
3. Identify the concept of soil quality/health to provide the needed functions for the conservation planning process.
4. Identify various types of soil erosion and utilize different methods to estimate and predict soil loss to assess land use impacts.
    A. Revised Universal Soil Loss Equation (RUSLE)
    B. Aerial Photograph
    C. Topographic Maps
    D. Soil Maps
    E. USDA Classification System
    F. Soil Surveys
5. Explain why land-use planning is important to our ecosystems and to our economy to achieve sustainable agriculture.

SAMPLE QUESTIONS

1. Explain what a best management practice is.
2. Describe impairments typically found in Delaware's waterways.
3. Explain why cover crops are important for soil health.
4. Name the best management practices that could be implemented to reduce soil erosion.
5. What are some reasons a farmer may want to implement best management practices on their land?
6. What best management practices could be used to improve forage conditions?
7. What percentage of Delaware's waterways are considered impaired?

AIR QUALITY

Air pollution can be simply defined as gas and particle contaminants present in the atmosphere. Although simple by definition, the potential health and environmental impacts of air pollution has local, state, national, and global consequences. In 1970, Congress passed the Clean Air Act that authorized the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants shown to threaten human health and welfare.

By reducing air pollution, the Clean Air Act has led to significant improvements in human health and the environment in the United States. Since 1970: six commonly found air pollutants have decreased by more than 50%; air toxics from large industrial sources, such as chemical plants, petroleum refineries, and paper mills have been reduced by nearly 70%; new cars are 90% cleaner and will be cleaner in the future; and production of most ozone-depleting chemicals has ceased.

These significant reductions were achieved while the U.S. Gross Domestic Product has tripled, energy consumption has increased by 50%, and vehicle use has increased by almost 200%.

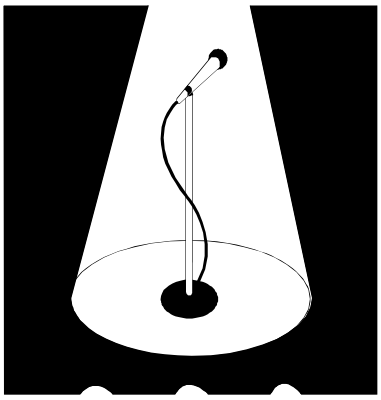
The health, environmental, and economic impacts of air pollution are significant. Each day, air pollution causes thousands of illnesses leading to lost days at work and school. Air pollution also reduces agricultural crop and commercial forest yields by billions of dollars each year. Air pollution is a worldwide problem with no political or geographic boundaries. Once released from the source, air pollutants can't be recaptured. Considering the primary sources of air pollution are vehicular transportation and energy production, the immediate challenge for all of us is to reduce, recycle and conserve!

The Air Quality focus of study for the 2017 competition is "Air Pollution Basics". The students will study the U.S. Environmental Protection Agency's (USEPA) National Ambient Air Quality Standards (NAAQS) or "criteria pollutants." This area of study will highlight the significant progress local, state and national agencies have made in improving air quality while stressing the primary air pollution sources, monitoring networks, control measures, and most importantly the health and environmental impacts of air pollution.

After studying the 2017 Delaware Envirothon Air Quality Student Guide, students will be able to:

- Identify the National Ambient Air Quality Standards (NAAQS) or "criteria pollutants"
- Understand the difference between primary and secondary EPA Standards
- Identify the chemical composition of the criteria pollutants
- Understand how air pollutants are formed
- Understand how air pollutants are controlled
- Be familiar with the Environmental Protection Agency's Air Quality Index (AQI)
- Be familiar with Delaware's air monitoring network
- Understand the principles and major factors impacting the long-range transport air pollution
- Identify the categories of mobile sources and the specific pollutants emitted from these sources
- Understand the effects air pollution has on aquatic ecology, forestry, soils and land use, and wildlife.

PUBLIC SPEAKING



Verbal communication of natural resource issues is crucial in addressing environmental problems/concerns, particularly in situations where collaborative efforts are required to develop practical solutions and effect change. The Delaware Envirothon strives to challenge and promote the development of verbal communication skills in each student participant, which is why Public Speaking was added as part of the competition day. Recently added to this portion of the event was the requirement for a visual aid (poster). The visual aid component offers students the ability to not only use audio, but also visual tools in demonstrating highlights of their presentation.

Public Speaking Rules

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.

The length of the presentation must be between 7 and 10 minutes.

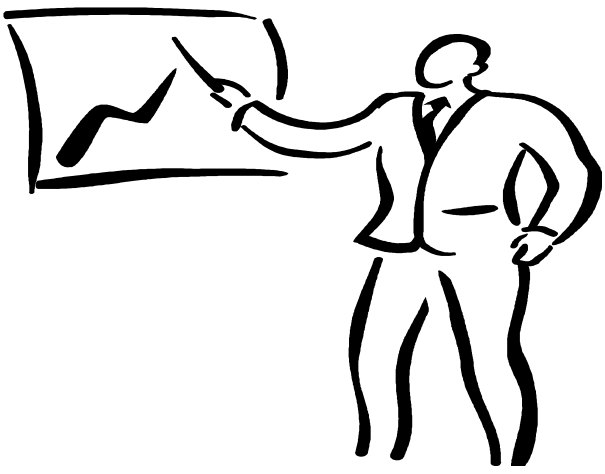
All team members must participate in the oral part of the presentation.

Teams are responsible for purchasing their own standard poster board and standard markers. The poster must be white and measure 22" x 28" in size (standard). Markers can be any color, but NO glitter, neon, or scented markers. Only one side of the poster may be used. Only one poster per team.

Poster board and markers are the <u>only materials to be used</u> in creating the poster (no construction paper, etc.).

The **back of the poster must identify the school and team name**. Posters must be turned in at registration along with any note cards.

There will be an easel for the poster available during the competition.



* NOTE: Use of the poster does not have to be done by all members of the team. It is permissible to have someone else refer to the poster (point, etc.) while a team member speaks about the poster.

RESOURCE AGENCIES

Artesian Water Company
664 Churchman Road
Newark, Delaware 19702

Delaware Association of Conservation Districts
800 Bay Road, Suite 2
Dover, Delaware 19901

Delaware Department of Agriculture
Forest Service
2320 S. DuPont Highway
Dover, Delaware 19901

Delaware Department of Natural Resources
& Environmental Control

Division of Air Quality
Division of Energy & Climate
Division of Fish & Wildlife
Division of Parks & Recreation
Division of Waste & Hazardous Substances
Division of Water
Division of Watershed Stewardship

89 Kings Highway
Dover, Delaware 19901

Delaware Department of Public Instruction
P.O. Box 1402
Townsend Building
Dover, Delaware 19903-1402

Delaware Nature Conservancy
1661 S. DuPont Highway, Dover, DE 19901
100 W. 10th Street, Suite 1107, Wilm., DE 19801

Delaware Nature Society
P.O. Box 700
Hockessin, Delaware 19707

Delaware Solid Waste Authority
1128 S. Bradford Street
P.O. Box 455
Dover, Delaware 19903-0455

Kent Conservation District
800 Bay Road, Suite 2
Dover, Delaware 19901

New Castle Conservation District
2430 Old County Road
Newark, Delaware 19702

Sussex Conservation District
21315 Berlin Road, Unit 4
Georgetown, Delaware 19947

United States Department of Agriculture
Natural Resources Conservation Service
1221 College Park Drive, Suite 100
Dover, Delaware 19904

University of Delaware
Cooperative Extension
69 Transportation Circle
Dover, Delaware 19901

U. S. Fish & Wildlife Service
2610 Whitehall Neck Road
Smyrna, Delaware 19977

VOLUNTEER SUPPORT

The Envirothon has become successful because of the help of many volunteers. Conservation district boards, organizations, and many others work together behind the scenes to make certain the Envirothon happens. Though their work is not highly publicized, it does not go unrecognized.

The Natural Resources Conservation Service (NRCS) is an agency of the U.S. Department of Agriculture and supports the Delaware Association of Conservation Districts' efforts in pulling together the Envirothon Program. A big part of the support from NRCS comes from its volunteer arm, the EARTH TEAM. EARTH TEAM volunteers are all types of people who have one common goal - they care about our environment and our future. EARTH TEAM volunteers donate their time and talents to help preserve and protect our nation's natural resources.

Volunteering for the EARTH TEAM can be a very rewarding experience, and it can also help you. Some schools give extra credit for volunteer efforts — the experience learned is invaluable for students who are interested in natural resources and conservation efforts. For more information about the EARTH TEAM, contact your local Earth Team Volunteer Coordinator at (302) 678-4160. EARTH TEAM volunteers must be at least 16 years of age.

DELAWARE ASSOCIATION OF CONSERVATION DISTRICTS

WHAT A DISTRICT IS...

A conservation district is a quasi-state agency authorized by state legislation responsible under state law for conservation work within its boundaries. In Delaware, conservation districts border county lines.

Conservation districts:

- focus attention on land, water, and related resource problems;
- develop programs to solve them;
- enlist and coordinate help from public and private sources to accomplish the district goals; and
- increase awareness of the inter-relationship between human activities and the natural environment.

Districts are managed by citizens who know local problems. Each Conservation District is guided by a board of at least six supervisors - four elected by landowners in local elections, one representing county government, and the county extension agent.

It is the district supervisor's responsibility to plan and direct the district program, coordinate the help of governmental agencies, assign priority to requests for conservation technical assistance from private landowners, and serve as a community clearinghouse for information services.

HOW DISTRICTS WORK. . .

The district board of supervisors meet at least monthly and all meetings are open to the public. Much of the districts effectiveness is due to their ability to work with local, state, and federal agencies to solve local environmental problems. Districts enter into agreements (memorandums of understanding) with cooperating agencies and organizations that outline the obligations of each party and the assistance available.

Each Conservation District employs a district manager and technicians who do the leg work for the non-paid supervisors. District operations are supported by federal, state and local government and private individuals. The Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture and the Delaware Department of Natural Resources and Environmental Control (DNREC) provide technical leadership to each conservation district. The districts receive an annual allocation from Delaware administered through the Delaware Department of Natural Resources and Environmental Control. This funding supports personnel and administrative costs. Districts also obtain funding from county governments to address local resource needs. Additional funding is received through special conservation grants and equipment rental. Employees within the district provide technical, administrative, and clerical support to district programs. Earth Team Volunteers assist them in carrying out the district conservation programs.

Agencies cooperating with conservation districts include, but are not limited to: USDA- Cooperative Extension, USDA-Natural Resources Conservation Service, USDA-Farm Service Agency, Del. Department of Agriculture, Delaware Department of Natural Resources and Environment Control, University of Delaware and the First State Resource Conservation and Development Council.

WHAT DISTRICTS DO...

Programs may vary from district to district since each conservation district develops its own program to best suit the environmental needs of the county's residents as well as the area's resources.

Delaware Conservation Districts work directly with farmers, landowners, and municipalities on the following types of challenges: water quality protection; storm water management; aquifer protection; land use planning; erosion and sediment control on land undergoing development, farmland, critical areas, and public lands; flooding problems; wetlands delineation; soil survey information; sustainable agriculture; and agricultural land preservation.

STATE AND NATIONAL ASSOCIATIONS...

Delaware's district supervisors have a statewide organization known as the Delaware Association of Conservation Districts (DACD). DACD is a voluntary, non-profit alliance, providing a forum for discussion and coordination among the Districts as they work to ensure the wise use and treatment of renewable natural resources.

The 3,000 conservation districts across the United States belong to the National Association of Conservation Districts (NACD). This organization's primary goal is the conservation, orderly development, and judicious use of the nation's resources. For more information visit www.nacdnet.org.

Both of these organizations make the effort of conservation districts more effective by providing a vehicle through which conservation districts can band together to promote their causes at the state and national levels.

For more information contact:

Delaware Association of Conservation Districts
800 Bay Road, Suite 2, Dover, Delaware 19901
Phone: (302) 741-2600, ext. 3
Fax: (302) 741-0347

Delaware Envirothon Team

Code of Conduct/Photo Release

When a Delaware Envirothon team and their advisor(s), represent the State of Delaware and/or the Delaware Envirothon at events and functions they shall conduct themselves so as to not blemish or discredit the Delaware Envirothon program. This includes proper dress and language, attending all sessions in the planned program, following event rules and abiding by instructions according to Delaware Envirothon planning committee requests and recommendations. Behavior that is abrasive, violent, irresponsible, abusive, rude, or illegal will not be tolerated. The use of tobacco, alcohol, electronic devices and non-prescribed drugs is prohibited at all Envirothon events. If, at anytime, a Delaware Envirothon team member or their advisor(s) causes action that results in a discredit to the Delaware Envirothon program, they shall immediately be removed from the program at their expense. If this occurs during an event, the organization that sponsored this team will be responsible to reimburse the Delaware Envirothon program for all expenses incurred.

- ◊ **I have read the Delaware Envirothon Handbook for Advisors and Students, including the Code of Conduct, and agree to live up to the expectations. I realize that failure, on my part, to do so will result in the immediate loss of the privilege to be a part of the Delaware Envirothon Program.**
- ◊ **I also grant permission to the Delaware Envirothon Planning Committee to use my photo in Envirothon-related publications and marketing presentations.**

Student's Signature _____ **Date** _____

Print Name Clearly _____

Parent/Guardian Signature _____ **Date** _____

As sponsoring organization of (list team name)_____, **I fully agree with the Delaware Envirothon Code of Ethics and will support the Delaware Envirothon Planning Committee in the performance of their responsibilities to see that appropriate behavior is maintained.**

Advisor's Signature _____ **Date** _____

This page is to be fully completed and returned to the Delaware Envirothon prior to participating in the Delaware Envirothon events.