Westmoreland Sanctuary

NATURE CENTER & WILDLIFE PRESERVE

Educational Program Guide

Introduction

This guidebook was created to introduce you to all the environmental education programs Westmoreland Sanctuary offers on a year-round basis. You will notice that our core programs are consistent with Next Generation Science Standards (NGSS). These standards allow us to better support teachers and community organizations that use these same standards in their classrooms across New York. Westmoreland's programs offer an experiential learning experience where students have multiple opportunities for hands-on engagement to improve their understanding of the natural world. Our teaching staff are experienced environmental educators with educational and professional backgrounds in environmental science. We are excited for you to browse through this diverse list and choose the programs that best fit your interests and the needs of your students.

Please note that most programs can be adapted to fit your individual needs. For customized programming, please contact the Director of Conservation or Director of Education.

Contents

conEdison | Everything Matters

We would like to formally recognize Con Edison for their support in the creation of this curriculum and program guide.

Pre-Kindergarten *Next Generation Science Standards

Forest Ecology

Students will learn how to make maple syrup from sugar maple trees. Students will learn about the history of maple syrup production, have a chance to tap a maple tree, and taste real maple syrup. Students will discuss what trees need to survive and why weather can affect sap production.

*P-PS1-1
*P-LS1-1
*P-ESS1-1
*P-PS3-1
*P-LS3-1

Animal Kingdom

Students will be introduced to a tree frog, a leopard gecko lizard, a rabbit, a ring-neck dove, a corn snake and a variety of native plants. Students will share what they see, hear, smell and feel by mimicking the animals' behavior to better understand how they survive. By the end of the lesson students will understand that all animals need food, air, and water to live, grow, and thrive.

*P-LS1-1
*P-LS1-2

Weather Study

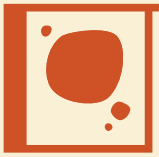
Students will take on the role of scientists and observe how local weather conditions change constantly. No matter the season, students will measure the temperature, observe the clouds/wind/snow/rain/ sunlight, and discuss common weather patterns. Students will participate in an outdoor activity and practice making observations and asking questions about their natural environment.

*P-ESS2-1

Healthy Lifestyle

Students will understand what it means to live a healthy and active lifestyle. Topics discussed include nutrition and a balanced diet, benefits of being outside, and options for how to stay active! Students will also have a chance to take a nature hike throughout our educational campus.

*P-LS1-1
*P-PS3-1



Compost

Students will understand what compost is and why it is important to reduce their waste through composting and recycling. Students will investigate earthworms and discuss their role as decomposers in the compost process. Students will also have a chance to interact with Westmoreland's outdoor compost bins.

*P-PS3-1
*P-LS1-2

Pond Ecology

Students will understand what a pond ecosystem looks like. Students will collect pond samples and discuss the common plants and animals they find. The focus of this lesson will be what plants and animals need to survive and how they use their unique behaviors and adaptations to survive in a pond environment.

*P-LS1-1
*P-LS1-2
*P-PS1-1
*P-ESS2-1

Kindergarten

*Next Generation Science Standards

Forest Ecology

Students will observe common patterns found in nature through a guided nature hike. Topics will include symbiotic relationships and predator/prey relationships. Students will play a game that will help them better understand a food web and the interconnectedness of an ecosystem.

*K-ESS3-1
*K-LS1-1

Animal Kingdom

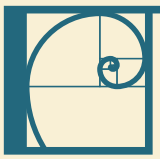
Students will have a chance to feed some of the Westmoreland museum animals! Students will understand the basic energy flow in a food chain and investigate a common food web of a forest ecosystem.

*K-LS1-1
*K-ESS2-2
*K-ESS3-1

Organic Chemistry

Students will cook with a solar oven. Students will be able to fry an egg, make smores, and convert lemonade popsicles into lemonade! Students will develop a better understanding of solids and liquids and understand the effect of sunlight, or solar energy, on Earth's surface.

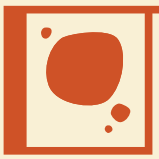
*K-PS1-1
*K-PS3-1



Bio-Mimicry

Students will observe various bird wings and other adaptations through hands-on investigations with a ring-neck dove and print media. Using this knowledge, students will make paper airplanes and discuss the similarities and differences between the airplane model and a bird's wing.

*K-LS1-1
*K-ESS3-1
*K-ESS3-3
*K-2-ETS1-2



Maple Sugaring

Students will learn about the origins of maple syrup production by observing some historical tools commonly used in the sap extraction and syrup production process. Students will discuss the weather conditions that are most ideal for maple sap production and then have a chance to help cook the sap into syrup!

*K-PS1-1
*K-LS1-1
*K-ESS3-1
*K-PS3-1
*K-ESS2-1

Pond Study

Students will investigate Westmoreland's pond ecosystem by collecting soil and water samples and physically interacting with the plants and animals that live below the pond's surface. Topics discussed include photosynthesis and biodiversity.

*K-ESS3-1
*K-LS1-1
*K-ESS2-1

1st Grade

**Next Generation Science Standards*

Forest Ecology

Students will interact with various forest animals (turtles, woodpeckers, gecko, etc.) and discuss how each use their unique external parts to help them survive in the wild. Students will play a biomimicry game where they will act as earthworms and investigate the role of decomposers in the forest ecosystem.

*1-LS1-1

Animal Kingdom

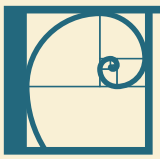
Students will take a guided nature hike and observe birds such as the house wren, american robin, eastern phoebe, blue bird and tree swallow. Students will discuss bird adaptations and biomimicry principles. Back in the nature center, students will make their own bird nests using organic materials.

*1-LS1-1
*1-LS1-2

Organic Chemistry

Students will create their own solar oven and then put it to the test with several food experiments! Topics discussed include non-renewable and renewable resources, pollution and sustainability. By the end of the lesson students will have a better understanding of the effect of sunlight, or solar energy, on Earth's surface.

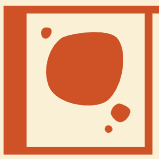
*1-PS4-3
*K-2-ETS1-2
*K-2-ETS1-3



Bio-Mimicry

Students will observe many bird features, with a focus on their feet, and discuss how they help the bird to survive in unique habitats. Using this knowledge, students will design a new shoe model inspired by the structure of bird's feet.

*1-LS1-1
*K-2-ETS1-2



Maple Sugaring

Students will investigate how to make maple syrup from tree sap. Students will learn how to use a bit and brace to drill a hole in a sugar maple to access the sap and then discuss its unique features. Students will then take the sap to our outdoor sugaring shed and cook the sap into maple syrup!

*1-ESS1-2
*1-LS3-1
*K-2-ETS1-2

Pond Study

Students will focus on frogs and tadpoles to observe how young organisms are similar to - but not exactly like - their parents. Students will collect mud/water samples from the pond, observe their findings, and make connections to the guiding theme of metamorphosis.

*1-LS3-1

2nd Grade

**Next Generation Science Standards*

Forest Ecology

Students will have the opportunity to conduct a hands-on investigation of the organisms that live on the forest floor. Students will gain a deeper understanding of soil composition, decomposition, and the nutrient cycle.

*2-LS4-1
*2-PS1-1

Animal Kingdom

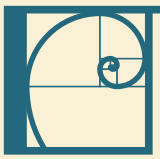
Students will learn about honey bees and their unique life cycles. Topics discussed include pollination, bee colonies, and metamorphosis. Students will play a game to deepen their understanding of pollination and its importance on plant reproduction.

*2-LS2-2

Organic Chemistry

Students will create wax candles and investigate their unique properties in both solid and liquid form. Students will learn about how the molecular structure changes from liquid to solid and understand the science behind the burning of a candle.

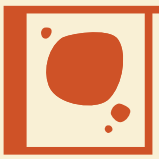
*2-PS1-1
*2-PS1-2



Bio-Mimicry

Students will have an opportunity to dissect a barn owl's pellet and learn about their unique diet and habitat. Students will discuss common owl features, such as their specialized feathers, and understand how their unique shape has helped scientists develop innovative solutions in the aviation industry.

*2-LS2-2
*2-LS4-1
*2-PS1-1



Maple Sugaring

Students will learn about how Native American's used to produce maple syrup and discuss the similarities and differences between how it is produced today. Students will get to use historical and modern tools to tap a maple sugar tree and cook sap to make maple syrup.

*K-2-ETS1-2
*2-PS1-4
*2-PS1-1

Pond Study

Students will investigate Westmoreland's teaching pond and compare border designs that prevent water and wind from changing the shape of the land. Students will design their own dams using organic materials to deepen their understanding of topics such as riparian zones, erosion, flooding and succession.

*2-ESS2-1
*2-LS4-1

3rd Grade

*Next Generation Science Standards

Forest Ecology

Students will take a nature hike through the Sanctuary and investigate various tree rings. Students will explore topics such as a tree's life cycle, their unique internal and external structures, and how environmental factors can affect tree growth. Students will play a game where they will analyze tree rings by "reading between the rings."

*3-LS1-1
*3-ESS2-1
*3-LS3-2

Animal Kingdom

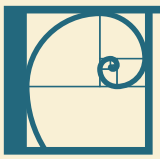
Students will understand what a "day in the life of a butterfly" looks like through a fun outdoor game. Students will then take a guided nature hike through the Sanctuary and look for several butterfly species. Topics discussed include metamorphosis, habitat, and limiting factors that threaten the survival of butterflies.

*3-LS1-1
*3-LS4-2
*3-LS4-3

Organic Chemistry

Students will create their own solar oven and use it to engage in several food experiments! Topics discussed include non-renewable and renewable resources, solar energy, pollution and sustainability.

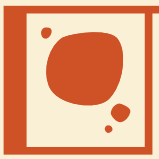
*3-5-ETS1-3



Bio-Mimicry

Students will have an opportunity to dissect a barn owl's pellet and learn about its diet and habitat. The focus of discussion will be on natural selection and how some owls use certain adaptations to help them survive, find mates, and reproduce better than others. Students will also learn about biomimicry lessons scientists and engineers have learned from owl's distinctive features.

*3-LS4-3
*3-LS4-2



Maple Sugaring

Students will discuss important weather conditions that affect sap production in trees. Discussion will focus on climate change and how maple producers are adapting to recent volatile weather. Students will have a chance to tap a tree and cook the sap into syrup.

*3-ESS2-1
*3-ESS2-2
*3-LS4-3

Pond Study

Students will investigate three common pond organisms: dragonflies, frogs, and spiders. Topics discussed include metamorphosis, nymphs vs. adults, and life cycles. Students will play a card game that will help them decipher young and adult pond organisms.

*3-LS1-1

4th Grade

*Next Generation Science Standards

Forest Ecology

Students will be introduced to the rock cycle and learn about igneous, sedimentary and metamorphic rocks. After a short nature hike around the Sanctuary, students will investigate mineral characteristics through three tests: hardness, luster, and streak.

*4-ESS1-1
*4-ESS2-1

Animal Kingdom

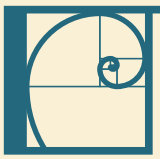
Students will take on the role of bird watchers and pay close attention to bird's distinctive physical characteristics, behaviors, and sounds. Staff will lead students in a birdbanding lesson and discuss topics such as adaptations and conservation management. Students will then make bird houses to take back home and install in their backyards!

*4-LS1-1
*4-LS1-2

Organic Chemistry

Students will discuss erosion and explore signs of chemical weathering around the Sanctuary. Students will visit the Zarr Cemetery, a cemetery from the late colonial era, to investigate different types of rocks and determine if they have been exposed to chemical weathering.

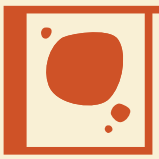
*4-ESS2-1



Bio-Mimicry

Students will have an opportunity to dissect a leopard frog and learn about their internal and external structures. The focus will be on frog anatomy and biomimicry lessons scientists and engineers have learned from studying frog adaptations.

*4-LS1-1



Maple Sugaring

Students will take a closer look into a tree's internal and external structures that support sap production. Discussion topics will include chloroplasts, chlorophyll, xylem, phloem and diffusion. Students will have a chance to tap a tree and cook the sap into maple syrup.

*4-LS1-1
*4-PS3-2

Pond Study

Students will explore Westmoreland's woods for signs of erosion. Students will discuss topics like weathering, littoral zones, watersheds, runoff, eutrophication and acid rain. Students will understand best erosion prevention practices through an organic dam making activity.

*4-ESS2-1

5th Grade

*Next Generation Science Standards

Forest Ecology

Students will gain a holistic understanding of the dangers of invasive species in non-native areas. Topics discussed include plant life cycles, photosynthesis, native vs non-native species, and best natural resource management practices. Students will take a nature hike hunt and search for several invasive species around the Sanctuary.

*5-LS2-1
*5-LS1-1
*5-PS3-1
*5-ESS2-1

Animal Kingdom

Students will learn about bioaccumulation in a food chain and learn about the impacts this can have on wildlife, the environment and human health. Students will play a food chain simulation game and discuss the following topics: trophic levels, pesticides, herbicides, insecticides, biomagnification and microplastics.

*5-PS3-1
*5-LS2-1

Organic Chemistry

Students will investigate why leaves change color during autumn. Students will take a short hike throughout the Sanctuary to collect deciduous and evergreen plant samples. These samples will be used in an experiment to test for four different plant pigments.

*5-PS3-1
*5-LS1-1
*5-LS2-1

Bio-Mimicry

Students will dissect a leopard frog and learn about the key internal and external structures that help it to survive and reproduce. The focus will be on a frog's role in a pond ecosystem food web as well as biomimicry lessons scientists and engineers have learned from studying frog adaptations.

*5-ESS3-1
*5-LS2-1

Maple Sugaring

Students will learn how to make maple syrup from sugar maple trees. Students will measure a tree's diameter at breast height (DBH) and discuss tree's internal and external structures as they relate to sap production.

*5-PS1-3
*5-LS1-1

Pond Study

Students will build an understanding of the interconnected systems that keep Earth in equilibrium. Students will learn about the importance of pH and acid rain as it affects the hydrosphere, biosphere, and atmosphere. Students will test the pond's pH levels.

*5-ESS2-1
*3-5-ETS1-3

Middle School

*Next Generation Science Standards

Forest Ecology

Students will learn about the Tragedy of the Commons phenomenon and design solutions to monitor or minimize human impact on the environment. Students will understand the benefits of cooperation and sustainable resource management in order to preserve limited resources as populations increase.

*MS-ESS3-3
*MS-ESS3-4

Animal Kingdom

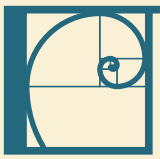
Students will learn about carrying capacity in an ecosystem and discuss the differences between biological and cultural carrying capacity. Students will simulate herds of deer seeking food, water and shelter in a physical game activity to deepen their understanding.

*MS-LS2-1
*MS-LS2-4

Organic Chemistry

Students will learn what happens to an aquatic ecosystem when there is an oil spill. Through a simulation activity, students will investigate the impact oil has on bird feathers and explore best oil clean-up practices.

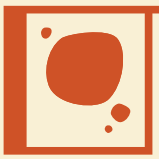
*MS-PS1-2
*MS-LS2-5
*MS-PS1-8
*MS-ESS3-3



Bio-Mimicry

Students will have an opportunity to dissect a snake and learn about the organs that work together to maintain homeostasis. Students will also learn about how/why scientists study snakes to help them create solutions to human challenges.

*MS-LS1-5
*MS-LS1-3



Maple Sugaring

Students will take a closer look at the internal and external structures of trees that relate to sap production. Focusing on translocation, osmosis, cohesion and adhesion students will better understand how nutrients are moved throughout a tree. Students will have a chance to tap a tree and cook the sap into maple syrup.

*MS-PS1-2
*MS-PS1-8
*MS-ESS2-4
*MS-PS1-7
*MS-LS1-6
*MS-LS1-8

Pond Study

Students will understand the basics of the water cycle (evaporation, condensation, precipitation) and the importance of water in sustaining life. Students will see a mini water-cycle model and then play a game to improve their understanding of evaporation.

*MS-ESS2-4

High School

*Next Generation Science Standards

Forest Ecology

Students will explore the relationships between soil productivity and soil variables (i.e. temperature, habitat, soil type and agricultural management choices). Students will discuss the carbon cycle, plant cellular respiration, soil type and how all these concepts are related.

*HS-ESS2-2
*HS-LS2-6
*HS-LS2-5
*HS-LS2-3
*HS-ESS3-4

Animal Kingdom

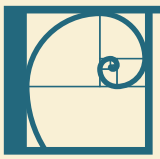
Students will take a short hike through the Sanctuary to look for signs of animals. Using the scientific method, students will practice identifying certain animal tracks through a game activity. Topics discussed include locomotion and diverse social behaviors (altruism, commensalism, eusociality, etc.).

*HS-LS2-8
*HS-LS4-4

Organic Chemistry

Students will learn about the differences between plastic types and explore the global plastic pollution crisis through real world solutions. In collaborative groups, students will design and articulate a plan of action to address plastic pollution.

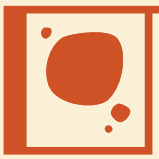
*HS-ESS3-4
*HS-ETS1-1
*HS-LS2-7



Bio-Mimicry

Students will investigate the shape and structure of bird wings through interacting with a ring-neck dove and various print media resources. Students will then design an airplane inspired by certain bird wing characteristics.

*HS-LS4-4
*HS-LS2-7
*HS-ETS1-2



Maple Sugaring

Students will take a closer look at the internal and external structures of trees that relate to sap production. Students will have a chance to tap a tree and cook the sap into maple syrup. During this activity students will learn about the reactions (Maillard and caramelization) that take place during the cooking process.

*HS-ESS3-1
*HS-ESS3-5
*HS-LS1-5
*HS-LS1-3
*HS-LS1-2

Pond Study

Students will become familiar with turtle traps and understand why this data collection technique is important for monitoring turtle health. Students will practice identifying turtles by their physical characteristics and discuss their ecological role in the pond ecosystem.

*HS-LS2-6
*HS-LS2-7

Here is a broader listing of available programming Westmoreland offers. All these programs can be tailored to fit any age level. If you have any questions, or are looking for something that is not listed, please contact a Westmoreland staff member.

Animal Dissections
Students will have the ability to learn how to dissect an animal and learn about its internal and external parts. These include, but are not limited to, owl pellets, frogs, rats, pigeons, sharks, snakes, fetal pigs, sea stars, sea urchins, and squids. Level of student involvement depends upon age, as does what animals will be recommended for use.

Animal Kingdoms
Students will participate in an interactive show and tell of the museum animals. They will learn about the adaptations specific to that animal and what the animals need in order to survive.

Animal Tracking
Students will learn how to look for and notice signs of animal movement in an area. They will also create a plaster mold of an animal's footprint.

Bat Houses
Students will learn about bats, how they help us, and the challenges they face. They will then learn basic tool use and construct their own bat house.

Bird-Feeders
Students will learn what types of birds need seeds to survive and how different birds may eat different seeds and how all this helps the ecosystem as a whole. Students will then learn basic tool use and construct their own bird feeder.

Bluebird House Construction
Students will learn about New York's state bird – the Bluebird. They'll learn why its population has been decreasing and what we can do to help them. Students will then learn basic tool use and construct their own Bluebird nesting box.

Bird-Banding
Students will participate in a conservation effort known as "bird-banding". Bird-banding involves temporarily trapping birds to measure them, weigh them, see what types of birds are around during a certain part of the year, and see the overall health of each individual bird. They are then either given a small metal band or, if they already have a band – we mark down their band's ID. This will help other bird-banders track the movements of the birds.

Candle-Making
Students will learn the history of candle-making and how candles were made. They will then have the opportunity to make their own candles.

Fire-Building
Students will learn how to gather the correct materials in order to start a fire, how to identify if an area is safe to build a fire, how to properly use matches and/or lighters, and how to construct a small fire.

Geology
Students will learn how to identify rocks and minerals. They will learn what characteristics geologists use to identify different minerals and learn about the Mohs scale/how hard a mineral is. They will then be given minerals to identify on their own.

Guided Nature Hike
Students will participate in a hike led by a Westmoreland staff member. These hikes can focus on a variety of different topics and the overall theme can be left up to the participants.

Knot-Tying
Students will learn about different types of knots, how they are useful, and how to make them.

Maple Sugaring:
Students will learn about the history behind maple sugar, how it's made, why we do it, and – of course – get to taste it.

Native American Workshop
Students will learn about the local Native American tribes that lived in this area, their culture, and way of life using replica tools and items. Students will learn what it took to be a hunter, create their own Native American toy, and participate in a game the local tribes may have played.

Orienteering (Maps & Compass)
Students will learn how to read a map and compass and navigate an orienteering course using this knowledge.

Outdoor Cooking
Students will learn about how to make a fire used for cooking and then how to prepare food to be cooked over a fire safely. Students will then get to cook their own food.

Papermaking/Recycling
Students will learn about the waste we create in everyday life and what we can do as individuals to help the environment. We will repurpose waste paper to create something new and interesting.

Plant Study
Students will learn about how plants work and what they need to survive. Students will get to plant their very own seeds and then go outside to learn about the local plants around the Sanctuary.

Pond Study
Students will take a hike down to Betchel Lake where they will learn about the local pond ecosystem, how to tell if a pond is healthy, and catch insects and animals that inhabit the pond. They will learn about these creatures and the role they play in our environment.

Seeds
Students will learn about the importance of seeds and, by using interactive examples, the different mechanisms they have to spread themselves out. Students will then learn how to care for and plant their own seeds.

Shelter-Building
Students will learn about the importance of shelter, the different types of outdoor shelters that people make, and will construct one of their own.

Survival Bracelets
Students will create their own survival bracelet which is a bracelet made with a very strong, thin rope known as para-cord. It can also include a small flint and steel, a compass, and a whistle.

Worms
Students will learn about the importance of worms and what they do for our environment. They will get to interact with worms, learn how and why worms move certain ways through experimentation, and create their own worms' habitats.

Internship Opportunities

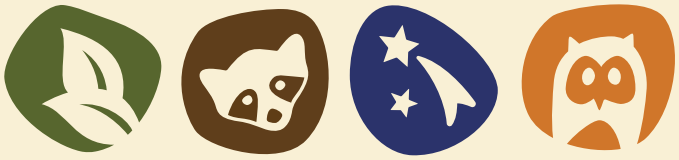
In this 6-12 week internship program, students will be introduced to more advanced environmental topics through hands-on field work and independent research. Students will also help lead and teach during community outreach initiatives and regular field-trip programming. The focus of this internship is not only environmental education, but also professional development. Throughout the program students will develop critical vocational skills such as communication (oral & written), public speaking, critical thinking, teamwork, and self-motivation. All these skills are transferrable to any career and will help prepare students for success in the workplace!

This is a free program for high school seniors and college students only. High school seniors are welcome to participate during the Spring semester of their senior year. College students are welcome to participate in the Fall, Spring and Summer semesters. College students can be eligible for a financial stipend for their service. All participants are eligible for academic and community service credit.

Application requirements include an interview with the Executive Director and Director of Conservation and a resume to be submitted. Letters of recommendation are suggested.

Please note this program is flexible and can be adapted to individual & institution needs. We are able to work directly with your curriculum and make any changes as needed. We invite teachers, guidance counselors, parents, principals and guardians to observe the program in-action during a site-walk!

2018 high school interns getting for an outdoor pond ecology lesson!



Westmoreland Sanctuary

NATURE CENTER & WILDLIFE PRESERVE