

LUCAS SOIL & WATER CONSERVATION DISTRICT CONSERVATION EDUCATION PROGRAMS



6th through 12th Grade Programs

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The Lucas SWCD prohibits discrimination in its programs on the basis of race, color, national origin, religion, sex, age, political beliefs, sexual orientation, and marital or familial status.

2022-2023 School Year

Dear Educator,

The Lucas Soil & Water Conservation District (SWCD) has a variety of educational presentations and activities available to be presented in your classroom, **free of charge**, which align with State Board of Education Standards. These are generally science related, however, we do offer programs that incorporate math, social studies/civics, and language arts standards. Take note of some of the new programs that are available for this year and a return of many of your favorites!

Please note page 3 is a list of all presentations offered at the time this book is put together. ***NOTE: This booklet contains programs for 6th grade through 12th grade. Please see our Preschool to 5th grade booklet also posted on our website.*** Program descriptions along with estimated time of presentations, can be found throughout this booklet. Presentations are categorized by grade level, however, these are suggestions based on standards for the specific grade level. Pages 4-5 contain a highlight of programs for this year that can fit with multiple grade levels. All presentations can be adapted to your specific grade level and meet the needs of your students.

To schedule a classroom program, please contact Patrick Troyer, Education Specialist at Lucas SWCD, via phone or email. Mondays will be my office days with programs being offered the rest of the week. If there is a specific topic area that you wish to have presented that is not listed in this book, please contact me to see how we can develop a program or activity to fit your needs.

The Lucas SWCD wants to focus its efforts on presenting and reinforcing the conservation message through educational programming and outreach about the great outdoors and our natural resources! I look forward to working with each one of you and your students this year!

Sincerely,

Patrick Troyer
Education Specialist
Lucas SWCD

*If there is a topic you would like covered that is not listed, let me know and we can see where it fits! *

Programs are available for any grade level and are adjusted accordingly to your standards

The Lucas Soil and Water Conservation District is supported primarily by state, county, municipality, and township funds.

The mission of the Lucas Soil & Water Conservation District is to provide leadership for conservation of our soil, water, and other resources through education, information, and technical assistance.



2022-2023 Lucas SWCD Summary of Programming for Grades 6-12

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	Agricultural & Conservation Careers, SWCD Duties	5
Sum of the Parts	Point/Non-Point Pollution, Human Impacts on Environment, Watersheds, Best Management Practices, Runoff, Turbidity	5
So that's a Watershed?	Watersheds, Hydrologic cycle, Water Pollution, Water Quality Human Environmental Impacts	6
The Streamulator: Understanding how the Earth's Surface Changes	Factors changing Earth's surface: Erosion, Weathering, Deposition, Velocity, Discharge, Stream anatomy & 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
Excellent Ecosystems	Trophic levels, Producer/Consumer/Decomposer, Biomes/Biodiversity, Ecosystems (biotic/abiotic surroundings), Energy Flow & Pyramids, Carrying Capacity, Wildlife Management	7
Soils	Soil formation, Types of soil particles & properties, Soil biota, Soil properties (permeability, porosity, texture)	8
Macroinvertebrate Mayhem	Water quality, Macroinvertebrate classification, Importance of macros to water quality, Macroinvertebrate habitat, Indicator species	8
Farm to Fork	Consumer, Product, Distributor, Processor, Producer, Production, Retailer, Natural Resource	9

High School (9th-12th):

Program Name	Topics Covered	Page
What's the deal with wetlands?	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, SWCD Duties	5
The Streamulator: Understanding how the Earth's Surface Changes	Factors changing Earth's surface: Erosion, Weathering, Deposition, Velocity, Discharge, Stream Anatomy & Function	6
So that's a Watershed?	Watersheds, Hydrologic cycle, Water Pollution, Water Quality Human Environmental Impacts, Contours, Topography	6
Sum of the Parts (NPS Enviroscope)	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
Excellent Ecosystems	Food webs/Food chains, Energy flow, Biodiversity, Niche, Carrying Capacity, Homeostasis, Equilibrium, , Wildlife Management, Gene Pool, Habitat Fragmentation	7
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	9
Farm to Fork	Consumer, product, Distributor, Processor, Producer, Production, Retailer, Natural Resource	9

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.

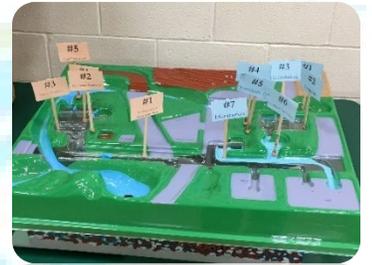


These questions and more will be answered with a demonstration of our Enviroscape Wetlands Model where students will learn about the services wetlands provide along with the many types of wetlands and the function of each. Students will gain an understanding on the characteristics of wetlands as well as learn about and appreciate the vital functions wetlands serve to the environment for both humans and animals. The high school version will go in greater detail to show wetland restoration/mitigation, hydric soils, wetland types, and the functions of each type of wetland.

Estimated Time: 40 minutes

DRINKING WATER SYSTEMS

In the United States, we are very fortunate to have 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 our 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.



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!

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, aquifers, groundwater recharge, and more. 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 bio solids.

Estimated Time: 40 minutes

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Programs are available for any grade level and are adjusted accordingly to your standards

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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 in so many places in Lucas 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!



Source: Farmers Weekly

Follow along with us as we give a glimpse at our work at the Lucas 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 Nonpoint Source EnviroScape Model easily demonstrates how stormwater 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 and its application at the federal, state, and local levels will also be discussed.

Estimated Time: 40 minutes

*If there is a topic you would like covered that is not listed, let me know and we can see where it fits! *

Programs are available for any grade level and are adjusted accordingly to your standards

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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 how different land uses have an impact on a watershed. Terms such as watershed, runoff, floodplain, spring, contours, and tributary will be introduced.

Option A: Students will have the opportunity to view the Augmented Reality Sandbox which is a 3D, interactive, dynamic educational tool that will help to understand mapping, topography, watersheds, natural hazards and more. This tool uses a motion sensor and specialized computer software to map contour lines (lines of equal elevation) onto the sand that will adjust the elevation levels of the sand in real-time.

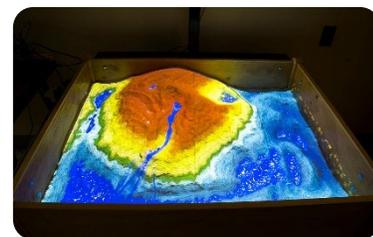


Photo Source: Allegheny College

Option B: Students will take part in an activity where they journey through a watershed and see how humans impact the water quality given a certain scenario. They will receive a cup of clean water and either add or subtract a certain number of beads given their choice in the scenario card drawn and the students with the cleanest water at the end (fewest beads in their cup) wins.

Estimated Time: 35 minutes

STREAMULATOR: UNDESTANDING NATURAL CHANGES

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, riparian buffer, 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 will also see demonstrations and experiment with 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, and 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.

Estimated Time: 40 minutes

Program Descriptions

“ROCKING ON”-A GUIDE TO GEOLOGY



Photo Source: Nevada Mining Association

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.

JH: Students will conduct a lab on Moh’s Hardness Scale using samples of rocks that can be found around the area while also looking at texture, particle size/shape, and color to aid in identification of the rock sample.

HS: High School students will conduct a Moh’s hardness scale experiment along with a mineral ID exercise testing luster, hardness, and streak. In this lab, students will learn which properties are the most/least helpful along with the tools useful in mineral identification.

Estimated Time: 40 minutes

EXCELLENT ECOSYSTEMS

Ecosystems are dynamic in nature with the number and types of species fluctuating over time and each species serving a specific niche. There are disruptions, whether they are intended or unintended, to the biotic and abiotic components of an ecosystem. 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. 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.



Photo Source: National Geographic Society

There are many activities to choose from for Excellent Ecosystems. See the table below for the activity you would like for your classroom:

<u>Junior High (6-8)</u>	<u>High School (9-12)</u>
<p>Option A (Checks/Balances): Students will evaluate hypothetical wildlife management decisions and evaluate at least four factors that can affect the size of a wildlife population. Acting as wildlife managers, students will conduct an activity where they will perform calculations to understand factors affecting a herd of animals. The goal of the activity is to make sustainable management decisions to have a viable population after ten rounds (representing a decade). Students will then share how variables (condition, reproduction, and management) affected the population size of their herd of animals.</p>	<p>Option A (Carrying Capacity): 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. In this activity, students will demonstrate the concept of carrying capacity by simulating herds of animals seeking food in a physical activity.</p>
<p>Option B (Trophic Transfer): In this activity, students will simulate organic production and energy loss for major trophic levels in an ecosystem. The class acts a “growth” assembly line that becomes increasingly complex with each round of play. Students will be able to explain why energy dissipates at each trophic level, contrast the transfer of energy and recycling of material within an ecosystem and be able to relate the role of each trophic level to ecosystem dynamics.</p>	<p>Option B (Bottleneck Genes): In this activity, students will simulate the gene-pool analysis of a population of black-footed ferrets using colored beads. Students will describe biodiversity as it relates to ecosystems, species, or individuals; explain why genetic diversity is essential to the health of a species; and explain how natural selection favors individuals with traits adapted to their environments.</p>

Estimated Time: 40 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. They 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 Option: Students will perform tests to determine soil permeability of various soil materials and time how long it takes for water to pass through different sediments and into the cup below.

HS Option: Students will conduct an experiment on measuring a soil's water holding capacity. We will explore how much water various soil samples are capable of holding for plant use. We will also learn how to conduct a soil ribbon test.

Alternative JH/HS Option: Students will make a model soil and learn about the various soil components using flour, cornstarch, salt, water, and vegetable oil while also learning how to conduct a ribbon test to determine soil texture.

Estimated Time: 40 minutes

VERMICOMPOSTING

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 are 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. A lab activity will be conducted to observe and identify worm anatomy, exploring the components of a compost environment, and also the construction of a vermicomposting site for students to take home with them.

Estimated Time: 40 minutes

MACROINVERTEBRATES MAYHEM

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 a mock stream along with real samples of macroinvertebrates that are living in our water. The amount of a particular species will help to determine the level of water quality of our water systems. Data collected during this activity will be used to calculate and then develop a water quality rating. Students will also view a demonstration of the tools used to sample for macroinvertebrates.



Photo Source: Utah State University Extension

Additional Option: In the field stream sampling and identification can also be done as part of this program if it is feasible for your group and there is an accessible site either at your school or you have transportation to another stream site. 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 stormwater runoff.

Estimated Time: 30 minutes

FARM TO FORK

Did you know that one in six members of the workforce in the United States are employed in the food chain, from farm fields to food service? This program explores how the food we eat each day including plant, animal, and seafood products is grown, harvested, processed, and then distributed. Students will look at traditional industrial practices/growing methods, explore sustainable alternatives, all while taking into consideration the impact both have on not only human health but environmental health. To understand how food and many other products get to our table, we need to understand the source of the goods. In this activity, students will learn that agriculture provides nearly all of the products we rely on in any given day by participating in a relay where they match an everyday item with its "source." After learning about the “source”, students conduct an activity to learn the sequence of production to discover the resources required and the variety of careers involved to take a raw food from the farm to the consumer.



Photo Source: Getty Images

Estimated Time: 35 minutes

LUCAS SOIL & WATER
CONSERVATION DISTRICT

Field Trip Programs

Located near Whitehouse, Ohio, the Blue Creek Conservation Area (BCCA) is a 500+ acre working farm and conservation/land lab area. Students will explore environmental and agricultural processes occurring in the soils, gardens, and fields with the Lucas SWCD; savannahs, wetlands, and prairies with the Metroparks Toledo; and a live animal presentation from Nature's Nursery Wildlife Rehabilitation Center.



School and community groups may schedule field trips during April -October (or weather permitting). Field trips typically last from 10:00AM—1:00PM but may be adjusted to your needs and topics customized. BCCA is open to scheduled groups only. BCCA is a partnership of the Metroparks Toledo, Lucas Soil & Water Conservation District, & Nature's Nursery.

A day's program is only \$4.00 per students that are in Lucas County, \$6.00 for out of county (funds go to Nature's Nursery & Metroparks). Teachers and parents are free! Some groups may be eligible for assistance with field trip transportation costs. Please call Lucas SWCD for further information at 419-893-1966 or email ptroyer@co.lucas.oh.us.

Teacher Workshops & E-Letter

SWCD Staff is available for workshops, seminars, and training for you and your staff. Teacher workshops are offered throughout the year for many of the curriculums listed below and much more! Join the Lucas SWCD Educator's E-Letter list serve to keep updated on workshops, grants, free resources, and more by emailing ptroyer@co.lucas.oh.us.

Loan Materials

We have an extensive loan library of videos, CD/DVDs, curricula, and reference books available for loan. The Enviroscape Model, Groundwater Model, Stream Table, Septic System Model, and library materials may also be borrowed at no charge. The Water Test Kit is available for loan at \$5/group.

Grant Assistance:

Our office is willing to assist you in writing grants. We are also available for assistance with projects after grants are accepted.

National Curriculum Offered:

Just some of the offerings:

Project Learning Tree (PreK - 12th)

Project WILD/Flying WILD (PreK - 8th)

Science and Civics (9th - 12th)

Project WET (K through 12th)

Healthy Water/Healthy People (6th - 12th)

Leopold Education Project (5th - 12th)

Project Food, Land & People (PreK-12th)

Lessons in Economics (4th - 6th)

Celebrating the Harvest (Primary grades)

Windows on Waste (Primary - Middle) Habitats for Learning - Land Lab

WWF – Biodiversity Basics/Smart Consumers Project Seasons (PreK - 6th)

Growing Up WILD/PLT (Pre-K)