

## Glen Helen Outdoor School Curriculum

Glen Helen Outdoor Education Center's mission is to offer transformative learning experiences that engage learners in the practices of science; promote self-discovery and growth; cultivate community; and create a connection to the natural world.

All of our lesson hikes are aligned with Ohio's Learning Standards for Science, with a strong focus on overarching grade band themes and the Nature of Science goals for science education. Students at Outdoor School not only learn science that can connect to their classroom experiences, but do so through inquiry, exploration, and real-world experiences.

Nature of Science goals include Scientific Inquiry, Practice, and Application; Science is a Way of Knowing; Science is a Human Endeavor; and Scientific Knowledge is Open to Revision in Light of New Evidence. These goals are at the center of our lesson hikes, making science an everyday endeavor, and acknowledging that everyone is a scientist. These goals are central to our lessons and our approach.

Science Standard Grade Band Themes include:

- Grades K-2 - Observations of the Environment - this theme focuses on helping students develop skills for systematic discord to understand the science of the natural world around them in greater depth by using scientific inquiry
- Grades 3-5 - Interconnections within Systems - this themes focuses on helping students explore the components of various systems and then investigate dynamic and sustainable relationships within systems using scientific inquiry
- Grades 6-8 - This theme focuses on helping students use scientific inquiry to discover patterns, trends, structures, and relationships that may be inferred from simple principles. Those principles are related to the properties or interactions within and between systems

Elements of Ohio's Learning Standards for Math, Social Studies, and English Language Arts are integrated throughout the Outdoor School experience, as are 21<sup>st</sup> century student outcomes, as defined by the Partnership for 21<sup>st</sup> Century Skills.

We draw heavily from University of California Berkeley Lawrence Hall of Science's BEETLES curriculum ([beetlesproject.org](http://beetlesproject.org)), which is emerging as a national leader in environmental education teaching. Our approach is student- and nature-centered, allowing students to engage directly with nature, and to approach science as an everyday endeavor.

Our Outdoor School program has also intentionally integrated Ohio's K-12 Social and Emotional Learning Standards. The Core Competencies of Self-Awareness, Self-Management, Relationship Skills, and Responsible Decision Making are inherent in our work here at the Glen Helen Outdoor Education Center; by living together in the dormitory cabins, eating and learning together in a trail group, and being challenged with self-management, students practice skills simply by participating in Outdoor School programming.

For a four-day program, teachers choose **five** lesson hikes; for a three-day program, teachers choose **three** lesson hikes. Four day programs will also include an All Day Hike experience.

## Lesson Hikes Included for Every School

Certain experiences are a part of every visit to Glen Helen Outdoor School. Every school will participate in:

- an introductory “Discovery of the Glen” hike, described below
- a bird talk and visit to our Raptor Center
- a reptile talk
- a visit to the Yellow Spring
- a lesson on nocturnal life with an animal ambassador and a night hike, described below

### Discovery of the Glen Lesson Hike

While in the Glen, students are immersed in an entirely new experience and environment with different roles and responsibilities. Discovery activities teach observation skills and are used to get the students in tune with their surroundings and provide enhanced meaning to their Glen Helen and nature experiences. Experience and learning research support dedicating some time for students to get to know each other and their naturalist, to feel safe and comfortable in a new environment, and to understand “the rules of the road” of this new experience. This gives them the greatest possibility for a successful program.

1. Students will adapt to a new schedule of activity during their time in the Glen.
2. Students learn responsibilities for bunk and dining room set-up and clean-up.
3. Students will work together to achieve wasted food goals throughout the week.
4. Students will fill diverse roles within their dorm and trail groups.
5. Students map and explore the physical spaces of the Outdoor Education Center campus.
6. Students use their five senses to make observations about their natural surroundings.
7. Students learn each other’s names and their naturalist’s name, and vice versa.
8. Students undergo simple cooperative challenges to begin to work together.
9. Students learn the basic rules of the Glen that facilitate health, safety, and a positive experience.
10. Students understand the unique schema of Glen Helen: we’re an outdoor school, a place where learning is participatory, scientific, creative, fun, social, and usually out- of-doors. But we are a school, we are here to learn, and sometimes that takes attention, effort, and concentration - but it will be worth it.

### Nocturnal World Lesson Hike

Synopsis: Students will meet some of the nocturnal residents of the Raptor Center, explore Glen Helen at night, and learn about the special adaptations of nocturnal animals. Sensory awareness activities during the hike will teach students how to use their senses to navigate in the dark. On clear nights, students will stargaze and learn constellations.

#### Learning Outcomes:

- Students become aware, comfortable, and respectful of the nocturnal world and the creatures that are active within.
- Students describe adaptations of various nocturnal animals and how they help each animal to fill its respective niche.
- Students describe the lunar cycle and its various effects on Earth.

#### Academic Standards:

- Grade 4 Science - 4.LS.1
- Grade 5 Science - 5.LS.1, 5.LS.2; 5.PS.2
- Grade 6 Science - 6.LS.4
- Grade 7 Science - 7.ESS.4

#### Concepts:

Adaptations, niche, ecosystem, nocturnal, diurnal

## Lesson Hikes Options

For a four-day program, teachers choose **five** lesson hikes; for a three-day program, teachers choose **three** lesson hikes. Four day programs will also include an All Day Hike experience.

### BIRDS

In this lesson hike, students will learn what makes a bird a bird, about the roles birds play in ecosystems, and various bird adaptations through hands-on activities and experiences. Students will also practice their observation and identification skills at our bird blind, and be able to visit and see birds of prey up close at our Raptor Center.

#### Learning Outcomes:

- Students describe the place of raptors in local food webs and food chains.
- Students observe bird adaptations and describe their functions in the ecosystem.
- Students use binoculars to observe and identify local songbirds.
- Students collect songbird data at the bird blind

#### Academic Standards:

- Grade 4 Science - 4.LS.1, 4.LS.2
- Grade 5 Science - 5.LS.1, 5.LS.2
- Grade 6 Science - 6.LS.4
- Grade 4 Math - 4.MD.4
- Grade 5 Math - 5.MD.2

#### Concepts:

Food webs, Food chains, adaptations, structure & function, energy flow, ecosystem changes

### Cooperative Activities and Learning (Co-op)

Students are presented with a series of challenges, which encourage cooperation and teamwork. Challenges develop trust between group members, encourage logical thinking in problem solving and build students' sense of self-confidence.

#### Learning Objectives:

- Students work together in order to successfully meet challenges.
- Students develop trust between group members.
- Students problem-solve to overcome challenges.
- Students build self-confidence.

#### Academic Standards: SEL Core Competencies - Ohio Learning Standards

- Self-Awareness
- Self-Management
- Social Awareness
- Relationship Skills
- Responsible Decision Making

#### Concepts:

Food webs, Food chains, adaptations, structure & function, energy flow, ecosystem changes

### Critters

This lesson introduces students to the amazing adaptations of animals found in Glen Helen. Students also create food chains and webs to explore relationships between animals within an ecosystem. The highlight of this lesson is the opportunity to hold or touch either an Eastern box turtle or a black rat snake.

#### Learning Objectives:

- Students name the different animal classes represented in Glen Helen, and learn what characterized each animal class.
- Students describe various adaptations of Glen

#### Academic Standards:

- Grade 4 Science - 4.LS.1, 4.LS.2 -
- Grade 5 Science - 5.LS.1, 5.LS.2
- Grade 6 Science - 6.LS.4
- Grade 7 Science - 7.LS.2

- Helen fauna and relate to habitat requirements.
- Students observe animal adaptations while handling live animals.
- Students use observation skills to identify evidence of animals in the Glen.

#### Concepts:

Classification, adaptations, habitat requirements, biodiversity, abiotic and biotic factors, energy, biomes

### Cultural History

During this introduction to the cultural history of the area, students learn about the native peoples that inhabited Glen Helen and about pioneers during westward expansion. Students also visit to the Hopewell burial mound located in Glen Helen and view ancient artifacts.

#### Learning Outcomes:

- Students explore the native populations of Ohio from pre-history through the early 1800's.
- Students examine what life was like for pioneers and Native Americans in the Northwest Territory.
- Students explore the relationship between Native Americans and pioneers.
- Students explain how Native Americans and pioneers used natural resources.
- Students observe a Native American burial mound and Native American artifacts.

#### Academic Standards:

- Grade 4 Social Studies – History (Heritage 3)
- Grade 5 Social Studies - History (Early Civilizations 2)
- Grade 5 Social Studies - Geography (Human Systems 8)

#### Concepts:

Ohio history, Civilizations, Cultures and ways of life, Ancient life, Indigenous peoples, Pioneers, Historical Use of Natural Resources

### Environmental Problem Solving (EPS)

Students learn about human impacts, hypothesize solutions, and sharpen critical thinking skills in this lesson. Students also investigate ways in which the earth's resources may be used sustainably.

#### Learning Outcomes:

- Students explain ways that humans impact the planet.
- Students explore local environmental problems and hypothesize solutions.
- Students differentiate between renewable and non-renewable resources.
- Students cite ways in which they can help reduce their own impact on the planet

#### Academic Standards:

- Grade 3 Science - 3.ESS.2, 3.ESS.3
- Grade 6 Science - 6.ESS.5
- Grade 4 Social Studies - Geography (Human Systems 12)
- Prepare for Environmental Science - ENV.ER.1 - Energy Resources and ENV.GP. 1-9 - Global Environmental Problems and Issues

#### Concepts:

Rocks, Minerals, Non-renewable resources, Renewable resources, Energy, Environmental Science, Invasive species, Biodiversity, Land management, Sustainability, Conservation

### Forest Ecology

Students explore the Glen Helen forest, and learn about the interrelationships that make it a functioning ecosystem. Students use a dichotomous key to identify trees, learn how trees make their own food, and take a special hike to the Glen Helen Pine Forest.

#### Learning Outcomes:

- Students observe and differentiate forest communities of the Eastern deciduous forest using a dichotomous key for tree species identification.
- Students explain that living organisms in a community are interconnected and interact with one another in various ways.
- Students differentiate between producers, consumers, and decomposers.
- Students illustrate a food chain and food web of Glen Helen.
- Students explain the process of photosynthesis.

#### Academic Standards:

- Grade 4 Science - 4.LS.1
- Grade 5 Science - 5.LS.1, 5.LS.2
- Grade 7 Science - 7.LS.1, 7.LS.2

#### Concepts:

Environmental changes, energy, food web, food chain, biome, biotic and abiotic survival factors, ecosystems

### Geology

This lesson explores the geologic features found in Glen Helen, including potholes, rock creep, cascades, limestone caves and glacial valleys. Students will learn how glaciers have shaped the Ohio landscape while witnessing evidence of their presence. A hike to the Yellow Spring is a highlight of this lesson.

#### Learning Objectives:

- Students observe and differentiate the geological forces that shaped Glen Helen.
- Students observe fossils and can explain that fossils form from preexisting plants and animals, and how they were formed in Glen Helen.
- Students differentiate between physical and chemical weathering.
- Students explain the rock cycle.
- Students differentiate between igneous, sedimentary, and metamorphic rock.

#### Academic Standards:

- Grade 4 Science - 4.ESS.1, 4.ESS.2, 4.ESS.3; 4.LS.2
- Grade 6 Science - 6.ESS.1, 6.ESS.2, 6.ESS.3
- Grade 7 Science - 7.ESS.1

#### Concepts:

Geology, hydrologic cycle, erosion, weathering, deposition, Igneous, Metamorphic, Sedimentary, Minerals, Rocks

### Meadow, Thicket, Forest

Students visit ecosystems that represent three successional stages: a meadow, a thicket, and a forest. Students learn about succession, explore these diverse habitats, and visit Baldwin Pond.

#### Learning Outcomes:

- Students explain the concept of succession, observe three successional stages, and record characterizing data.
- Students take soil samples and differentiate characteristics of soil in each phase of succession.
- Students define the terms ecosystem and niche, and explain that each organism has a niche within an ecosystem.

#### Academic Standards:

- Grade 4 Science - 4.LS.1
- Grade 5 Science - 5.LS.2
- Grade 6 Science - 6.ESS.4
- Grade 7 Science - 7.LS.2

#### Concepts:

Energy, Soil, Biome, Succession, Habitat, Niche, Biodiversity, Minerals, Rocks

**Stream Investigation \*\*Warmer months only, approximately April - October\*\***

Students conduct a scientific experiment to determine the pollution levels of a local stream. Equipped with nets and buckets, students search the waters for macroinvertebrates, and collect data on physical and chemical properties.

**Learning Outcomes:**

- Students investigate the relative health of a local stream through experimentation with macroinvertebrates.
- Students gather data on physical and chemical properties of a stream.
- Students describe ways that they can conserve water and mitigate water pollution.

**Academic Standards:**

- Grade 4 Science - 4.ESS.1
- Grade 4 Math - 4.MD.4
- Prepare for Environmental Science - ENV.ER.3 - Water and Water Pollution

**Concepts:**

Water quality, Scientific method, Hydrologic cycle