VIRGINIA’S DOMINION ENVIROTHON COACHES HANDBOOK

Updated January 2019
WHAT OTHERS ARE SAYING ABOUT ENVIROTHON …

“The Envirothon competition gives the students the opportunity to study in depth environmental issues that are beyond the scope of a normal science class. . .

. . . They are also given the rare opportunity to investigate a problem and most importantly, to try and positively impact that problem. “

-Kate Kelderman,
Virginia Envirothon Coach

“Envirothon has really changed my way of thinking. Envirothon has taught me how different factors work together to make a situation--pollution control cannot be the only solution in helping the environment; but broader social, cultural, and political concerns must also be considered.”

-Claire Snell-Rood,
Virginia Envirothon Team Member

“Envirotion got me my first real job, cultivated my passion for the environment, expanded my worldview, and connected me with an unforgettable group of friends. (Envirothon) taught me patience, conflict-resolution, divided leadership, positivity, compromise, and so much more. In addition, the cumulative hours of presenting to various audiences, from professionals in the field to government officials, has given me the confidence to address any number of people with relative ease. This transformation has afforded me not only better speaking skills, but job opportunities, networking, and incredible bonds of friendship.”

-Alexandra Ramey,
Virginia Envirothon Team Member

“Our Envirothon team is like a family…it feels good to get together with people that are interested in the same things to work hard both to learn about wildlife and ecosystems but also to win.”

Brooke Castigan
-Virginia Envirothon Team Member

-Steven Yeung,
Virginia Envirothon Team Member
INTRODUCTION

Welcome to the Virginia’s Dominion Envirothon. The Virginia Association of Soil and Water Conservation Districts presents the Dominion Envirothon. This handbook contains information to aide you and your team in preparation for Envirothon.

Envirothon is a natural resources competition for high school students. Teams of five students compete in the areas of: soils, forestry, aquatics, wildlife, an environmental issue and oral presentation. Students are tested as a team on the topics above and their ability to apply that knowledge to solve real-life environmental problems.

Envirothon stimulates curriculum development by establishing broad study areas and helping students and educators to find useful resources in their community. Such resources are mentioned in this handbook. To complement this handbook, each Virginia SWCD has hands-on resources and publications relating to the study areas of Envirothon. The VASWCD Envirothon website located at www.vaswcd.org has digital resources available. The environmental issue is updated annually.

The learning objectives of the Virginia Envirothon correlate with the National Science Standards and the Virginia Standards of Learning. By incorporating the Envirothon curriculum into classrooms, Conservation Districts in Virginia and across the nation are taking a notable lead in responding to the public school system's need for a strong, hands-on approach to environmental education.

To help teams prepare for the Envirothon, Training Workshops are offered annually by VASWCD and local SWCDs.

ENVIROTHON GOALS

1) To promote a desire to learn more about the natural environment and develop knowledge and skills to apply the basic principles and practices of resource management and ecology.

2) To promote stewardship of natural resources and develop critical thinking skills, cooperative problem-solving skills, and decision making skills of students to balance the quality of life and the quality of the environment.

3) To provide students with experience in environmentally oriented activities to enable them to become environmentally aware, action oriented citizens.

Questions regarding the Virginia Envirothon may be directed to the Virginia Association of Soil and Water Conservation Districts. The telephone number is (804) 559-0324. You may also e-mail Bonnie Mahl at bonnie.mahl@vaswcd.org. The Association offers its programs and assistance on a non-discriminatory basis to all persons or groups.
SPONSORS

The Virginia Envirothon is sponsored by the Virginia Association of Soil and Water Conservation Districts (VASWCD)

Funding for the Envirothon has been provided by:

- Dominion Energy
- Virginia’s Soil and Water Conservation Districts
- Chesapeake Bay Restoration Fund
- Virginia Chapter of Soil and Water Conservation Society
- Smithfield Foods
- Virginia Chapter of the American Fisheries Society
- Virginia Chapter, The Wildlife Society
- See www.vaswcd.org for sponsorship opportunities and a current list of Sponsors
LOCAL COMPETITIONS

The VASWCD requires a district to host a local Envirothon competition when the district has more than one Envirothon team (schools may have more than one team). Local competitions are typically held in the month of March. Contact your local SWCD for details.

Winners of the local Envirothon competitions will be eligible to represent their district at their Area Envirothon Competition (see SWCD Map to determine your district and Area).

AREA COMPETITIONS

Area Competitions are held in the month of April. The top three teams from each VASWCD Area Envirothon are eligible to attend the State Envirothon.

STATE COMPETITION

Visit the Virginia Envirothon Website www.vaswcd.org.

Virginia’s Dominion Envirothon is an annual competition held during the month of May. The competition is held at a different location in Virginia each year.

The top three teams from each VASWCD Area Envirothon are eligible to attend the State Envirothon. In the event that one of the top three teams cannot attend, the fourth place team may be eligible to move on to the State competition.

The first place team of the Virginia Envirothon will represent Virginia at the North American Envirothon. Five team members and one coach may be provided funding to travel to the North American competition. The state competition includes an oral presentation (worth 2/7 of overall score), for more details visit the website or contact the VASWCD.
Virginia Code Language:
§ 10.1-549.1. Virginia Envirothon.

Districts in partnership with other districts, agencies, organizations, and associations are authorized to coordinate and implement the Virginia Envirothon Program, administered by the Virginia Association of Soil and Water Conservation Districts, which enables learning experiences for high school students through competitive events focusing on natural resource conservation.

NORTH AMERICAN ENVIROTHON COMPETITION

North American Envirothon Website- www.envirothon.org

Local conservation districts, in conjunction with cooperating agencies and educators, organize and run local Envirothon competitions. Winning teams will compete in a state/province contest, and the winning team will compete in the international contest. Conservation Districts, governed by locally elected supervisors, help landowners and land users solve resource management problems.

The first place team of the Virginia Envirothon will represent Virginia at the North American Envirothon. In the event that the first place team is unable to go, the second place team will represent Virginia at the North American contest. The Virginia Association of Soil and Water Conservation Districts provides an all expense paid trip to the North American Competition for the five team members and one coach. Competitions are held throughout the US and Canada.
2019 VIRGINIA STATE ENVIROTHON RULES

1. Students enrolled in grades 9-12 or an equivalent home school ranking during the current competition are eligible to participate.

2. Each VASWCD Area may send the top three teams from the Area contest to participate in the state Envirothon contest. The top three teams must represent three different groups ex. different schools, FFA team, 4-H Club, Scout troop, home school group etc. In the event that a top 3 team is unable to attend, the fourth-place team may attend the state Envirothon contest. Each team may represent any group of high school aged students including but not limited to FFA, 4-H Club, Ecology Club, Scout troop, home school group, etc. Coaches may be teachers, scout leaders, parents, or any interested adult. Each team must have at least one dedicated adult serving as a coach.

3. A state registration form is due to the VASWCD office by the noted deadline. State contest materials will be distributed to the host of each Area competition before each Area Envirothon so that the materials may be distributed to the teams that will advance as soon as that team is known. It is the SWCD’s responsibility to let the VASWCD office know the teams participating in the state contest in a timely manner so that arrangements for teams can be made. It is the duty of the coach to make sure appropriate chaperones are in keeping with their individual school policies for field trips. The VASWCD requires a minimum of 1 chaperone per team. Information will be included in registration materials that relates to housing and meals.

4. A team must consist of five members. One or two alternates are allowed. In the event an original member is unable to participate, a registered alternate may take their place. Changes to a team roster will not be allowed past the registration deadline, unless approved by VASWCD in emergency circumstances. Alternates will not be allowed to go to the stations with their team and may not help the team set up during the presentation part of the contest. In the event of an emergency that would prevent a registered five member team from competing in the state competition, the VASWCD Envirothon committee may allow a team to compete with fewer than five members. The respective coach must certify the legitimacy of the emergency by phone or letter. If a registered five member team is not complete and present at the start of the set presentation time, the VASWCD may impose a penalty up to disqualification.

5. Coaches or advisors must accompany their team to the state contest. They will not have contact with their team at the stations during the competition but may be guides for other teams during the contest, if needed.

6. The contest will consist of questions on soils, aquatics, forestry, wildlife, and special issue: Agriculture and the Environment: Knowledge and technology to feed the world. The station areas will be worth 1/7 each of the overall score. The presentation will be worth 2/7. Tiebreakers shall be as follows: Current Issue score; Soils score, Aquatics score, Forestry score, and wildlife score. Students may compile a list of resource references and information and present it to judges before or during their presentation.

7. Team members work together to answer test questions, submitting one completed test to the station judges before moving to the next station. Each station will allow 30-45 minutes for teams to complete the test.

8. Presentations will be given Sunday afternoon of the competition. Each team will be assigned a location and time for their presentation. Each team will have 5 minutes to set up, 20 minutes to make their presentation and 5 minutes to answer questions from the judges—30 minutes total. The North American Envirothon presentation score sheet will be used at the State contest with additional criteria included to meet the current oral presentation problem requirements. There will be two rooms assigned for nine presentations each. There will be a minimum of two sets of five judges. After each presentation, judges
will rotate to ensure no set of judges is used twice. The high and the low score from each presentation will be dropped and the remaining scores averaged and rounded to the nearest hundredth following the practice of the North American Envirothon. During the final round, the teams with the top two presentation scores will present to another panel of judges for final ranking. Scores are calculated in the same manner as in the preliminary round. The scores from the final round will be averaged with the teams’ first round scores. **If a top 2 team does not have a full 5 member team present for the 2nd round of scoring, the VASWCD committee may disqualify the team or impose a penalty as deemed appropriate by the committee.** Only nonelectrical “AV” such as flip charts, posters, models, maps, etc. will be allowed. Any items handed to judges during a team’s presentation must be returned to teams following the presentation, including but not limited to brochures, food, promotional items etc. Each team will be assigned a team letter for representation during the event. A team name should not be mentioned during oral presentation or school/team shirts worn that identify the school or SWCD.

9. The scores of the Sunday afternoon presentations (worth 2/7 of total) will be added to the scores of each station (worth 1/7 each) on Monday. The top two oral presentation teams will give their presentations again in front of everyone while the final scores are being tabulated. Team presentations will not be scored a third time.

10. Medallions will be presented to teams who earn the highest score in each of the stations (forestry, aquatics, wildlife, soils, and current issue.) Awards will be presented to the top overall scoring team.

11. The first-place team will represent Virginia at the North American Envirothon (July 28-Aug. 2, 2019 in Raleigh, NC). If the first-place team is unable to go, the second-place team will represent Virginia at the North American Envirothon contest. VASWCD will cover registration and fees for 5 team members and 1-2 coaches at the North American competition.

12. Medical needs, emergencies and student conduct during the competition are the responsibility of the school/coach or group the team represents during the contest. Please have students share medical information such as allergies or medication needs with coaches before leaving for the contest. The contest should be considered a school or group-sanctioned field trip. Check with the school or affiliated group about appropriate permission slips or liability waivers that apply to field trips for your school system.

13. Teams may only bring water bottles to testing stations (Calculators, clip boards, writing utensils, Biltmore sticks, and other items will be provided as needed). **Students are not permitted to carry electronic devices or bags of any kind on the day of the event.**

14. Any concerns related to testing should be brought to the immediate attention of the Scoring Committee and/or Envirothon Coordinator. Cheating will not be tolerated and is subject to disqualification. Teams must submit written appeals to the Envirothon Coordinator within 30 minutes of the completion of final testing station. Appeals forms can be found at score keeping headquarters. An Appeals Committee will review appeals and proper action will be taken if necessary. All decisions of the Appeals Committee are final.

15. Local and Area Envirothon Rules will not conflict with the aforementioned Virginia Envirothon Rules.

16. Any infraction of the Virginia Envirothon Rules may result in disqualification and dismissal from the event and host site.

17. Teams are not permitted to take completed tests home. Time will be provided to review tests and answers keys on site following the competition. Photos or detailed notes of tests or answer keys is not permitted.
PRE-COMPETITION CHECKLIST

Maintain close contact with your local Conservation District Office (local SWCD contact information can be found at http://vaswcd.org/district-directory).

Ensure the following checklist is completed.

- Team members are trained in each of the five test areas: Soils, Wildlife, Aquatics, Forestry, Current Issue Problem

- Team members are familiar with Learning Objectives associated with above test areas.

- Team has prepared an oral presentation in response to the presentation prompt provided by the Virginia Association of Soil & Water Conservation Districts. The presentation prompt is typically distributed in October. The prompt can be found at www.vaswcd.org or through your local SWCD office

- Registration forms returned to VASWCD Office (or district office for Local/Area competitions)

- Transportation has been arranged to the competition

- Team members are familiar with the rules of the competition

DAY OF THE EVENT REMINDERS

- Be on time! Allow ample travel time. Arrive 20 minutes prior to your assigned registration time.

- Accompany your team to the orientation session, if applicable and be sure they understand all instructions.

- Coaches may not consult with or accompany teams once the competition has begun.

- Familiarity with the rules and regulations of the competition is expected of all coaches and team members.
Virginia Envirothon Team Advisor Annual Schedule

Please use the following as a guide for your Envirothon program. Additional training opportunities may come available through other venues/resources to contribute to your annual Envirothon program.

- **September-October**
  - Recruit Envirothon team members.
    - An Envirothon team consists of a minimum of five high school aged students. An unlimited amount of students may participate in the program.
  - Review Envirothon Learning Objectives, resources and suggested activities provided by the North American Envirothon and Virginia Envirothon coordinators.
  - Design Meeting Schedule
    - September-February ~ once per week/every other week
    - March-Competition Dates ~ twice per week
  - Plan Envirothon team meetings to cover all materials provided in Learning Objectives
  - Begin utilizing Virginia Envirothon Resources
    - Acquire hands-on materials from local SWCD
    - Literature and online resources available through VASWCD
  - Contact local SWCD for Envirothon Training Workshop Schedule
    - Be aware of registration deadlines & follow proper procedure to allow school permission for students to attend training workshops

- **November-January**
  - Attend Envirothon Training Workshops
    - hands-on workshop open to students and advisors
    - Contact local SWCD for Training Workshop information
  - Continue Team Meeting Schedule

- **December-February**
  - Continue meeting with students
  - Contact local resource professionals to meet with team to develop field skills
    - Department of Forestry
    - Natural Resource Conservation Service
    - Department of Environmental Quality
    - Department of Game & Inland Fisheries
    - State Parks
    - Master Naturalist Volunteers
    - Local nature centers, etc.
  - Attend regional Envirothon training workshops

- **March-April**
  - Continue meeting with students
  - Attend local and/or Regional Envirothon competition
    - 1 day competitions

- **May**
  - Attend State Envirothon competition
    - 2 day competition
Aquatics

Key Point 1—Abiotic factors

**Learning Objectives:**
1. Know the processes and phases for each part of the water cycle and understand the water cycle's role in soil nutrient erosion, salinization of agricultural lands and climatic influences.
2. Understand the concept and components of a watershed and be able to identify stream orders and watershed boundaries. Know the features of a healthy watershed and an unhealthy watershed.
3. Know how to perform and interpret chemical water quality tests and understand why aquatic organisms and water quality are affected by the physical, chemical and biological conditions of the water.

**Suggested Activities:**
1. Use topographic maps to investigate the concept of a watershed, identify a river's watershed system and delineate the watershed of a given area. Be able to describe how different land uses and watershed characteristics can affect water runoff, water flow, types of stream habitats and management approaches.
2. Investigate and find out who is using the water in your watershed and become familiar with historic data to determine the health of your watershed.
3. Conduct chemical water quality tests to determine the temperature, dissolved oxygen, pH, phosphorus, alkalinity, nitrogen and percent of saturation of a water sample and explain why these test results are indicators of water quality and can be used to assess and manage aquatic environments.

**Resources:**
3. How to Read a Topographic Map and Delineate a Watershed https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nh/technical/?cid=nrcs144p2_015680

Key Point 2—Biotic factors

**Learning Objectives:**
1. Understand the dependence of all organisms on one another and how energy and matter flow within an aquatic ecosystem.
2. Understand the concept of carrying capacity for a given aquatic ecosystem and be able to discuss how competing water usage may affect the ability of the system to sustain wildlife, forestry and anthropogenic needs.
3. Identify common, rare, threatened and endangered aquatic species as well as Aquatic Nuisance Species (ANS) through the use of a key.
4. Know how to perform biological water quality monitoring tests and understand why these tests are used to assess and manage aquatic environments.

**Suggested Activities:**
1. Describe the habitat needs of three specific aquatic animals and compare and contrast the flow of energy in three different aquatic food chains.
2. Create a visual display of rare and endangered aquatic species. Explain how human activities are causing species imperilment and specify actions being taken to protect these species.
3. Conduct a biological stream assessment by collecting macroinvertebrates. Stream Data sheets (key point 1 resource 4) should be used to record and analyse information. Explain why these organisms are biological indicators that help us determine the health of a stream or waterway.

**Resources:**
Key Point 3—Aquatic Environments

Learning Objectives:
1. Identify aquatic and wetland environments based on their physical, chemical and biological characteristics.
2. Know characteristics of different types of aquifers and understand historical trends and threats to groundwater quantity and quality.
3. Understand societal benefits and ecological functions of wetlands.
4. Understand the functions and values of riparian zones and be able to identify riparian zone areas.

Suggested Activities:
1. Describe the physical, chemical and biological characteristics of a stream, river, pond, lake and wetland.
2. Explain how different types of aquifers are indicators of water quantity and quality. Describe how subsidence and salt water intrusion are related to the falling water table in many aquifers.
3. Describe three functions of wetlands and explain how these functions are met in the absence of wetlands.
4. Describe three functions of riparian zones and explain how the removal of or damage to the riparian zone would affect water quality and specific aquatic food chains.

Resources:

Key Point 4—Water Protection and Conservation

Learning Objectives:
1. Understand how education programs and enforcement agencies are working together to protect aquatic habitats and preventing those who use our waterways from inadvertently transporting Aquatic Nuisance Species (ANS) from one river to another.
2. Interpret major provincial and/or federal laws and methods used to protect water quality (i.e. surface and groundwater). Utilize this information to propose management decisions that would improve the quality of water in a given situation.
3. Be familiar with the Federal, Provincial and state agencies that provide oversight of water resources and understand that Geographic Information Systems (GIS) is a useful and important tool in the management of water resources.
4. Identify global and local sources of point and non-point source pollution and be able to discuss methods to reduce point and non-point source pollution.
5. Understand the interaction of competing uses of water for water supply, hydropower, navigation, wildlife, recreation, waste assimilation, irrigation and industry.
6. Know the meaning of water conservation and understand why it is important every time you turn on a faucet.

Suggested Activities:
1. List at least 3 Aquatic Nuisance Species (ANS) and describe their effects on an aquatic ecosystem. Consider what can happen when predator ANS are imported and develop a plan for the eradication of a target ANS.
2. Site water protection laws at a mock hearing to decide whether a permit should be given to build a new shopping mall along a river.  
3. Explain how Geographic Information Systems (GIS) are being used to help communities assess water quality and watershed health information.

4. Compare water usage in different regions of Canada and the United States and propose actions to help countries strike a balance between supply and demand in order to realize maximum benefit from our water resources.

5. Design a comprehensive water conservation plan for your home and the watershed below your home. This should include groundwater replenishment, securing sediment on your property, managing non-point source pollution and following the path of good water quality as it leaves your property on its way to the sea.

6. Many dams are used to provide low cost electricity at the critical time of day when there is peak demand for electricity. Today a major issue is deciding which is more important to the economy, low cost energy or improving/restoring the ecology of a river. Evaluate the issue and develop recommendations for conservation groups and utility executives.

**Resources:**
8. Polluted Runoff: Non-point source pollution [https://www.epa.gov/nps](https://www.epa.gov/nps)
9. EPA Office Of Water- [https://www.epa.gov/aboutepa/about-office-water#wetlands](https://www.epa.gov/aboutepa/about-office-water#wetlands)
FORESTRY

Forestry Key Point 1—Tree Physiology and Tree and Shrub Identification


Learning Objectives:
1. Know the parts and tissues of a tree, and be able to explain the growth cycle and life cycle of a tree.
2. Understand the processes of photosynthesis and respiration and how they are important to the growth and reproduction of trees.
3. Identify common tree species without a key, and identify specific or unusual trees and shrubs through the use of a key.

Suggested Activities:
1. Identify trees and shrubs using leaf and seed samples.

Suggested Resources:

Forestry Key Point 2—Forest Ecology


Learning Objectives:
1. Know the typical forest structure: canopy, understory and ground layers and crown classes.
2. Understand forest ecology concepts and factors affecting them, including the relationship between soil and forest types, tree communities, regeneration, competition, and primary and secondary succession.
3. Identify the abiotic and biotic factors in a forest ecosystem, and understand how these factors affect tree growth and forest development. Consider factors such as climate, insects, microorganisms, and wildlife.

Suggested Activities:
1. Identify and describe the life cycle of forest pests and invasive plants and describe their impact to a forest ecosystem. Research integrated pest management strategies for selected pests.
2. Draw food webs of a mature deciduous forest and a mature coniferous forest. Explain how wildlife habitat relates to the forest community and describe the niches of various organisms that live in both of these forest ecosystems.
3. Examine a “tree cookie” or core sample taken with an increment borer to determine the age, growing conditions, insect and disease damage, and past weather conditions.
4. Project Learning Tree Activity 7, Understanding Fire: Explore patterns of change brought about by fires in a forest ecosystem.

Suggested Resources:
3. Project Learning Tree Activity 7: Understanding Fire

Forestry Key Point 3—Sustainable Forest Management


Learning Objectives:
1. Understand the term silviculture, and be able to explain the uses of the following silviculture techniques: thinning, prescribed burning, single tree and group tree selection, shelterwood method, clear-cutting with and without seed trees, and coppice management.
2. Explain the following silviculture systems: clear-cutting, seed tree method, even-aged management, uneven-aged management, shelterwood and selection.
3. Understand the methodology and uses of the following silviculture treatments: Planting, weeding, pre-commercial thinning (PCT), commercial thinning and harvesting.
4. Know how to use forestry tools and equipment in order to measure tree diameter, height and basal area.
5. Understand how the following issues are affected by forest health and management: biodiversity, forest fragmentation, forest health, air quality, aesthetics, fire, global warming and recreation.
6. Understand how forestry management practices and policy affect sustainability.
7. Understand how economic, social and ecological factors influence forest management decisions.
8. Learn how science and technology are being utilized in all aspects of forest management.

Suggested Activities:
1. Use the following forestry tools and know how they are used in forest management. clinometer, increment borer, diameter tape, biltmore stick, abney level, and compass, prism and telescopic.
2. Use a variety of volume tables to calculate the volume of lumber for several different tree species.
3. Project Learning Tree Activity 8, Fire Management: Learn the many interdependencies of forests and fire in healthy ecosystems.
4. Compare two different forest types. For example: an eastern hardwood forest in PA to a conifer forest in Oregon. Identify economic, social and ecological factors that affect how both of these forests are managed.
5. Explain the Information Technology used to monitor and productively manage forests, and give specific examples of how this technology is being utilized in all aspects of forest management.

Suggested Resources:
1. Woodland Management: Measuring your Forests


3. Forest Stewardship –BMPs: PSU Bulletin 12

4. Project Learning Tree Activity 8, Fire Management
Forestry Key Point 4—Trees as an Important Renewable Resource


Learning Objectives:
1. Understand the importance and value of trees in urban and community settings, and know the factors affecting their health and survival.
2. Understand the economic value of forests and know many of the products they provide to people and society.
3. Explain the “Ecosystem Services” provided by trees, and understand why trees and forests are important to human health, recreation, wildlife, and watershed quality.

Suggested Activities:
1. Create a display showing the value of trees in both urban and suburban settings. Identify the factors that affect their health and survival, and explain how to properly care for trees in an urban environment.
2. Make a list of products and by-products that come from your home and are made from trees. Describe the chemical and physical properties of trees used in making these products.

Suggested Resources:
1. Trees and Ecosystems Services - http://www.naturewithin.info/UF/UFdefined.html
SOILS/LAND USE

Soils/Land Use Key Point 1—Physical Properties of Soil and Soil Formation


Learning Objectives:
1. Understand the importance of soils and appreciate the relatively small amount of usable soil that exists on Earth.
2. Know the five soil forming factors, and understand how they influence soil properties.
3. Understand the origin and types of soil parent materials.
4. Understand basic soil forming processes: additions, losses, translocations, and transformations.
5. Recognize and understand features of Soil Profiles, and be able to use this information to determine basic soil properties and limitations.
6. Identify and describe soil characteristics (texture, structure, and color - using Munsell color charts).

Suggested Activities:
1. Generate a list of reasons why soils and the study of soil science is important to sustaining life on Earth, and explore how much soil available on Earth is for human use.
2. Describe the five factors of soil formation and be able to explain how each factor affects the soil profile.
3. Conduct a field analysis by digging or using an auger to examine a soil pit. Determine soil characteristics and properties, by describing soil horizons and recording data.
4. Use soil profile information to compare soil samples from agriculture cropland, wetland, forest and an urban area, and explain why there are differences in water table, permeability, runoff, infiltration and water holding capacity.
5. Estimate percent sand, silt, and clay for soil samples collected and determine texture class using the texture triangle. Explain how texture is important in soil fertility and soil management.

Resources:
1. Why Soil is Important  
   http://www.envirothon.org/files/curriculum/soil/Why_Soil_is_Important_sm.pdf

2. How Much Soil is there?  
   http://www.envirothon.org/files/curriculum/soil/KP1.2How_Much_Soil_Is_There%5b1%5d.pdf

3. From the Surface Down  https://www.youtube.com/watch?v=knrmCbcGfGEA

4. Land Capability Classification:  

5. Soil Formation and Classification  
   https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054278

6. Guide to Texture by Feel  
   https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054311
Soils/Land Use Key Point 2—Soil Ecosystems


Learning Objectives:
1. Recognize that biological diversity is important for soil health and hence plant, human and environmental health.
2. Understand how the hydrologic, carbon and nutrient cycles relate to soil management.
3. Recognize that understanding soil ecosystems is important to soil management.

Suggested Activities:
1. Construct a Burlese funnel to learn about the diversity of life living in the soil. Draw a soil food web showing the 5 trophic levels and discuss why biodiversity is important to healthy soil. (note: some important soil organisms will not show up in the Burlese funnel, but they should be included in the trophic level diagram.)
2. Draw the nitrogen, carbon and phosphorus cycles and identify the types of organisms (flora and fauna) involved in these cycles. Identify their roles in decomposition and nutrient cycling.
3. Discuss the decomposition and transformations of organic matter, toxins and pesticides. Discuss the importance of microorganisms, and what would occur if they were not present in the food chain.
4. Discuss how Integrated Pest Management can affect biological diversity.

Resources:

Soils/Land Use Key Point 3—Chemical Properties of Soil and Soil Fertility


Learning Objectives:
1. Understand the procedure for taking a soil sample and conducting nutrient analysis.
6. Know that plants must receive essential micronutrients and macronutrients from the soil in order to be healthy, and understand that soil fertility relates to the physical and chemical properties of the soil in addition to the quantity of nutrients.

7. Understand why soil fertility reflects the physical, chemical and biological state of the soil.

**Suggested Activities:**

1. Collect a representative soil sample from a piece of land (preferably your own) as an introduction to soil testing. Conduct soil test experiments to measure pH and determine the amounts of plant available nitrogen (N), Phosphorus (P), and Potassium (K) in soil samples collected from different locations such as: cropland, forested area, and in a flood plain. Record your data, and analyze and compare results.

2. Explain the ABC’s of Nutrient Management, and how Nutrients and Plant Health, Pest, Profits and the Environment relate to healthy soil.

3. Explain why soil fertility reflects the physical, chemical and biological state of the soil.

4. Compare and contrast the benefits and risks of using nutrients from a synthetic fertilizer with those from a natural source.

**Resources:**

1. Soil Testing - [https://extension.umd.edu/hgic/topics/soil-testing](https://extension.umd.edu/hgic/topics/soil-testing)

2. Plant Nutrients - [http://landresources.montana.edu/nm/documents/NM2.pdf](http://landresources.montana.edu/nm/documents/NM2.pdf)

3. Nutrient Management  
   [https://extension2.missouri.edu/mg4](https://extension2.missouri.edu/mg4)

**Soils/Land Use Key Point 4—Soil Conservation and Land Use Management**


**Learning Objectives:**

1. Compare different land uses and conservation practices and their impact on soils and erosion.

2. Understand how soil is impacted by point & non-point source pollution & the importance of soil management to agriculture and clean water.

3. Understand that soil management and environmental protection requires agricultural and resource managers to use spatial tools such as Geographic Information Systems (GIS), and Global Positioning Systems (GPS) in order to make the best possible resource decisions.

4. Learn about career opportunities and the role of government in the management of natural resources.

**Suggested Activities:**

1. Identify or recommend Best Management Practices to maximize agriculture production and control water movement to prevent erosion and pollution on construction sites, residential development and cropland.
2. In a land use planning discussion, identify types of soil erosion and explain how soil is a factor in non-point source pollution, and describe how soils can be used to clean up pollutants.

3. Become familiar with the Universal Soil Loss Equation (USLE), and learn how it used to estimate the soil erosion rates of a selected construction site and cropland field.


**Resources:**

1. Urban Soil Primer 
2. Soil Erosion: Causes and Effects- 
3. Using the Universal Soil Loss Equation (USLE)- 
4. Careers in Soil Science- 
   http://www.envirothon.org/files/curriculum/soil/KP3.4careers_in_soil_science%5b1%5d.pdf

**Soils/Land Use Key Point 5—Web soil surveys & Soil Surveys**


**Learning Objectives:**

1. Access and use published and on-line soil data and other resources to learn how land use affects soil, and the limitations of local soils.

2. Understand the eight Land Capability Classes and how they are important in determining appropriate land use.

3. Understand soil drainage classes and be able to recognize the characteristics of hydric soils and know how soils fit into the definition of wetlands.

**Suggested Activities:**

1. Download your local area’s soil survey map to learn the limitations that local soils have for septic systems, foundations, agriculture, and future development.

2. Describe the eight Land Capability Classes and use a soil profile and site description to determine land capability class.

3. Visit your local land planning office and ask how GIS and GPS systems are used in making land use planning and development decisions. Explain how GIS and GPS can be used in learning about the soil characteristics in a wetland soil.
Resources:

1. **Web Soil Survey: know how to access and use soil data**
   http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

2. **National Soils Data Base (NSDB): Know how to access and use soil and landscape data of Canada**

3. **Land Capability Classification**
   http://www1.udel.edu/FREC/spatlab/oldpix/nrcssoilde/Descriptions/landcap.htm

4. **Hydric Soils**
   https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961

5. **Site Fingerprinting**

Additional Soil Resources

- Additional soils information may be found at: https://www.soils.org/
WILDLIFE

Wildlife Key Point 1- Knowledge of Wild Birds, Mammals and Herps

Learning Objectives:
1. Identify wildlife species using mounted specimens, skins/pelts, pictures, skulls, silhouettes, decoys, wings (waterfowl), scats, tracks, animal sounds, or other common signs. Animal tracks may be original or molds made of the prints. Wildlife signs may be real or reproduced.
2. Use a key or field guide to identify wildlife species or signs. Wildlife species or signs may be presented in any form as described above.
3. Identify general food habits (herbivore, omnivore, carnivore), habitats (terrestrial, aquatic, fossorial), and habits (diurnal, nocturnal) using skull morphology and/or teeth.

Resources:
1. These resources can be used as references:
2. Outdoor Action Guide to Animal Tracking: pages 1 – 6
   http://www.princeton.edu/~oa/nature/tracking.pdf

Wildlife Key Point 2—Wildlife Ecology

Learning Objectives:
1. Know the meaning of “habitat”, and be able to name the habitat requirements for wildlife and the factors that affect wildlife suitability.
2. Know and understand basic ecological concepts and terminology.
3. Understand the difference between an ecosystem, community and population. Be able to explain how communities interact with their non-living surroundings to form ecosystems.
4. Understand wildlife population dynamics such as birth, mortality, age-structure, sex ratio, and mating systems. Understand the impact of limiting and decimating factors of common wildlife species on wildlife management.
5. Recognize that all living things must be well-adapted to their native environment in order to survive. Be able to identify, describe and explain the advantages of specific anatomical, physiological and/or behavioural adaptations of wildlife to their environment.
6. Know the meaning of the term “Biodiversity”, and understand why biodiversity is important to people and wildlife.

7. Understand the importance of the 3 levels of biodiversity: genetics, species and ecosystem or community, and understand the implications of biodiversity loss at each level.

**Suggested Activities:**

1. Draw a map of an area and identify sources of food, water and shelter available to wildlife. Select a wildlife species, and assess whether the area on your map will provide suitable habitat for this species. If any part of the habitat is lacking, explain what you could do to improve the habitat for this species?

2. Explain the relationship between the Pyramid of Numbers and the Pyramid of Biomass. Relate this exercise to an actual habitat to help you understand how much land area is needed to support life at each level of the food chain. Lesson: Ecological Pyramids, (http://sfr.psu.edu/youth/sftrc/lesson-plans/wildlife/9-12/pyramid)

3. Create a detailed display to show examples of different types of food chains and illustrate the interdependence of organisms within a food web. Include terms such as tropic levels, predator, prey, scavengers, decomposers, omnivore, insectivore, herbivore, carnivore, producer, primary consumer, secondary consumer and tertiary consumer.

4. Explain the term “ecosystem” and give examples of different types of ecosystems. Describe a type of ecosystem and explain the importance of a keystone species. Draw food chains that include a specific keystone species and discuss what might happen if this species were removed from the food chain or if their populations diminished.

5. Select several wildlife species common to your area and list potential limiting and decimating factors for each. Visit a natural area, park, forest, and/or farm and assess the area to determine which of the limiting and decimating factors on your list would actually impact your selected species. For example, water may be a potential limiting factor, but the area you visit may have an abundance of water. Therefore, water would not be a limiting factor on this area and would have no impact.

6. Explain why your state or province is so diverse and explain what is being done to protect the biodiversity of wildlife. Include the following vocabulary to help you explain your answer: biodiversity, keystone species, native, endemic, habitat, biome, and food web.

7. Compare and contrast the behavioural and physiological adaptations of specific animals that live in two different environments. Explain why these animals are well-adapted to survive in their particular environment and include wildlife biology terms to describe specific adaptations.

8. Explain the three levels of biodiversity and give several reasons why biodiversity is important to wildlife and people. Select examples of species in your area that have become locally extinct and explain what causes loss of biodiversity. What can be done to gain biodiversity?

**Resources:**


Wildlife Key Point 3—Conservation and Management of Wildlife


Learning Objectives:
1. Know the preferred habitat types and specific habitat requirements of common wildlife species. Understand how this knowledge helps us to better protect both the land and the wildlife species that depend on it.
2. Understand the difference between biological and cultural carrying capacity, and be able to identify social and ecological considerations where human use of land conflicts with wildlife habitat needs.
3. Identify common wildlife management practices and methods that are being used to manage and improve wildlife habitat.
4. Understand the role of federal, state and provincial Fish and Wildlife Agencies in the management, conservation, protection, and enhancement of fish and wildlife and their habitats.
5. Know that all states and provinces have a hunting safety course and mandatory hunter education program developed specifically for each state or provincial government’s hunting and wildlife agency.

Suggested Activities:
1. Explain the meaning of the terms "migration route" and "flyway". Know the four major North American flyways and understand the importance of these routes to migratory land, water and shore birds.
2. Determine which common wildlife species in your area depend on open land, woodland and wetland habitat for their survival. Identify the various types of habitat within open lands, woodlands, and wetlands, and explain the importance of these specific habitats to common wildlife species within your area.
3. Explain why human use of land is the major reason for habitat loss. Provide examples of habitat destruction, fragmentation, and degradation and explain how wildlife species survival is threatened by habitat loss in your area.
4. Research and analyze controversial issues in order to understand the relationship between wildlife, economics and society. Penn. State School of Forest Resources: The Social and Economic Impact of Wildlife and Natural Resource Management Lesson Plan (http://sfr.psu.edu/youth/sftrc/lesson-plans/wildlife/9-12/impact)
5. Make a list of wildlife management practices and strategies that will restore or improve habitat for each of the following land uses: cropland, grassland, woodland, wetland, pond/lake, and urban setting (backyards, greenways, urban parks). Include specific wildlife species that will benefit from each wildlife practice or strategy.
6. Make a list of the Federal and State Fish and Wildlife Agencies within your state or province. Determine how each protects and manages the wildlife resources of your area, and describe activities and programs that are undertaken to protect and manage wildlife and their habitats.
7. Explain regulated trapping procedures and discuss the issues that are involved in trapping fur-bearing animals. Research and explain the dilemma of biological carrying capacity vs. cultural carrying capacity in your discussion.

8. Explain how Wildlife Managers are using Satellite Remote Sensing, GPS and GIS in Conservation and Wildlife Management. Give an example explaining the benefits of using this technology in remote areas.

Resources:

1. North American Migration Flyways –
   https://www.fws.gov/birds/

2. This resource is to be used as a reference: Online Hunting Safety Classes and Hunter Certification Tests –

3. Trapping and Furbearer Management in North American Wildlife Conservation pages 4-20 -
   http://files.dnr.state.mn.us/recreation/hunting/trapping/na_furbearer_mgt.pdf

Wildlife Key Point 4—Issues Involving Wildlife and Society


Learning Objectives:

1. Understand how non-native (exotic), invasive species threaten our environment and the biodiversity of many wildlife species. Understand that non-native (exotic), invasive plants impact wildlife habitat and thus have a tremendous impact on native wildlife.

2. Learn about the complexities of decision-making in making land use decisions that affect wildlife, and understand that wildlife resources are under constant pressure caused by human population growth, environmental degradation, and habitat reduction.

3. Know that Wildlife species are subject to diseases resulting from exposure to microbes, parasites, toxins, and other biological and physical agents.

4. Understand the terminology and factors that affect threatened and endangered wildlife species. Know the meaning of extinct, extirpated, endangered, threatened, candidate species and reintroduction.

5. Identify the characteristics that many extinct and endangered species possess, and be able to identify many species wildlife that are endangered and threatened.

6. Understand the role of the Endangered Species Act in helping to conserve endangered and threatened species. Know the organizations and agencies responsible for listing and protecting endangered species on global, federal, state and provincial levels.
Suggested Activities:
1. Give specific examples of non-native (exotic), invasive species in your area and describe how they have altered habitats, threatened ecosystems, and impacted wildlife. Explain what is being done to increase awareness and facilitate effective prevention and management of non-native (exotic) invasive species.

2. Explain the three major kinds of habitat loss. Give examples of how human activity is the biggest threat to wildlife habitat and also discuss how people can have a positive impact on wildlife habitat and biodiversity.

3. HIPPO is an acronym that represents the five major threats to biodiversity, which are caused by human activity. Design a poster to illustrate the HIPPO concept and factors that bring about the loss of biodiversity.

4. Name and describe two examples of diseases that are critically impacting Wildlife and explain why controlling emerging wildlife diseases have become a high-priority concern in the United States and Canada. Explain the life cycles of these diseases and how they can be transmitted to humans.

5. Identify and describe factors that threaten and endanger wildlife species in your area. Explain what actions are being taken by various agencies and interest groups to improve the chance of survival for specific threatened and endangered species. Also, determine what practical measures private citizens can take to assist in the recovery of threatened and endangered species.

6. Select several endangered species and create a display to describe the characteristics that have made these species more vulnerable. Discuss state, provincial and federal efforts being taken to protect these species.

Resources:
1. Introduced Species: The Threat to Biodiversity and What Can Be Done (See ‘learn more links’ at the end of article for additional information) http://www.actionbioscience.org/biodiversity/simberloff.html?print


4. This resource is to be used as a reference: USGS Vector-borne Diseases and Zoonotic (transmitted between animals and humans) Diseases http://health.usgs.gov/vector_zoonotic/


Current Issue Learning Objectives

In addition to the station topics, each year there is a current issue learning objective. Previous examples of learning objectives for reference include:

- 2010 Current Issue: “Protection of Groundwater Through Urban, Agricultural and Environmental Planning”
- 2011 Current Issue: “Salt and Fresh Water Estuaries”
- 2012 Current Issue: “Nonpoint Source Pollution/Low Impact Development”
- 2013 Current Issue: “Sustainable Rangeland Management”
- 2014 Current Issue: “Sustainable Agriculture”
- 2015 Current Issue: “Urban & Community Forestry”
- 2016 Current Issue: “Invasive Species”
- 2018 Current Issue: “Pastureland Management in Virginia”
- 2019 Current Issue: “Agriculture and the Environment: Knowledge and technology to feed the world”

Please check with your local Soil & Water Conservation District office or the Virginia Association of Soil & Water Conservation Districts for the Current Issue Learning Objectives and resources.
SAMPLE ENVIROTHON TEST QUESTIONS

Contact your local Soil & Water Conservation District for more sample tests.
*Tests are completed as a team. Each team will receive one copy of the test to complete and submit.

SOILS SAMPLE QUESTIONS

Field Exercises – Soil Pit

1. What is the general color of the A horizon in this soil profile?
2. Why is the A horizon this color?
3. What is the name of the dominant process which has resulted in the formation of this A horizon?
   A. Weathering
   B. Humus Incorporation
   C. Leaching/Eluviation
   D. Gleying
4. What is the texture class of the A horizon in this profile?
5. Based on your inspection of the soil profile and the overall site, what would you say is the drainage class of this soil/site?
   A. Rapid
   B. Well
   C. Imperfect
   D. Poor

Written Exercises

1. Soil scientists classify soil particles in the categories of ______, ______, and ______.
2. Sediment from erosion can be reduced by
   a. planting grass and trees
   b. digging ditches
   c. mulching areas
   d. a and c
   e. all of the above
3. Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. One of the most important soil properties that affect the available water capacity is:
   a. the amount of rainfall the soil receives
   b. the flooding frequency of the soil
   c. the type of bedrock
   d. the soil texture (the percentage of sand, silt and clay in soil)
4. Crops grown in rotations to maintain or improve soil productivity and fertility is called
   a. contour farming
   b. conservation tillage
   c. crop rotation
   d. none of the above
5. The two factors that help break down organic matter to create soil are _____ and ______.
SOILS SAMPLE TEST ANSWERS

1. Soil scientists classify soil particles in the categories of sand, silt, and clay.

2. Sediment from erosion can be reduced by planting grass and trees and mulching areas.

3. Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. One of the most important soil properties that affect the available water capacity is the soil texture (the percentage of sand, silt, and clay in soil).

4. Crops grown in rotations to maintain or improve soil productivity and fertility is called crop rotation.

5. The two factors that help break down organic matter to create soil are bacteria and fungi.

FOREST EVALUATION SAMPLE QUESTIONS

Contestants should be able to complete the following forms while standing on a 1/10th acre forest plot, with five trees marked for measurement:

SITE EVALUATION: Circle (A) soil depth; (B) slope percent; (C) aspect; and (D) slope position as they apply to the area.

<table>
<thead>
<tr>
<th>A. Soil Depth</th>
<th>Deep -- 24&quot; or more</th>
<th>Shallow -- Less than 24&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Slope Percent</td>
<td>Rolling 0-20%</td>
<td>Steep 21-40%</td>
</tr>
<tr>
<td>C. Aspect</td>
<td>NE</td>
<td>SW</td>
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<tr>
<td>D. Slope Position:</td>
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<tr>
<td>Bottom</td>
<td>I</td>
<td>II</td>
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<td>Lower 1/3</td>
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<td>II</td>
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<td>Middle 1/3</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Upper 1/3</td>
<td>II</td>
<td>III</td>
</tr>
</tbody>
</table>

E. Forest Land Capability Class: Based on the above information, circle the correct class below.

I. Excellent   II. Good   III. Fair   IV. Poor
FOREST STAND EVALUATION: Check the correct answer in each section A-F:

A. Grazing Damage
   _____ grazed
   _____ ungrazed

B. Fire
   _____ unburned
   _____ wildfire
   _____ prescribed fire

C. Size Distribution (there may be more than one correct answer)
   _____ reproduction
   _____ sapling
   _____ pole
   _____ sawtimber

D. Forest Type
   _____ hard pines
   _____ mixed oaks
   _____ white pine
   _____ cove hardwoods
   _____ red oak, white oak, hickory
   _____ northern hardwoods

E. Stand Origin
   _____ seedling
   _____ sprout
   _____ mixed
   _____ plantation

F. Stocking
   _____ understocked
   _____ overstocked
   _____ well stocked
FOREST INVENTORY

<table>
<thead>
<tr>
<th>Tree Number</th>
<th>Tree Species (2 pts)</th>
<th>Crown Class (2 pts)</th>
<th>DBH (2 pts)</th>
<th>Height in 16 ft Logs (2 pts)</th>
<th>Board-foot Volume</th>
<th>Tree Value $</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</table>

Plot volume and value (1/10th acre plot)

Per acre volume and value (5 pts. each)

MANAGEMENT RECOMMENDATIONS (Mark those you recommend)

1. Which species (one or more) would you favor on this site? __________________________
2. Clearcut the stand and plant with a desirable species……………………………
3. Clearcut and allow for natural regeneration………………………………………..
4. Conduct a shelterwood or seed-tree harvest………………………………………
5. Conduct a selection harvest of mature trees, undesirable species and
   and poorly formed trees ……………………………………………………………
6. Conduct a salvage or sanitation cutting …………………………………………..
7. Conduct a thinning ………………………………………………………………
8. Leave alone to grow ………………………………………………………………
9. Use Best Management Practices to protect water quality …………………….
10. Protect the area from wildfire …………………………………………………
11. Manage stand for non-timber forest products ……………………………….
12. Manage stand for recreational opportunities ……………………………….
13. Conduct a prescribed burn? ……………………………………………………..
14. Manage stand for wildlife habitat improvement? ………………………….
15. Fence area from livestock …………………………………………………….
AQUATICS SAMPLE QUESTIONS

1. What are biological indicator species used for? List two types of organisms used for this purpose.

2. What is the preferred pH range for most freshwater organisms?
   a. 5-6
   b. 5.5-8.5
   c. 7-10
   d. 4-7
   e. 0-14

3. What are the two, primary nutrients that affect water quality?

4. List two examples of point source pollution.

5. List two examples of nonpoint source pollution.

AQUATICS SAMPLE QUESTION ANSWERS

1. Biological indicator species are used to determine the relative health and quality of water. The absence of pollution sensitive species indicates a water quality problem. Types of organisms used for this purpose include larval stages of the Mayfly, Caddisfly, Stonefly, Helgrammite, Riffle beetle, Dragonfly/damselfly and Cranefly.

2. What is the preferred pH range for most freshwater organisms? 5.5 - 8.5

3. Nitrogen and phosphorus are the two, primary nutrients that affect water quality.

4. Sewage discharge, factory discharge, cooling towers, landfill/dump sites, underground tanks and chemical/oils spills are examples of point source pollution. You can easily determine where the pollution is coming from into water.

5. Stormwater runoff, farm/yard runoff, air pollution, shoreline erosion and road/parking lot runoff are examples of nonpoint source pollution. It's difficult to identify where the pollution is coming from.
WILDLIFE SAMPLE QUESTIONS

1. List five herbaceous (non-woody) plant species that provide browse for whitetail deer and other small mammal herbivores.

2. Identify each skin and indicate which scat, skull and track go with it. (Items on tables during testing.)

3. An environmental condition that has a detrimental effect on a species' population and can cause a decline in or an elimination of that population is called a
   a. biotic niche
   b. carrying capacity
   c. life zone
   d. limiting factor

4. __________________ are areas of continuous habitat that permit animals to travel securely from one habitat to another.
   a. life zones
   b. corridors
   c. travel lanes
   d. flyways

WILDLIFE SAMPLE QUESTION ANSWERS

1. Greenbrier, Honeysuckle, Poison Ivy, Virginia Creeper, Forbs, Clover, etc.

2. Specimen identification.

3. An environmental condition that has a detrimental effect on a species’ population and can cause a decline in or an elimination of that population is called a limiting factor.

4. Corridors are areas of continuous habitat that permit animals to travel securely from one habitat to another.
Team members will use their knowledge, research and training in the areas of aquatics, soils, wildlife, forestry and the special issue as background for their oral presentation. Teams will be allowed 5 minutes to set up and 20 minutes to make their presentation. Following the presentation will be a 5 minute question and answer period. (The oral presentation time is 30 minutes total.)

The current oral presentation problem can be found through your local soil & water conservation district or VASWCD. The oral presentation problem will also be available online at the VASWCD Envirothon website.

Scoring procedures at Virginia’s Dominion Envirothon-State Competition
The North American Envirothon presentation score sheet will be used at the Virginia State contest. There will be two rooms assigned for 9 presentations each. There will be two sets of 5 judges. After every presentation, two judges will rotate to the other room. The high and the low score from each presentation will be dropped and the remaining scores will be averaged. The teams with the top two oral presentation scores will be scored again by the finals panel of judges. The scores from the first and final round oral presentations will be averaged to create the final score for the top two presentation teams. The scores of the presentations (worth 2/7 of total) will be added to the scores of each station (worth 1/7 each).

Materials allowed for visual display
Only non-electrical "AV" such as flip charts, posters, models, maps, etc. will be allowed. Any items used during presentation must leave the room with the team following the presentation, this includes any brochures or promotional items shared with judges.

Awards and recognition
The top two teams in the presentation area will give their presentations in front of the entire assembly while the final scores are being tabulated (the presentations will not be scored for a 3rd time). After the final judging has concluded, the top three teams (highest overall score) will be announced.

The team earning the highest score in the oral presentation category will be presented medallions at the awards ceremony.

**Oral Presentation/English Learning Objectives**

Prepare for a concise, compelling presentation using available resources (Conduct research).

Using materials and information gathered in your research, construct and present a presentation to a diverse judging panel of resource and communications professionals.

Respond to questions from the judging panel at the conclusion of your presentation. Questions may be direct or indirect.

**Standards of Learning**

**Communication**: 9.1, 9.2, 10.1, 10.2, 11.1, 11.2, 12.1, 12.2

**Reading**: 9.5, 10.5, 11.5, 12.5

**Writing**: 9.6, 10.6, 11.6, 12.6

**Research**: 9.8, 10.8, 11.8,
Judges Scoring Sheet. Each point is scored from 0-10

Part I Preparation & Presentation of Plan (60 point maximum)

A. How well did the presentation address or identify:
   - The interrelationship between the environment, natural resources, and the different natural resource management strategies?
   - The major natural resources areas (soils/land use, aquatic ecology, forestry, wildlife?)
   - All the different players/interest groups affected by the problem?
   - The current issue?
   - The specific environmental problem and related issues regarding the problem?

B. Were references and resources cited in the team presentation?

Part II Application of Data (80 points maximum)

A. Team demonstrated a solid understanding of political issue(s) related to the problem (regulations, mandates, impact on political system/community).
B. Team demonstrated a solid understanding of ecological/environmental issue(s) related to the problem.
C. The team demonstrated a solid understanding of economic issue(s) related to the problem including the cost & benefit of the proposed plan, (cost of implementing the plan, economic impact on local resources, cost of doing nothing, future costs, funding source(s), etc.)
D. The team demonstrated a solid understanding of social and/cultural issue(s) related to the problem (private property rights, traditions, clean and healthy environment, right to farm, urban issues, cultural issues, environmental justice).
E. The team presented one viable solution to the problem addressing the resource issue.
F. Solution in the presentation has potential to be applied or implemented with long term sustainability to natural resources.
G. Did the solution reflect or address the concerns of all affected groups and issues?
H. The main points were clearly stated and supported.

Part III Quality of Presentation (40 points maximum)

A. Presentation was well organized with a clear introduction and strong conclusion.
B. Participants enhanced the presentation (eye contact, gestures, voice inflection, originality, exhibited professionalism, etc.)
C. Visual aids were used to make major points and show conclusions. (Visual aids should be correct, eye appealing, readable, neat, etc.)
D. Questions were answered logically and concisely by all team members participating.

Part IV Required Elements (20 points maximum)

A. Add up to ten points for all team members participating in presentation. (Each team member gets 2 point for equal oral participation in presentation.)
B. Add up to five points if the presentation accomplished the task of presenting a plan.
C. Team demonstrated a solid understanding of ecological/environmental issue(s) related to the problem.
D. The team demonstrated a solid understanding of economic issue(s) related to the problem including the cost & benefit of the proposed plan, (cost of implementing the plan, economic impact on local resources, cost of doing nothing, future costs, funding source(s), etc.)
E. The team demonstrated a solid understanding of social and/cultural issue(s) related to the problem (private property rights, traditions, clean and healthy environment, right to farm, urban issues, cultural issues, environmental justice).
F. The team presented one viable solution to the problem addressing the resource issue.
G. Solution in the presentation has potential to be implemented with long term sustainability to natural resources.
H. Did the solution reflect or address the concerns of all affected groups and issues?
I. The main points were clearly stated and supported.
J. Up to five points awarded if the presentation was accomplished in allotted time and team made effective use of time. (5 pts-17-20 mins/4pts-15-16:59 mins/3pts-13-14:59mins/2pts-11-12:59mins/1pt-9-10:59mins/0pts)
### North American Envirothon Judges’ Note taking Help Sheet

**Team Letter:** ___________________  **Judge:** ___________________

<table>
<thead>
<tr>
<th>Scoring Description</th>
<th>0: Not at all</th>
<th>2: Major misconceptions or gaps; ineffective; inappropriate</th>
<th>4: Some misconceptions &amp; flaws; minimally effective; somewhat appropriate</th>
<th>6: Complete &amp; accurate; effective; adequate; appropriate</th>
<th>8: Complete, very detailed, logical, ideas well supported and well organized; highly effective, all details appropriate.</th>
<th>10: Profound, in-depth, done in an insightful manner; extremely organized, points to a most effective strategy.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I:</strong> Preparation &amp; Presentation Plan</td>
<td>Total Pts</td>
<td>How well do they address:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I A1: Interrelationships between: envir., nat. resources and management strategies</td>
<td></td>
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<tr>
<td>I A2: Players/interest groups and their positions.</td>
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<td>I A3: Addresses Nat. Resource Areas: Check off: (aquatics, soils, forestry, wildlife, other)</td>
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<td>I A4: Addresses the Current Topic</td>
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<td>I A5: Addresses the Oral Presentation Problem</td>
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<tr>
<td>I B: References and Resources Count of citations:</td>
<td>1-2 sources</td>
<td>Several with gaps</td>
<td>4-5 appropriate sources</td>
<td>Adequate; different points of view</td>
<td>In depth, all supported</td>
<td></td>
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</table>

**Part II:** Application of Data

<p>| | | | | | | |
| | | | | | | |
| II A: Understanding of Political Aspects of the Problem | | | | | | |
| II B: Environmental Aspects of the Problem | | | | | | |
| II C: Economic Aspects of the Problem | | | | | | |</p>
<table>
<thead>
<tr>
<th>Scoring Description</th>
<th>0: Not at all</th>
<th>2: Major misconceptions or gaps; ineffective; inappropriate</th>
<th>4: Some misconceptions &amp; flaws; minimally effective; somewhat appropriate</th>
<th>6: Complete &amp; accurate; effective; adequate; appropriate</th>
<th>8: Complete, very detailed, logical, ideas well supported and well organized; highly effective, all details appropriate.</th>
<th>10: Profound, in-depth, done in an insightful manner; extremely organized, points to a most effective strategy.</th>
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<td>II D: Social/Cultural Aspects of the Problem</td>
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<td>II E: One Viable Solution Presented</td>
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<td>II F: Parts Clearly Stated &amp; Supported.</td>
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<td>II G: Solution that can be implemented with long term sustainability</td>
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<td>II H: Addressing Concerns of the Players and Issues Involved</td>
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<td><strong>Part III: Presentation Quality</strong></td>
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<td>III A: Well Organized, Clear Intro. &amp; Strong Conclusion</td>
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<td>III B: Good Presentation Skills (Eye contact, inflection, originality, professional, etc.)</td>
<td>Majority show limited skills</td>
<td>Several have limited skills</td>
<td>All do an adequate job</td>
<td>All show effective skills</td>
<td>Extremely effective, variety of ways: creative</td>
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<tr>
<td>III C: Visual Aids: correct, eye appealing, readable, neat.</td>
<td>Major flaws</td>
<td>Minor flaws</td>
<td>Correct, adequate, convey major point</td>
<td>All mentioned before and eye-catching</td>
<td>Creative, very effective, greatly enhance presentation</td>
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<td>III D: Questions and Answer Section</td>
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<td><strong>Part IV: Required</strong></td>
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<td>IV A: Team Participation (0-2 pts each)</td>
<td>Max 10</td>
<td>Student#1 0: none,</td>
<td>Student#2 2: limited</td>
<td>Student#3 2: adequate</td>
<td>Student#4</td>
<td>Student#5</td>
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<td>IV B: Time mins. Based only on time.</td>
<td>Max 5</td>
<td>1: 9-10 minutes</td>
<td>2: 11-12 minutes</td>
<td>3: 13-14 minutes</td>
<td>4: 15-16 minutes</td>
<td>5: 17-20 minutes</td>
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<td>IV C: Presents a Plan</td>
<td>Max 5</td>
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AWARDS & RECOGNITION

VIRGINIA ENVIROTHON

- All team members will receive certificates of participation and T-shirts.
- A trophy will be presented to the top overall scoring team, and gold, silver, and bronze medals to the top three overall teams.
- Medallions will be presented to teams who earn the highest score in each of the categories of forestry, aquatics, wildlife, soils, the environmental issue, and oral presentation.
- The first place team will represent Virginia at the North American Envirothon. All expenses associated with the North American Envirothon will be covered by the Virginia Association of Soil & Water Conservation Districts and the Virginia Envirothon. (In the event that the first place team is unable to go, the second place team will represent Virginia at the national contest.)

NORTH AMERICAN ENVIROTHON

- Scholarships and prizes will be awarded to the top teams at the North American Envirothon.
Virginia Soil and Water Conservation District Offices (SWCD) – Education Contacts

(E-mail addresses and names subject to change, call offices for most current Envirothon contact.)

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ksulliva@vb.gov.com
### SOIL AND WATER CONSERVATION DISTRICTS LISTED BY COUNTIES/CITIES

<table>
<thead>
<tr>
<th>Accomack Co.</th>
<th>Eastern Shore SWCD</th>
<th>New Kent Co.</th>
<th>Colonial SWCD</th>
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### Independent Cities Not Covered by SWCDs:

- Alexandria
- Bristol
- Charlottesville
- Clifton Forge
- Colonial Heights
- Danville
- Emporia
- Fairfax
- Falls Church
- Franklin
- Hampton
- Hopewell
- Manassas
- Martinsville
- Newport News
- Norfolk
- Norton
- Poquoson
- Portsmouth
- Radford
- Richmond
- Roanoke
- Salem

### County Not Covered by SWCD:

- Arlington County
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Fax: (804) 287-1737

Virginia Department of Forestry – http://www.dof.virginia.gov/

Virginia Department of Forestry Central Office
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Phone: 434.977.6555
Fax: 434.296.2369

Virginia Department of Environmental Quality Offices - http://www.deq.virginia.gov/

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629 East Main Street..............................
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Phone: (804) 786-6124

Virginia Department of Game & Inland Fisheries Offices - http://www.dgif.virginia.gov/

DGIF Headquarters
Phone: (804) 367-1000
ADDITIONAL RESOURCES

**The following resources may be helpful as additional resources to the main resources listed with the Learning Objectives and on the VASWCD Envirothon website**

A. SOILS

**Resources:**

*Web Soil Survey* - local SWCD, NRCS, county planning dept. offices and area Planning District Commissions have paper copies of Virginia Soil Surveys. Also found online at [http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm](http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)

**General Websites:**


B. FORESTRY

**Resources:**


Virginia Dept. of Forestry *Project Learning Tree Activity Guide* - Virginia Department of Forestry


*What Tree is That?* (Key) - National Arbor Day Foundation (402) 474-5655 [http://www.arborday.org/trees/whattree/?TrackingID=908](http://www.arborday.org/trees/whattree/?TrackingID=908)

*National 4-H Forestry Invitational 1999 Handbook* - Virginia Cooperative Extension

*Prescribed Burning* - Virginia Department of Forestry

**General Websites:**

Tree ID fact sheets, key and links - [http://dendro.cnre.vt.edu/wwwmain.html](http://dendro.cnre.vt.edu/wwwmain.html)
C. WILDLIFE

General Background Information:


Planting for Wildlife:

*Native Plants for Wildlife Habitat* U. S. Fish & Wildlife Service (16-pg. booklet; contact USFWS, Annapolis MD (410) 573-4500) [http://www.nativeplantcenter.net/guides/chesapeakenatives.pdf](http://www.nativeplantcenter.net/guides/chesapeakenatives.pdf)


Wildlife Laws:

*Fishing Regulations and Hunting Regulations* VDGIF (available in quantity from main VDGIF office 804-367-1000)

Identifying Wildlife:

*Peterson Field Guides* to Birds, Mammals, Reptiles and Amphibians etc. for species i.d. (available in libraries and bookstores) note: A Field Guide to the Mammals has a skull key in the back of the book

*Birding by Ear: A Guide to Bird Song Identification* audio tapes/CDs of bird calls (available from some library systems and at bookstores or nature shops)

Websites:


*National Wildlife Federation*: [www.nwf.org](http://www.nwf.org)

D. AQUATICS

Water
Project WET: Incredible Journey. Chemical and Physical Properties


A Study of Water Quality. LaMotte Chemical Products Co., P.O. Box 329, Chestertown, MD 21620

Water Resource Management


National Geographic Special Edition: Water: The Power, Promise, and Turmoil of North America’s Fresh Water (Volume 184, Number 5A)

Project Aquatic WILD: Dragonfly Pond Conservation and Point/Non-Point Source Pollution


Chesapeake Bay Program: http://www.chesapeakebay.net/

Project WET: Sum of the Parts

Aquatic Organisms


Save Our Streams. The Izaak Walton League of America, Inc. 707 Conservation Lane, Gaithersburg, MD 20878 (1-800-BUG-IWLA) Virginia Save Our Streams: http://www.vasos.org/


Watershed Delineation

Project Aquatic WILD: Watershed, Where Does the Water Run Off After School?

Project WET: Branching Out, Color Me a Watershed
Wetland Function

Wonders of Wetlands. 1995. Environmental Concern, Inc. P.O. Box P. St. Michaels, MD 21663-0480
*Your local SWCD may have a copy of this


Project Aquatic Wild: Wetland Metaphors, Marsh Munchers

Project WET: People of the Bog, Wetland Soils in Living Color

Wetlands: Characteristics & Boundaries, National Research Council

Aquifers


Project WET: A Drop in the Bucket, Get the Groundwater Picture, A Grave Mistake, The Pucker Effect

Groundwater flow model (Your local SWCD may have a copy of this)

Riparian Areas

Landowners Guide to Managing Streams.

Streamkeeper’s Fieldguide. The Adopt-a-Stream Foundation. 600-128th Street SE, Everett, WA 98208

To locate an educational facilitator or acquire training in the following curricula, please contact the persons listed.

Project WILD and Aquatic WILD:
- Suzie Gilley. VA-DGIF.
  Suzie.Gilley@dgif.virginia.gov

Project WET:
- 

Project Learning Tree (PLT)
- Virginia Department of Forestry
  - Page Hutchinson,
    page.hutchinson@dof.virginia.gov
Websites:

Chesapeake Bay Program Office: www.chesapeakebay.net


VA Department of Environmental Quality: www.deq.state.va.us

VA Naturally- Virginia’s Environmental Education Initiative: http://www.vanaturally.com/

EPA Office of Wetlands, Oceans and Watersheds: www.epa.gov/OWOW

VA Department of Conservation and Recreation: http://www.dcr.virginia.gov/

Virginia Natural Heritage Program: (from the above site)

National Marine Education WEB Site Hub: www.vims.edu/bridge
For more information on the Virginia Envirothon contact:
http://www.vaswcd.org
The Virginia Association of Soil & Water Conservation Districts
7308 Hanover Green Drive, Suite 100
Mechanicsville, Virginia 23111
Phone: (800) 727-6354; Fax (804) 559-0325
Bonnie.Mahl@vaswcd.org