

Paulding County Soil & Water Conservation District

2019



2020

Conservation Education Programs

Grade 6-12

Programs are **FREE** to be presented to all schools and community groups in Paulding County

Our Mission: To promote the wise use of our natural resources in order to enhance the environment and quality of life for the people of Paulding County.

Paulding SWCD
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Dear Educator,

The Paulding Soil & Water Conservation District has a variety of educational presentations, activities, and models available for Grades Pre-K through 12 to be presented in your classroom that align with the Ohio State Board of Education Standards. These are generally science related, however, can be directed toward math, social studies, and language arts standards as well. This book covers programs geared towards those in 6th through 12th grade. A separate publication exists for Grades Pre-K through 5th.

To schedule a classroom program please contact Patrick Troyer, Education Specialist/District Technician at Paulding SWCD via phone or email. A list of activities and presentations with brief descriptions are found throughout this booklet. If there is a specific topic area that you wish to have presented that is not listed in this book, please contact Patrick to develop a program to accommodate you!

Please note page 3 is a listing of all presentations offered at the time this book is put together with topics covered for Junior High and High School levels. Detailed descriptions appear later in this booklet. All presentations can be adapted to your specific grade level or subject needs.

The Paulding SWCD wants to focus its efforts on reinforcing the conservation message through educational programming and outreach to groups of all ages. Presentations can be offered in the classroom or in the field at the Black Swamp Nature Center. *We offer an **open invitation** to all Paulding County school groups to utilize the Black Swamp Nature Center as an outdoor learning lab (see page 9 for details).*

I look forward to working with each one of you this year!

Sincerely,

Patrick Troyer

District Technician/Education Specialist

Paulding SWCD

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2019-2020 Paulding SWCD Summary of Programming

Refer to the page number beside each program for detailed program descriptions.

Junior High (6th-8th):

Program Name	Topics Covered	Page
What's the Deal with Wetlands?	Functions/structure of wetlands, Plants/Animals, Biomes, Plant/Soil characteristics, Environmental benefits	4
Careers in Conservation & Agriculture	Agricultural & Conservation Careers	5
Sum of the Parts	Point/Non-Point Pollution, Human Impacts on Environment, Watersheds, Best Management Practices, Runoff	5
So that's a Watershed?	Watersheds, Hydrologic cycle, Water Pollution, Water Quality, Porosity/Permeability	6
The Streamulator: Understanding how the Earth's Surface Changes	Factors changing Earth's surface: Erosion, Weathering, Deposition, Velocity, Discharge, Parts of a stream & functions	6
Dig Those Chips	Market Functions/Types, Advertisement, Production, Purchasing Decisions, Supply/Demand	6
Rocking On!	Rock Cycle, Mineral & Rock Identification/Properties, Environmental Factors of Rock Formation, Moh's Hardness Scale	7
Ecosystems	Conservation of Mass/Energy, Photosynthesis, Biomes/Biodiversity, Ecosystems (biotic/abiotic surroundings), Energy Flow & Pyramids	7
Soils	Soil formation, types of soil particles & properties, soil biota, soil properties (permeability, porosity, texture)	7

High School:

Program Name	Topics Covered	Page
What's in a Wetland?	Mitigation/Restoration, functions/structure of wetlands, plants/animals, biomes, plant/soil characteristics, environmental benefits, types of wetlands	4
Drinking Water Systems	Watersheds, drinking water sources, water filtration, water treatment processes, groundwater sources, water pollution, wastewater treatment	4
Careers in Conservation	Agricultural & Conservation Careers	5
The Streamulator: Understanding how the Earth's Surface Changes	Factors changing Earth's surface: Erosion, Weathering, Deposition, Velocity, Discharge, Stream Anatomy & Function	6
Sum of the Parts (NPS Enviroscene)	Water pollution (point/nonpoint), runoff, watersheds, stormwater, eutrophication/hypoxia, best management practices, clean water act	5
Rocking on More!	Rock Cycle, Mineral & Rock Identification, Environmental Factors of Rock Formation, Moh's Hardness Scale Experiment	7
Ecosystems	Food webs/food chains, energy flow, biodiversity, niche, carrying capacity, homeostasis, equilibrium, symbiotic relationships	8
Soil	Soil formation, types of soil particles & properties, soil biota, soil properties (permeability, porosity, texture), determining soil properties	7
Vermicomposting	Composting, soil biota, decomposers/decomposition, nutrient recycling	8
Macroinvertebrate Mayhem	Water quality, macroinvertebrate classification, importance of macros to water quality, macroinvertebrate habitat, indicator species	8
4R Lake (Lake in a Bag)	Watersheds, types/causes of pollution (point/nonpoint), eutrophication, human alterations to the water cycle, storm water runoff	8

Don't see your topic listed? Contact me to see how we can fit it in! Email: patrick.troyer@pauldingswcd.org

Program Highlights

WHAT'S THE DEAL WITH WETLANDS?

Ecosystems are based on interrelationships among and between biotic and abiotic factors. Each will vary with the types of plants/animals found within them and the services they provide. This program will focus on one special type of ecosystem found throughout Ohio called wetlands. What are wetlands? What services do they provide to the environment? What plants and animals live in this type of ecosystem? How are they protected? Wetlands act as nature's sponge to soak up excess water to control flooding, a filtration system to filter out sediments, and trap water pollutants, all while improving the quality of our water.



These questions and more will be answered with a demonstration of our Enviroscape Wetlands Model where students will learn about the services wetlands provide along with the many types of wetlands and the function of each, along with how we can help wetlands through mitigation and restoration. Students will gain an understanding on the characteristics of wetlands as well as learn about and appreciate the vital functions wetlands serve to the environment for both humans and animals. **Model provided by a grant through the Ohio Environmental Protection Agency.*

Estimated Time: 40 minutes

DRINKING WATER SYSTEMS

In the United States, we are very fortunate to have safe, clean water to use in our daily lives as not everyone around the world enjoys the same benefits. Do you know where your water comes from and the processes involved with treating it? Follow along as we highlight the water treatment process before and after use. Students watch as we pump water from its source such as a lake or river to the water treatment plant where it is treated. Following treatment, water is then stored in either a reservoir or a water tower with the final step being distribution of clean water to our homes.



For High School, this program goes in more detail by looking at not only the processes involved with water treatment process but understand why it is necessary to conduct these processes. Discussion will be held on how an increasing population of humans have an impact on the environment as it relates to water quality, particularly the production of biosolids.

This program will feature our Drinking Water Enviroscape model that will show the processes involved with water treatment before it reaches our homes in addition to how wastewater is cleaned at the Wastewater Treatment Plant before it is released back into the environment. We will compare this process with a rural septic system. Book this program today to get another glimpse at how humans play a role in the quality of our water! **Model provided by a grant through the Ohio Environmental Protection Agency.*

Estimated Time: 40 Minutes

Program Highlights

CAREERS IN AGRICULTURE & CONSERVATION

Did you know that the world population is estimated to be 9.5 billion people by the year 2050? Do you want to be part of the solution to feed these 9.5 billion people while working to protect our natural resources? Then a career in the agricultural industry is for you! Agriculture can be found everywhere in Paulding County and around Ohio and with that comes a wide variety of valuable and rewarding careers. In this program, students view a glimpse of the careers in agriculture and conservation that are available to them whether it might be the Soil & Water Conservation District, Ohio Department of Agriculture, United States Department of Agriculture, parks district, or research, there are plenty of rewarding careers to be found!

Follow along with us as we give a glimpse at our work at the Paulding Soil & Water Conservation District and the career possibilities available in the Soil and Water world as well as throughout the agricultural industry.



Estimated Time: 30 minutes

SUM OF THE PARTS: (ENVIROSCAPE MODEL)

Students will learn about one way that organisms change their environment: pollution. A brief presentation will explain the concepts of point source pollution, nonpoint source pollution, best management practices, runoff, and erosion.



Different pollutants such as manure, soil, fertilizer, pesticides, motor oil, and many more are introduced to the environment from a variety of different sources. How do all of these pollutants have an impact on our water quality? The Non-Point Source Enviroscape model easily demonstrates how storm water runoff carries pollutants through the watershed to a pond, lake, river, bay, or ocean, and the best management practices to prevent this type of pollution from occurring.

In High School, we will go in detail with algae growth, hypoxia, eutrophication, storm water runoff, all which can be traced back to water pollution. The Clean Water Act will also be discussed.

Estimated Time: 30-40 minutes

*If there is a topic you would like covered that is not listed, let me know and I can set something up for you! *

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Program Descriptions

SO THAT IS A WATERSHED?

Watersheds are areas of land that drain water to a certain area or body of water. This includes all the land, air, municipalities, and water found within specific boundaries. In this program, students will learn the major components of a watershed, how they are mapped, and how water moves throughout this natural system. This presentation shows how water is a limited natural resource and how nature is one interconnected system. Students will also be able to compare and contrast the amount and speed by which water moves through the watershed based on climate and weather. Terms such as watershed, runoff, floodplain, spring, and tributary will be introduced. Indicator species will be discussed as they relate to determination of water quality within the watershed.



Students will have the opportunity to partake in a whole-body activity to imitate how water takes its journey from sky to stream in the varying avenues of a watershed. Essentially, students will form a human version of a watershed forming streams/ rivers in a branched formation and pass blue beads down the chain (tributaries) to the river under a variety of different scenarios such as changes in climate or weather.

Estimated Time: 35 Minutes

STREAMULATOR



Many different processes continually build up or tear down the surface of the Earth. Students learn about factors that affect the patterns and features associated with streams and floodplains such as discharge, velocity, erosion, and deposition, just to name a few. The students will learn how these factors can cause changes in landscapes and landforms via an interactive program with our Streamulator table. This program covers basic stream anatomy such as a run, delta, bank, floodplain, riffle etc. The use of sand and flowing water allows the students to visually see the effects of flowing water through sediment transport, delta formation, erosion, discharge, sedimentation, and velocity.

With the use of the Streamulator Model, students see demonstrations on velocity, discharge, meander formation and understand how water is a powerful force that helps to develop the landscape.

Estimated Time: 40 Minutes

DIG THOSE CHIPS

This program combines Social Studies and Science concepts into one presentation. Emphasis will be put on the fact that soil forms the very foundation of our economy as many industries such as agriculture, forestry, and clothing are heavily dependent on a healthy soil to have resources to bring their products to the market. Students will learn that regions and countries become interdependent when they specialize in what they produce best and then trade with other regions to increase the amount and variety of goods and services available to the consumer. Students will conduct an interactive activity to demonstrate this concept.



This program also covers the basics of how a market works and other terms such as supply/demand, competition, advertising, producer, consumer, market. The students will learn about how potatoes are grown from planting to harvesting to consuming potato chips. They will conduct their own taste test of potato chips and think like a consumer deciding which chip to buy based on price, product quality, brand, and advertising.

NOTE *Estimated Time: 2-40-minute sessions*

“ROCKING ON”-A GUIDE TO GEOLOGY



What is the difference between igneous, metamorphic, and sedimentary rocks? What is the difference between a rock and a mineral? In this program, students will explore the rock cycle and investigate properties associated with various rocks. Rocks have unique characteristics that allow them to be sorted as well as classified and they form in different ways such as luster, texture, weight/hardness, and color. Moh’s Hardness Scale will be discussed and demonstrated to show mineral identification.

They will view samples of rocks that can be found around the area and partake in an activity called “Rock Candy” where they will put their identification skills to the test by identifying their “rock sample” and matching it up with the description on their paper. High School students will conduct a Moh’s hardness scale experiment along with a rock ID exercise.

Estimated Time: 30-40 minutes

FOOD WEBS & ECOSYSTEMS

Ecosystems are dynamic in nature; the number and types of species fluctuate over time. There are disruptions whether they are intended or unintended to the biotic and abiotic components of an ecosystem. Biomes are regional ecosystems that are identified by a distinct group of organisms that developed under a specific set of soil and climatic conditions. Animals serve a niche in their habitat that involves things such as where and how an animal gathers its food, its role in the ecosystem, along with what it gives to and does for the community.



Discussion will be held on how organisms serve their ecosystem as a producer, consumer, scavenger, or decomposer and the quantity of resources an area can provide to support life known as carrying capacity. Within any biological community, there are numerous relationships and interdependences by means of food or symbiotic relationships. Students learn that energy can transform from one form to another in living things and the total amount of matter & energy remains constant even though its form and location change known as the conservation of mass and energy. **Option A:** Students will take part in an activity called “Carrying Capacity” where they will (1) formulate and test hypotheses related to wildlife populations and carrying capacity and (2) describe the significance of carrying capacity to the health of an ecosystem.

Option B: Dissection of Owl Pellets to learn about food webs and energy transfer in more specific detail. Students examine the owl pellets, reconstruct prey skeletons, and hypothesize food sources of the prey.

Estimated Time: 30-35 minutes

SOILS

How long does it take to build 1 inch of soil and what are the soil formation factors? Students will learn the answer to this question and many more as they explore the world of soil and the importance a healthy soil serves in a productive agricultural system. Students will learn about how soil develops through weathering and erosion which plays a key role in the formation of soil particles. Students will be given characteristics of the three main soil types, which are sand, silt and clay. An understanding of soil formation factors, soil biota, texture, porosity, permeability, and soil testing will be obtained through the discussion and activities of this program. Junior High students will perform tests to determine soil density, porosity, and permeability along with understanding the limitations that come with certain classifications of soil properties when it comes to construction or agricultural use.



Option A: High School students will perform their own ribbon test to determine soil texture and be able to identify the soil horizons by the end of this program. **Option B:** Make a model soil using flour, cornstarch, salt, vegetable oil, water, and food coloring to learn about all the different components of the soil (Junior High may also use Option B).

Estimated Time: 30-40 minutes

VERMICOMPOSTING

Living things function and interact with their physical environments while causing changes in the environments where they live. These changes can be very noticeable or slightly noticeable, fast or slow. Decomposers are a vital part of any ecosystem as they take decaying organic matter, digest it, and recycle the nutrients found in these materials to allow for a constant supply of nutrients for an ecosystem. One way that humans utilize decomposers is through the process of vermicomposting. Vermicomposting is the process of using worms (“vermin” is Latin for worm”) to recycle organic food waste into a nutrient-rich soil. The nutrients recycled by the worms is very valuable to a healthy ecosystem by providing plants with what they need to grow which will feed the rest of the food chain.

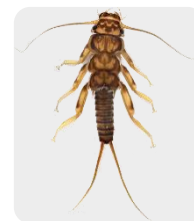


Through this program, students will gain an understanding of vermicomposting and its contributions to the environment. Not only does vermicomposting provide a nutrient-rich soil, but it also helps reduce food waste that goes to landfills and the production of methane gas that contributes to climate change. Construction of a vermicomposting site will further be covered in this program in both an outdoor and indoor setting. A live worm composting bin will be brought in for demonstration.

Estimated Time: 40 minutes

MACROINVERTEBRATES

Macroinvertebrates are organisms that lack a spine and are large enough to be seen with the naked eye. Students will learn about their life cycle, how they are classified, and the importance they serve when determining water quality. This program will discuss how macroinvertebrates are classified by how they eat their food and their tolerance to water pollution as an indicator species. Identification skills will be put to the test, as students will work together in groups to examine water samples to see what macroinvertebrates are living in our water. The amount of a particular species will help to determine the level of water quality of our water systems. Students will also view a demonstration of the tools used to sample for macroinvertebrates.



Stream sampling and identification can also be done as part of this program if it is feasible for your group. The Black Swamp Nature Center offers a great opportunity for this. Otherwise, water samples will be collected prior to the program and brought into the classroom for the identification exercise.

Estimated Time: 40 minutes

4R LAKE: A GLIMPSE AT WATER QUALITY

We all enjoy fresh, clean water, not only for nourishment, but also for recreation and many other uses in our daily lives. This program will help remind us of the simple things that we can do to help keep our waterways clean and healthy for the safe enjoyment of humans and animals. Students will start out with a small bag with gel to represent a “clean lake” that will not stay clean for long! Over the program, we will see grass clippings, fertilizer, pet wastes, and soap/car chemicals make their way to the lake and see how these pollutants affect the quality of our water, but we are not done! Also affecting the water quality of our lake will be factors such as sunshine and wind which help to heat the water and mix up all the pollutants. How is the water quality now? This program covers the following water quality topics: watersheds, types/causes of pollution (point/nonpoint), eutrophication, human alterations to the water cycle, and storm water runoff.



Finished Lake in a Bag Product

Estimated Time: 30 Minutes

BLACK SWAMP NATURE CENTER TOURS & FIELD DAYS

This is a wonderful field trip opportunity for any age group! There are mounted birds and fish in the building. Well-kept trails and yards for site seeing outdoors. The Paulding Soil & Water Conservation



District offers an *open invitation* to all Paulding County school and educational groups to the Black Swamp Nature Center for a great field learning experience for students. It is the intention of the Paulding SWCD and the Paulding County Commissioners to utilize the Black Swamp Nature Center as a learning opportunity for Paulding County schools and youth groups.

The Black Swamp Nature Center contains 51 acres consisting of 24 acres of woodland, 14 acres of wetlands, and 6 acres of old meadow. The old meadow and wetland areas provide an excellent habitat for many species of birds and plant life. The Black Swamp Nature Center provides a wonderful area to observe birdlife, especially during the spring and fall migrations. The site offers great opportunity for field observation and exercises with the diversity of habitats along with the ability to conduct water quality investigations (macroinvertebrates) with Flat Rock Creek bordering the Nature Center.

Coming Soon! The Paulding Soil & Water Conservation District is in the process of establishing a native pollinator garden at the Black Swamp Nature Center, which will provide a great learning lab opportunity for your students!

Approximate Time: Open

If you have an idea for a specific program that is not listed in this program, please feel free to contact the Paulding SWCD office at 419-399-4771 or email Patrick Troyer at patrick.troyer@pauldingswcd.org.

Additional information:

- Our office is willing to assist you in writing grants for your group or classroom
- We are also available for assistance with projects after grants are accepted.
- SWCD Staff are available for workshops, seminars, and training for you and your staff.