



First Peoples: Archaeology at Meadowcroft Rockshelter

A School- Programs Guide for Educators

This program is made possible through the generous support of the

Claude Worthington Benedum Foundation.

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“From its inception, the Meadowcroft/ Cross Creek project was a multi-disciplinary undertaking. The central goal or theme was, “the systematic acquisition, analysis and integration of all data bearing on the archaeology, history, paleoecology, geology, geomorphology, pedology, hydrology, climatology and floral and faunal succession of the entire Cross Creek drainage. Moreover, this data gathering, analysis, and interpretation was to be executed with as great a degree of precision and employing the most sophisticated methodologies of which any of the project staff were cognizant. Additionally, and to us critically, this research was carried out virtually without temporal or fiscal constraints. In short, the project was designed to epitomize so-called ‘state of the art’ data gathering and analytical methodologies and procedures.”

From “An Introduction to the Meadowcroft/ Cross Creek Archaeological Project 1973-1982” in Meadowcroft: Collected Papers

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About Meadowcroft Rockshelter and Historic Village

Meadowcroft Rockshelter and Historic Village, which operates in association with the Senator John



Heinz History Center, is a National Historic Landmark located on 275 acres in Avella, PA. The site is an outdoor living-history museum that uses a combination of reconstructed historic structures, traditional museum exhibits, and outdoor interpretive areas to tell the story about life in Western Pennsylvania during the past 16,000 years.

Interpretive areas at Meadowcroft include the Meadowcroft Rockshelter, one of the oldest documented sites of human **habitation** in North America; a recreated 19th century village; a recreated 16th century Indian Village, and a recreated 18th century frontier trade post. On-site and virtual educational programs immerse students in a variety of disciplines through the lens of 16,000 years of life in the Upper Ohio Valley.

TO VISIT:

Please visit [Educational Programs at Meadowcroft](#) for information about School programming.

TO VIEW:

The following [video](#) provides an excellent overview of Meadowcroft's interpretive areas: <https://www.youtube.com/watch?v=w2vSS9cQmOI> (Run time is 2:44).

TO EXPLORE:

Explore the Meadowcroft website for a short [virtual exhibit](#) about the Meadowcroft Rockshelter.

About First Peoples: Archaeology at Meadowcroft Rockshelter

First Peoples: Archaeology at Meadowcroft Rockshelter is an ongoing project of Meadowcroft Rockshelter and Historic Village. The program encompasses on-site and virtual educational experiences and resources designed to support interactive exploration of Meadowcroft Rockshelter. A basic premise of the program is that all visitors possess the innate ability to make observations which serve as the foundation for constructing meaning from the sites, objects, and natural and recreated environments at Meadowcroft.



The current program is the extension of a 2007 project funded by the Claude Worthington Benedum Foundation. This program resulted in **archaeology** curriculum for use in 4th-8th grade classrooms. Beginning in autumn 2014, Meadowcroft staff, guided by an Educator's Advisory Team, reevaluated existing resources and created new on-site and virtual Meadowcroft Rockshelter school programs. These programs follow the **multi-disciplinary** approach of the Rockshelter **excavation**, focusing on **geology, ecology, geography, and archaeology** to help explain the cultural significance of the site.

At the core of the new thematic programming lies a series of five extreme resolution GigaPan images of the Rockshelter. Partners at Carnegie Mellon University's CREATE Lab developed new technology platforms to overlay multimedia interest spots on the images. The interest spots include audio and video interviews with experts, animations, graphics, photographs and text that provide **context** as students or visitors interactively explore the Rockshelter using a computer. The resulting images support mediated, unmediated, and theme-based interactive explorations, encouraging students to begin to look with the eye of a scientist in a compelling visual mode that is accessible, responsive to individual interests and engaging.

For the first time, students who will visit, as well as those who cannot physically visit, have unprecedented access to the Meadowcroft Rockshelter **excavation**. Teachers can guide students through the GigaPan photographs, bolstering their own knowledge with essays and resources in the First Peoples Teacher Guides. A selection of standards-aligned activity suggestions offers additional opportunities for exploration. Armed with authentic resources and virtual access to the **excavation**, students can view the images, connect what they see with data from the site, and draw their own interpretations.

Intersection of Major Themes and Disciplines in *First Peoples* Programming

Meadowcroft Rockshelter can be used to discuss several themes that appear across academic standards for Pennsylvania, Ohio and West Virginia. In most cases, the themes draw from multiple disciplines. The approach of the *First Peoples: Archaeology at Meadowcroft Rockshelter* curriculum models the **multi-disciplinary** approach taken by the **archaeologists** who investigated Meadowcroft Rockshelter.

The table below summarizes the intersection of First Peoples themes with the major disciplines. Grade-appropriate activity suggestions are included in Teacher’s Guides for each thematic area.

First Peoples Themes	Major Disciplines addressed in First Peoples				
	Science	History	Environment and Ecology	Geography	Technology and Engineering
Geology	Natural stratigraphy explains the evolution of the Rockshelter over time. Physical features suggest how the landscape was created.	Throughout 16,000 years, geology has served as the foundation for all human activity at the site. At the most basic, the rocks around Meadowcroft anchor all aspects of the landscape from which humans met their basic needs.	The geologic processes that created the Cross Creek drainage impacted the flow of water throughout the watershed . The slope of the land and proximity to water dictate the ecology of the watershed .	Topography influenced how prehistoric peoples moved through the landscape. In the 20 th and 21 st centuries, energy extraction resulted in drastic human alteration to the landscape.	Lithic (stone) tools were the backbone of the Paleo- toolkit. Coal extraction in the 20 th century and natural gas extraction today are major industries.
Geography and Ecology	The topography of the region dictated the movements of early peoples. All aspects of prehistoric life were dominated by climatic conditions and the availability of natural resources. The processes that created and changed the physical landscape are still at play today.	All prehistoric human activity at Meadowcroft Rockshelter was dictated by the topography of the region and availability of natural resources.	The Cross Creek drainage displayed a stable, temperate ecology during the Pleistocene, despite being only 80 miles south of the glacial advances. The diverse ecology remained stable until the Historic Period.	The physical characteristics and natural characteristics of a landscape contribute to discussions of how people used and modified the land to meet their needs. The decreasing availability of natural resources and population explosions resulted in shifts from foraging to horticultural, then agricultural and	Abundant natural resources provided materials for prehistoric tools. Adaptations to tools and techniques were influenced by the movement of peoples and the response to environmental conditions.

				industrial cultures.	
Archaeology	<p>Although often grouped with social sciences, archaeology uses scientific methodology and procedures to understand the lives of humans in the past.</p> <p>Attrition of the sandstone cliff and deposition of sediments created the stratigraphy of Meadowcroft Rockshelter (geology).</p> <p>Radiocarbon assay was used to scientifically date cultural evidence at the site.</p>	<p>The purpose of archaeological investigation is to reveal patterns about human culture over periods of time.</p>	<p>Geofacts and ecofacts contribute evidence to the study of archaeology, particularly regarding the availability of natural resources and human response to environmental conditions.</p>	<p>Geography contributes evidence about the movement of humans through the landscape, resource distribution, human characteristics of the landscape, and the interactions between people and the environment.</p>	<p>Archaeological evidence and stratigraphy can be used to demonstrate how prehistoric technologies and practices changed over time at Meadowcroft.</p> <p>Field Schools at Meadowcroft in the 1970s utilized early computer technologies in the systematic organization of data during the excavation.</p>
Cultural Findings	<p>Eleven naturally occurring strata (geology) and 52 Radiocarbon assays indicate a continuous human presence at Meadowcroft over 16,000 years.</p>	<p>All known New-World cultural periods are represented at Meadowcroft. Archaeological evidence explains how these cultures changed over time and the significance of these changes.</p>	<p>The abundant natural resources and a relatively stable climate resulted in continuous but intermittent human use of Meadowcroft over 16,000 years. Prehistoric peoples adapted to minor climatic episodes and modified their activity at the site based on the seasons.</p>	<p>Throughout 16,000 years, humans have modified the Cross Creek watershed to meet their evolving needs and in response to changing environments.</p>	<p>Prehistoric people adapted new technologies and practices in response to natural and cultural evolution.</p>

First Peoples: Archaeology at Meadowcroft Rockshelter On-Site Program

Program at a Glance

Audience: K- 12th grade

Duration: 1.5-2 hours

2 to 4 interpretive stations

Group Size: 4 groups of up to 40 students per group
(Accommodations for larger groups are available by adding a visit to the Woodland Encounters area)

The program takes place outside. Please dress accordingly.

The Meadowcroft Rockshelter is located at the top of a steep slope. Access is gained by climbing 65 stairs to the lower viewing platform. There is no handicap access. However, the program can be altered to accommodate visitors with physical and other disabilities. Please inform Museum Staff of your group's needs when making your reservation.

Explore the discovery and **excavation** of Meadowcroft Rockshelter, a National Historic Landmark, in this newly designed field trip experience. Interactive stations provide students with hands-on and inquiry-based opportunities for uncovering the secrets of the “First Peoples” and the **multi-disciplinary** approach of the experts who study the **archaeological** site. Investigate how **geography** and **ecology** of the Cross Creek watershed impacted the ability of **prehistoric** people to camp here, explore the geologic forces that created the Rockshelter and its **stratigraphy**, examine the **archaeological** site, and analyze educational **artifacts** to understand how **archaeologists** interpret a cultural **assemblage**.

Program Themes

A *First Peoples* Program uses two to four major themes to explore the Meadowcroft Rockshelter. Each theme focuses on a different **methodology** used by the **multi-disciplinary** team of experts who directed the **archaeological** investigations. Current themes include:

Geography and Ecology: students explore the **geography** and **ecology** of the Cross Creek watershed to learn about how the natural world contributes to human settlement patterns, such as the bivouac (or camp) at Meadowcroft Rockshelter

Archaeology: students explore the tools and techniques used to excavate, document, and interpret Meadowcroft Rockshelter, focusing on **stratigraphy** and site documentation

Geology: students investigate the geological story of the Cross Creek watershed and the formation of Meadowcroft Rockshelter

Cultural Findings: students participate in hands-on activities demonstrating material **culture** analysis and classification tools used by **archaeologists** to understand cultural changes over time.

Themes are selected for school field trips based on the grade level of students and the amount of time available for the experience.

Meadowcroft programs are facilitated by professional **historic** interpreters assisted by trained volunteers. Interpreters use an inquiry-based interpretive approach tailored to the grade-level and interest of their audience. When appropriate, interpreters present **evidence** from the **excavation** of the site and lead students through activities that apply the scientific method. Together, students and their interpreter formulate hypotheses, explore the procedures used to acquire data, analyze data from the **excavation**, and then draw conclusions based on their hypotheses. By the end of the program, students should be able to draw their own conclusions about the significance of the site while describing the processes and data which support those conclusions.

Intended Outcomes of Thematic On-Site Exploration

Students who participate in a *First People: Archaeology at Meadowcroft Rockshelter* program will demonstrate grade-appropriate understanding of the site in the following ways:

Geology
Students will: <ul style="list-style-type: none">• Identify and describe geologic events that shaped the landscape of the Upper Ohio Valley• Describe and explain the geologic forces that shaped the topography of the Cross Creek watershed• Identify and describe critical evidence used by geologists to reconstruct the geologic story of the Cross Creek watershed/ Upper Ohio watershed• Identify key rock formations, the composition of those rocks, and their ages at Meadowcroft Rockshelter• Describe and explain the life cycle of Meadowcroft Rockshelter• Describe and explain how attrition and deposition contribute to the stratigraphy of the Rockshelter

Geography, Environment, and Ecology
Students will: <ul style="list-style-type: none">• Identify, describe, or explain Meadowcroft’s geographic location and different mapping representations that can be used to explain the site• Identify and describe human and natural characteristics of the Cross Creek watershed

- Identify, describe or explain the major ecosystems of the Cross Creek watershed and the biotic and abiotic components of each
- Identify, describe, classify, or analyze the major categories of **flora** and **fauna** and the **habitats** of those organisms in the Cross Creek watershed
- Describe or explain how a stable, **temperate ecology** resulted in diverse natural resources throughout 16,000 years
- Identify, describe, explain or analyze the availability of natural resources and the human interaction with the **environment** near the Rockshelter over 16,000 years
- Identify, describe, explain, or analyze the transformations in the **ecology** and **geography** of the Cross Creek watershed due to increased human activity in the Historic Period
- Identify, describe, explain, or analyze how the Cross Creek watershed impacts geographic **features**, cultural behaviors and adaptation, and resource distribution.

Archaeology

Students will:

- Identify key **features** of an **archaeological** site
- Describe how **archaeologists** organized and excavated the site to preserve the **context** of all information
- Define **multi-disciplinary** and/ or give examples of the diverse disciplines that contributed to the Meadowcroft Project
- Explain **stratigraphy** of Meadowcroft Rockshelter and/or apply the **Law of Superposition** to demonstrate **relative dating**
- Differentiate between an **artifact** and an **anthropogenic feature**; give an example of each
- Identify major categories of **archaeological evidence**
- Describe and explain the recovery, classification, and analysis of critical **evidence** recovered from Meadowcroft Rockshelter
- Describe or explain how **archaeology** contributes to the understanding of **prehistoric** peoples
- Identify, describe, or explain the difference between **relative** and **scientific dating**; give examples of each

- Recognize Meadowcroft Rockshelter as the most significant **prehistoric archaeological** site in Pennsylvania/ the Upper Ohio Valley

Cultural Findings

Students will:

- Recognize that **archaeology** provides a process for learning about **prehistoric** cultural groups; **evidence** from **archaeological excavations** is analyzed and used to construct interpretations of **prehistoric** life
- Describe the **stratigraphy** of Meadowcroft Rockshelter and identify critical **cultural evidence** for each **stratum**
- Identify, describe and explain the different cultural groups who occupied Meadowcroft
- Explain how **archaeologists** use **stratigraphy** and diagnostic **artifacts** to differentiate between Cultural Periods at Meadowcroft
- Identify, describe or explain the major categories of **artifacts** recovered from a **prehistoric archaeological** site
- Identify, describe, explain and/or give examples of how continuity and change can appear in the **artifact** record
- Describe the Miller Complex and explain why the materials in Stratum IIa lower upset **archaeological** theories
- Describe and explain how **archaeology** at Meadowcroft contributed to a re-thinking of the Clovis First Theory

In addition to the anticipated outcomes for each theme, students will have the opportunity to practice the following reading, writing, speaking, listening and language strategies:

- Ask relevant questions
- Evaluate a variety of sources across a range of disciplines
- Demonstrate command of relevant vocabulary
- Articulate their own ideas
- Comprehend critical information about the theme and cite **evidence** that supports the theme
- Listen actively to a presenter; collaborate with classmates and museum staff
- Summarize key points
- Make and share observations about the site
- Experience sensory stimulation from the outdoor **environment** of the site

Preparing for an On-Site First Peoples Field Trip

On-Site Preparation Steps

1. Administer the appropriate Pre-Visit evaluation
2. Play the "[Introduction to Meadowcroft](#)" video OR present the Introduction to Meadowcroft Rockshelter PowerPoint
3. Conduct one of the First Peoples GigaPan activities
4. One day prior to your visit, offer an overview of the program, review logistics and review appropriate behavior and attire for the day.

Optional:

Select one of the thematic activities or create your own activity from the suggestions in the Thematic teacher guides.

Post-Visit

- Conduct a debriefing exercise or summary activity
- administer the Post-Visit Evaluation
- Provide feedback to Meadowcroft staff by e-mailing ardonovan@heinzhistorycenter.org

Schools planning to visit Meadowcroft Rockshelter during a field trip should allocate a minimum of one pre-visit and one-post visit classroom period for preparation and debriefing.

Students should have basic knowledge of the “sciences” of **archaeology, geology, and ecology** before visiting. They should also have working geographic knowledge of the area. *First Peoples: Archaeology at Meadowcroft Rockshelter Resources* can be used to prepare students for their visit.

Students should have attained at least an elementary understanding of the following general concepts/ vocabulary before visiting:

Vocabulary	Concepts
Rockshelter Watershed Archaeology Geology Geography Ecology Artifact Feature Stratigraphy Habitat Environment Culture Erosion Evidence	Basic Needs Ohio River Watershed Geologic Forces Scientific Method Law of Superposition/ Stratigraphy Relative vs. Scientific Dating Cultural Periods

On-site Logistics

A visit to Meadowcroft is a unique experience that is similar to a visit to a National or State Park than to a museum. In advance of your visit, please prepare your students for the experience so that they are comfortable and ready to learn when they arrive.

Outdoor Museum

Meadowcroft Rockshelter is an outdoor site. Please advise students and chaperones to dress appropriately for the weather. Close-toed shoes are highly recommended. Sunscreen and insect repellent are desirable depending on conditions the day you visit.

For your safety and the safety of the buildings and grounds, please stay on the trails. Poison ivy and stinging nettle grow on the property. A variety of diverse birds, animals, insects, reptiles, and amphibians call Meadowcroft home. Please respect their **habitats** and look but do not feed or touch any creatures. Leave only your footprints.

The Meadowcroft grounds encompass over 200 acres and include both open and forested areas with varying **slope** and terrain. For safety and out of respect to other visitors, please walk between interpretive areas and share the trails.

Lunch Arrangements

Lunch space is available on a first-come, first-served basis. A picnic pavilion, outdoor picnic tables, and limited indoor seating are available. Lunch will be scheduled either before or after your program since students must be bussed to a remote portion of the museum for the First Peoples program.

Students will need to bring bagged lunches as the museum sells only snacks and drinks. Water fountains are available if students wish to bring their own reusable water bottles. Please remind students to clean up after themselves and place any garbage in appropriate receptacles.

Group Size and Distinction

Groups will be divided according to the number of interpretive stations planned for the day. You may wish to make this easier by pre-assigning students to a group. Some teachers find it easiest to have all the students in one group wear the same color t-shirt or nametag.

Personal Technology

Cameras and cell phones are permitted during all portions of the First Peoples program, with permission of the teacher/ school. Please note that Meadowcroft is remotely located and that cell phone signal strength varies by carrier and location on the property. Please ensure that batteries are fully charged before visiting.

Accessibility

The First Peoples program occurs at the foot of the hill from the Meadowcroft Visitors Center. Interpretive stations are in the gravel lot at the Rockshelter and in the Rockshelter enclosure. The Rockshelter is located at the top of 65 stairs; rest areas are provided on the stairwell. Any student with special needs may be accompanied by an adult who can help them navigate the site and participate programs. Any accessibility-related concerns may be addressed prior to your visit by contacting Meadowcroft Staff at 724-587-3412.

Gift Shop

A gift shop/ bookstore is available onsite. Please let Meadowcroft staff know if you allow your students to visit the gift shop; we will assign each group a time on the schedule to minimize congestion in the space. If you will be shopping, please remind your students to bring money.

Chaperones

Chaperones are essential to the success of a field trip. However, a visit to Meadowcroft Rockshelter is unlike many field trips in that it bridges a traditional museum experience and an outdoor park-like atmosphere. Teachers should help prepare the chaperones for the visit, communicating expectations and basic safety information prior to your arrival on site. Use the chaperone guide on the following page to prepare your chaperones. Feel free to customize the guide with your own expectations or notes.

Chaperone Guide to Meadowcroft Rockshelter

About Our Field Trip:

Our students will be participating in a *First Peoples: Archaeology at Meadowcroft Rockshelter* program.

Students will be visiting the Meadowcroft Rockshelter, a **prehistoric archaeological** site, to learn about the process of **archaeology, geology, the geography and ecology** of the Cross Creek watershed, and the **cultural evidence** recovered by **archaeologists**. You can learn about the program by visiting Meadowcroft's website (<http://www.heinzhistorycenter.org/meadowcroft>).

Attire:

The program takes place outside; please dress accordingly. Close-toed shoes are highly suggested. Please remember that you are representing our school district when you choose your attire.

Groups:

Our students will be divided into groups for the duration of the Rockshelter program. You will be assigned to one group; please stay with that group at all times. Each group will have a unique schedule that allows them to experience all the interpretive stations at the Rockshelter. Please make sure your group follows the schedule.

Safety:

The program requires students to be bussed from the Visitor Center to a remote location on the site's property. Once at the Rockshelter, students will be near a deep and swift creek, rocky terrain, and a forest **environment**. Groups will need to climb a steep staircase (65 stairs) to access the Rockshelter site; landings and rest points are built in to the climb. Please make sure your group stays safe:

- Stay on marked trails and pathways
- Do not sit or climb on the fences, walls or barricades
- Walk; no running or horseplay
- Look at but do not feed, touch or approach any wild creatures you may encounter
- Stay to your right when using the stairs to the Rockshelter; groups will be passing one another when moving between interpretive stations.

Lunches:

Lunch space is available on a first-come, first-served basis. Museum staff will assign us a lunch time. The museum only sells snacks and beverages; please bring a lunch with you. Water fountains are available if you wish to bring a refillable water bottle.

Personal Technology:

We will be following our school's technology policy during the field trip. Please model appropriate behavior and mute your phone and only use it to take pictures. Note that Meadowcroft is remotely located and that cell phone signal strength varies by carrier and location on the property. Please ensure that batteries are fully charged before visiting.

First Peoples Virtual School Programs

Meadowcroft offers two different opportunities for virtual programming: facilitated videoconferencing or teacher-led virtual field trips. Both programs use the *First Peoples: Archaeology at Meadowcroft Rockshelter* resources and GigaPan images, offering students who cannot physically visit the site an unprecedented opportunity to investigate Meadowcroft Rockshelter.

Videoconferencing

Classrooms can engage in collaborative, interactive learning experiences with Meadowcroft staff from remote locations using videoconferencing technology. A designated member of the Meadowcroft Education staff will be assigned to facilitate all aspects of your program. These programs follow a general thematic outline; however, staff members will work with you (beginning up to six weeks in advance of your program) to tailor the program to your class.

During the videoconference, the facilitator will use a combination of distance learning techniques to engage your classroom, including presentation, discussion, question-and-answer, cooperative problem-solving, and reflection. The techniques require students to practice various reading, writing, speaking, listening, and language standards. Students will engage with a variety of data from the intensive study of the Rockshelter, high-resolution GigaPan images, and multi-media content.

Included in the fee for the videoconference, is a pre-visit phone call with the teacher to customize the experience, pre-visit materials which will be e-mailed a minimum of two weeks prior to the program, and a follow-up call or e-mail. Most programs require the teacher to have students write and submit questions in advance of your program date.

Program at a Glance

Audience: 4th- 12th grade

Program Duration: 45 to 60 minutes

Availability: November -March

The program requires Internet access.

Please inform Museum Staff of your group's technology capabilities when making your reservation. Content can be tailored to your needs.

For more information on the programs, contact Andrew Donovan, Program Coordinator, at ardonovan@heinzhistorycenter.org or (724)587-3412.

Videoconference Themes and Outcomes

Teachers can choose from five thematic videoconferencing explorations, including:

- 1) **Meadowcroft Rockshelter Overview:** Explore the secrets of Meadowcroft Rockshelter and the significance of the site in North American **archaeology**.

Anticipated Student Outcomes:

- Identify Meadowcroft Rockshelter as one of the oldest, most continually (although intermittently) occupied **archaeological** sites in North America, containing **evidence** of all major **prehistoric** Cultural Periods
- Explain the state-of-the-art **multi-disciplinary archaeological** investigation
- Describe critical **evidence** recovered from the site, including **artifacts, features, geofacts, and ecofacts**
- Explain how a stable, **temperate ecology** resulted in diverse **natural resources** throughout 16,000 years

2) Archaeology at Meadowcroft Rockshelter: Investigate the **methodologies** used by the experts who excavated the Rockshelter and explore the **evidence** left by the First Peoples.

Anticipated Student Outcomes:

- Describe how **archaeologists** organized and excavated the site to preserve the **context** of all information
- Define **multi-disciplinary** and give examples of the diverse disciplines that contributed to the Meadowcroft Project
- Explain **stratigraphy** of Meadowcroft Rockshelter and apply the **Law of Superposition** to demonstrate **relative dating**
- Describe and explain the recovery, classification, and analysis of critical evidence recovered from Meadowcroft Rockshelter

3) Cross Creek Ecology: Explore the **geography** and **ecology** of the Cross Creek watershed to determine how the natural world impacted the lives of the First Peoples.

Anticipated Student Outcomes:

- Describe the location of Meadowcroft Rockshelter on various geographic representations
- Explain the major **ecosystems** of the Cross Creek watershed
- Explain major categories of **flora** and **fauna** and the **habitats** of those organisms in the Cross Creek watershed
- Explain how a stable, **temperate ecology** resulted in diverse **natural resources** throughout 16,000 years

4) A Geologic History of the Meadowcroft Rockshelter: Discover the geologic forces that shaped the Cross Creek watershed, created the Rockshelter, and impacted the subsequent **stratigraphy** of the site.

Anticipated Student Outcomes:

- Describe and explain the geologic events/ forces that created the landscape of the Upper Ohio Valley, including **erosion, downcutting, etc.**
- Identify and Describe critical **evidence** used by geologists to reconstruct the geologic story of the Cross Creek watershed
- Describe and explain the life cycle of Meadowcroft Rockshelter
- Explain how **attrition** and **deposition** contribute to the **stratigraphy** of the Rockshelter

5) **The Cultural Significance of the Meadowcroft Rockshelter:** Uncover **cultural evidence** from Meadowcroft Rockshelter to understand the cultural progression of First Peoples in North America.

Anticipated Student Outcomes:

- Describe the **stratigraphy** of Meadowcroft Rockshelter and identify critical **cultural evidence** for each **stratum**
- Explain how **archaeologists** use **stratigraphy** and **diagnostic artifacts** to differentiate between **Cultural Periods** at Meadowcroft.
- Describe the **Miller Complex** and explain why the materials in Stratum IIa lower upset **archaeological** theories
- Describe and explain how **archaeology** at Meadowcroft contributed to a re-thinking of the Clovis First Theory

In addition to outcomes for each theme, students will have the opportunity to practice the following reading, writing, speaking, listening and language strategies:

- Write and ask relevant questions
- Evaluate a variety of sources across a range of disciplines
- Demonstrate command of relevant vocabulary
- Articulate their own ideas
- Comprehend critical information about the theme and cite **evidence** that supports the theme
- Listen actively to a presenter
- Summarize key points
- Describe the strengths and limitations of participating in a field exploration using videoconferencing technology

Preparing for Videoconferencing First Peoples Learning Experiences

Videoconferencing Programs are currently available November- March when Meadowcroft is not physically open to the public. Please contact staff a minimum of six weeks before your preferred program.

First Peoples: Archaeology at Meadowcroft Rockshelter Videoconferencing programs are designed as a collaborative endeavor between Meadowcroft staff and classroom teachers. Please be prepared to offer input during the planning process. The following table offers a summary timeline for planning and implementing your customized videoconference. Please note that the teacher is responsible for supplying information and/or leading a few activities before your program.

The table on the following page offers an approximate timeline for preparing for a *First Peoples* videoconference.

Timeline for Preparing for a First Peoples Videoconference		
Timeframe	Task	Notes
Six Weeks prior to preferred program date (minimum)	Contact Meadowcroft Staff to schedule program.	Meadowcroft staff will e-mail or call in response to your online or phone reservation.
One month prior to program	Correspond with Meadowcroft staff to tailor content and discuss preferred objectives.	Meadowcroft staff will call you a minimum of 30 days before your program to tailor content and discuss your objectives. Please schedule approximately 20 minutes for this call. This will be followed by a confirmation e-mail containing an outline for your program and any pre-visit activities/materials.
Two weeks prior to program	Introduce Meadowcroft to your students and administer the pre-program evaluation.	A pre- and post- evaluation (identical) offers you an opportunity to gauge student learning.
	Complete any pre-visit classroom activities, have students write questions they hope to have answered.	E-mail Meadowcroft Staff
	Share pre-program preparations and class profile with Meadowcroft Staff	
One week out	Participate in the tech run	This is a five (5) minute tech run to make sure there are no connectivity issues.
	Remind students that they will be participating in a Videoconference next week	Review protocol and expectations
Day Before	Remind students that tomorrow is the videoconference.	
	Prepare classroom and any materials that your Staff facilitator has suggested	
Day of	Help facilitate student participation during program	Please engage with Meadowcroft Staff and model appropriate behavior for your students.
Post-program	Administer post-program student evaluation	
	Complete a post-program activity	E-mail Meadowcroft Staff with any follow-up questions or “shareable” moments”
	Complete a program evaluation	Mail or e-mail your feedback to Meadowcroft Staff

Virtual Field Trips of Meadowcroft Rockshelter

The *First Peoples: Archaeology at Meadowcroft Rockshelter* GigaPan images provide an engaging virtual field trip for students. The images are structured to enable self-guided virtual field trips or for teacher-designed visits. The images contain embedded thematic “lessons”, complete with curated text, highlighted vocabulary terms, visual materials, and multimedia content. Tabs at the bottom of each image can be used to explore a theme, offering a numbered **sequence** of interest points. Alternately, students can randomly select interest points to explore the site as their own interests permit.

Teachers may also choose to develop their own virtual field trip by creating a worksheet that guides student exploration to the Meadowcroft Rockshelter. In this case, materials curriculum materials from the *First Peoples* resources will supplement the information embedded in the GigaPan images. If you develop a virtual field trip using *First Peoples: Archaeology at Meadowcroft Rockshelter*, please share your work with Meadowcroft Staff.

To conduct a virtual field trip, use the First Peoples GigaPan lessons.

To learn more about teaching with First Peoples GigaPan, download the First Peoples GigaPan Resources Guide.

Significance of Meadowcroft Rockshelter

Meadowcroft Rockshelter (36Wh297) is a deeply stratified, multi-component **archaeological** site situated on the north bank of Cross Creek, a small **uplaof** of the Ohio River. The site is located near Avella, Pennsylvania in Washington County. The **excavation** at Meadowcroft was conducted by the University of Pittsburgh beginning in the 1970s and yielded tremendous amounts of data, including well preserved plant, animal, and cultural remains.

Radiocarbon dates indicate that humans occupied the site at least 16,000 years ago, making the location one of the oldest cultural sites in North America. Due to exceptionally intact, deep **stratigraphy** (16 feet), Meadowcroft also yielded the most continuous record of **prehistoric** life in Pennsylvania, covering all major cultural periods from Paleo-Indian through the Historic Period.

The site is significant for two primary reasons:

- **Stratum IIa lower contains the most significant pre-Clovis Paleo-Indian artifacts in Pennsylvania, if not North America.** **Radiocarbon dates** from Stratum IIa indicate a human presence at least 5,000 years before Clovis Paleo-Indian sites. **Lithic** technologies from this level include stone blades that resemble stone tools found in Siberia dating to the same period. The Miller Lanceolate, named for the man who discovered Meadowcroft Rockshelter, is an unfluted projectile point that resembles later fluted points. This suggests that the earliest people at Meadowcroft were the ancestors of later Paleo- Indian groups. The appearance of this technology can also be used to support new claims to the peopling of North America.
- **The excavation at Meadowcroft Rockshelter is known in scientific communities for the thoroughness of the state-of-the-art, interdisciplinary archaeological investigation.** At Meadowcroft, a vast team of experts from thirty-two academic disciplines contributed the best practices for their specialties, resulting in a comprehensive gathering of data that enabled a virtual reconstruction of all aspects of life at **prehistoric** Meadowcroft. Although undertaken in the 1970s, the **methodologies** employed at the site are renowned throughout the **archaeological** community to this day.

The **excavation** team at Meadowcroft Rockshelter gathered an immense amount of data about the natural and cultural world. By preserving the **context** of each piece of data within the site's **stratigraphy**, the scientists and **archaeologists** could create a **chronology** of what all aspects of life at



Figure 1 View looking northeast at Meadowcroft Rockshelter from across Cross Creek showing first wooden structure over the shelter (Photograph by Dr. James Adovasio, November 1993)

Meadowcroft looked like. Specifically, the earth scientists, botanists, biologists, and ecologists studied the natural world and changes to the **prehistoric environment**. The **archaeologists** and anthropologists used the data to recreate the cultural record. Working together, the two teams (natural sciences and cultural sciences) began to interpret the cultural response to the changing natural world. The data generated during the **excavation** continues to be researched today. Educators can benefit from the data and study by using Meadowcroft as a case study for how different academic disciplines work together to draw conclusions.

The summaries on the following pages identify the key content for the major themes addressed in *First Peoples: Meadowcroft Rockshelter*. Each summary offers links to the GigaPan images, Thematic Teacher's Guides, and thematic GigaPan lessons that can be further investigated.

Geology Inquiry at Meadowcroft Rockshelter

Meadowcroft is located on the unglaciated portion of the Appalachian or **Allegheny Plateau**, west of the **valley** and ridge province of the **Appalachian Mountains**, and northwest of the **Appalachian Basin**. The surface rocks of this region are layered **sedimentary rocks** of Middle to Upper **Pennsylvania Age** (Casselman Formation). The predominant lithologies are **shale**, quartz, **sandstone**, **limestone**, and coal in decreasing order of abundance.

Rockshelters form when softer **bedrock** erodes under a harder **lithology**. Meadowcroft Rockshelter is formed beneath a cliff of Morgantown-Connellsville **sandstone**, a hard, thick **fluvial** or channel **sandstone** within the **Casselman Formation** (Upper Conemaugh) of the Pennsylvania Period. The **sandstone** varies from a sub-grey wacke to protoquartzite in composition. It is an immature **sandstone** composed predominantly of quartz grains with minor amounts of mica, feldspar, and rock fragments. The rock underlying the Morgantown-Connellsville **sandstone** is a less resistant lithology, most likely **shale**. The Rockshelter formed when **surface weathering** and **stream erosion** from Cross Creek wore away at the softer lithology, cutting back into the hillside under the **sandstone** and forming a **reentrant** under the **sandstone** cliff. The **sandstone** then remained as a roof to the Rockshelter. By 21,000 years before the present, the Rockshelter was high and dry above the **floodplain** of Cross Creek and available for human occupation.

The ceiling of the Rockshelter is gradually migrating upward and cliff-ward as **erosion** occurs both on the **Rockshelter** ceiling and the cliff face. Within the face of the shelter **excavation**, the recession of the **dripline** representing the cliff edge position can be plainly seen. Most typically, **erosion** results in the dislodgment of individual sand grains. More rarely, rock fragments up to the size of a small house have fallen. This **erosion**, in addition to **sheetwash** from the contiguous **upland** areas, is responsible for the development of the **stratigraphy** of the **archaeological** site.

To learn more about the geology of Meadowcroft Rockshelter, please explore the companion [Teacher's Guide to Geology at Meadowcroft Rockshelter](#)

To conduct a lesson on geology, download the [Geology GigaPan Exploration](#).

Primary Concepts

Landforms in the Ohio drainage
Ancestral Ohio River drainage
Geologic Time Scale and History of Ohio valley
Downcutting and Erosion in the formation of Topography
Lithologies and Geologic Dating
Rockshelter Formation and lifecycle
Stratigraphy and the Law of Superposition

Geography and Ecology of the Cross Creek Watershed

Meadowcroft Rockshelter is in northern Washington County, Pennsylvania, roughly 35 miles southwest of Pittsburgh and just over 2 miles from Avella, PA. The site is situated on the north bank of Cross Creek, a small **tributary** of the Ohio River, which lies roughly 7 miles to the west. The site is in the Pittsburgh Plateaus Section of the Appalachian Plateaus Physiographic Province.

Topographically, the region is maturely dissected. More than 50 percent of the area is in **valley slopes** with **upland** and **valley bottom** areas in the minority. The stream pattern is **dendritic** with **drainage** running northwestward to westward, crossing the state line into Brooke County, West Virginia and ultimately draining into the Ohio River near Follansbee, WV. This **topography** was generated during the Pleistocene when increased **precipitation** and runoff caused extensive **downcutting**.

Meadowcroft Rockshelter is oriented roughly east-west with a southern **exposure**, and stands approximately 50 feet above Cross Creek and 803.5 feet above sea level. The area protected by the extant **sandstone** overhang is ca. 213 square feet while the overhang itself is some 42.6 feet above the modern surface of the site. The shelter was available for human occupation by 21,000 years ago. In addition to the potential availability of water from Cross Creek, **springs** are abundant in the immediate vicinity of the shelter. The Cross Creek **floodplain** below, and **bluff** face and bluff top immediately around Meadowcroft Rockshelter, are currently covered with a mixed **deciduous** forest.

The **ecology** of the Cross Creek Valley remained relatively stable from the end of the Wisconsin Glaciation 11,000 years ago until the Historic Period. At one time, forest covered all the **watershed**. **Mixed oak forests** dominated hill-tops and south-facing **slopes**, mixed Appalachian **mesophytic forests** on north-facing **slopes** and in headwater coves, and **riverine** forests on alluvial **floodplains**. Most of the area was cut in the early nineteenth-century when the land was first cleared and prepared for **agriculture**. Areas which are reforested have been repeatedly logged and represent secondary forests.

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First Peoples: Archaeology at Meadowcroft Rockshelter
School Programs Guide

Primary Concepts

Ecology

Habitats in the Cross Creek drainage

Categories of Life

Forest Types and Succession

Floral and Faunal Species

Biotic and Abiotic components of a landscape

Climatic Episodes and Adaptation

Natural Resources

Human impact on the environment

Agriculture and Society

Resource Management

Geography

Geographic Literacy of the Ohio valley

Watershed flow and drainage patterns

Stream Succession

Topography

Landforms

Physical and human characteristics of the landscape

Interactions between people and the environment

Faunal populations remained relatively stable from Pleistocene until the Historic Period. As late as the beginning of the eighteenth-century, elk, black bear, mountain lion, wild cat, timber wolf, fisher, otter, beaver, wild turkey and passenger pigeon could be found in the hills of western Pennsylvania. Today, white-tailed deer, cottontail rabbit, gray and fox squirrel, ringneck pheasant, bobwhite quail, ruffed grouse, muskrat and mink constitute the principle game **species** of the area. The ruffed grouse, wild turkey, and the introduced ringneck pheasant comprise the game birds of the area. **Terrestrial** and **riverine reptiles** are represented by black snake, garter snake, box turtle and snapping turtle. **Amphibians** include various salamanders, toads, tree frogs and bull frogs.

Throughout the **glacial advances**, which came within 80 miles of Meadowcroft Rockshelter, the Cross Creek Valley retained a **temperate, Carolinian environment**. The **climate** of the area is characterized by a wide seasonal temperature range with a moderate amount of **precipitation** falling primarily during the warm parts of the year. In Washington County, PA, the yearly temperatures range from -20°F during the winter months to 90°F in July and August. The temperatures tend to be lower in hilly areas than in more level parts of the county, with nighttime temperatures dropping colder than daytime. Meanwhile, daytime temperatures are generally higher in **valley** bottoms than on hilltops. Approximately 22 inches of rain fall during the 150 frost-free growing season days, with an average total of 40 inches of rain falling annually.

To learn more about the geography and ecology at Meadowcroft, please explore the [Teacher's Guide to Geography and Ecology at Meadowcroft Rockshelter](#).

To conduct a lesson, download the [Geography and Ecology Exploration](#).

Archaeology at Meadowcroft Rockshelter

Primary Concepts

History

Branches of Anthropology

Peopling of North America:
Clovis vs. Pre-Clovis

Continuity and Change over
Time

Complete, Sequential
Occupational Series at
Rockshelter

Artifact and Features as
Primary Evidence

Rockshelter's significance in
regional and world history

Science

Scientific Methodology

Ecofacts and Evidence

Stratigraphy

Radiocarbon Dating

Archaeological excavations were conducted at Meadowcroft Rockshelter under the direction of Dr. James Adovasio, then of the Department of **Anthropology** at the University of Pittsburgh, from 1973 to 1979 (6 field seasons, 417 **excavation** days of 12 to 14 hours). Dr. Adovasio later led additional work during the 1990s as director of the Mercyhurst **Archaeological** Institute, Mercyhurst College. This work consisted of site maintenance to clean up slumps in the shelter. No new **archaeological excavation** work has been undertaken since this period.

From the start of the project, the **excavation** was designed as a **multi-disciplinary** investigation to gather as much data as possible about the site and surrounding area. Every step of the process was planned and documented to preserve the **context** of any recovered data. **Context** is the three-dimensional location of an **artifact** or **feature** in relation to all the other **artifacts, features, geofacts, or ecofacts** around it, including soil. **Archaeology** is a destructive science: the process destroys the **context** of the **evidence**. Great care is necessary to ensure that all information is recorded accurately since there are no second chances. The data gathered during the **archaeological** investigation yielded geological, **ecological**, and **anthropological** information.

Eleven well-defined **stratigraphic units** were isolated at the site and meticulously excavated using the best stratigraphic **methodology** available at the time. In fact, the **excavations** are still widely considered to be state-of-the-art. The **strata** were numbered from Stratum I, the oldest and deepest unit, to Stratum XI, the uppermost and youngest. Fifty-four **radiocarbon assays** have been run on samples from Meadowcroft, firmly dating the eleven **strata** and various occupations of the **Rockshelter**.

Excavations at Meadowcroft ended after 1979, at which time approximately three-quarters of the area under the **dripline** had been excavated. It was decided after the 1979

field school to preserve unexcavated deposits for future work when newer **methodologies** and technologies might yield significant new data. Since then, only maintenance work has been conducted on site. There remain significant deposits of all eleven defined **strata** that could be excavated using newer **methodologies** and techniques to address new research questions and extract information and data not recovered by **excavations** conducted during the 1970s.

To learn more about archaeology at Meadowcroft, please explore the [Teacher's Guide to Archaeology at Meadowcroft Rockshelter](#).

To conduct a lesson, download the [Archaeology Exploration](#).

Cultural Significance of Meadowcroft Rockshelter

Primary Concepts

History

Peopling of North America:
Clovis vs. Pre-Clovis

Cultural Periods: Continuity
and Change over Time

Miller lanceolate and artifacts
critical to history

Complete, Sequential
Occupational Series at
Rockshelter

Significance of Meadowcroft
Rockshelter in regional, US, and
World History

Human geography and social
organization

Science, Technology and Engineering Education

Characteristics of prehistoric
technologies

Natural Resources and
materials selection

Meadowcroft Rockshelter's significance lies with the **stratigraphy** of the site: hidden within the eleven natural **strata** is a continuous but intermittent record of cultural activity. Applying the **Law of Superposition**, **archaeologists** safely assume that any **cultural evidence** is where it was deposited by **prehistoric** peoples, with the oldest **evidence** being deepest and the newest on top.

Fifty-two **radiocarbon dates** anchor the stratigraphic **sequence**. The calibrated ages for these assays indicate a **Woodland period** ascription for Strata XI-IV (upper), an **Archaic** ascription for Strata IV (middle)-IIb, and a predominately **Paleo-Indian** ascription for Stratum IIa. In short, the calibrated dates from Meadowcroft support a complete **sequence** of every major **prehistoric** cultural period in North America, including major cultural transitions such as crop domestication.

Prior to the **excavation** of Meadowcroft Rockshelter, the accepted "First Peoples" were the Paleo-Indian Clovis **cultures**, named for a set of distinctive stone tools associated with Pleistocene **fauna** discovered near Clovis, New Mexico, and radiocarbon dated between 11,500 and 11,000 YBP. However, in Stratum IIA at Meadowcroft, **archaeologists** encountered **ecological** data and cultural materials dubbed the "Miller Complex" (including **basketry**, a modified wood spear foreshaft, a notable **lithic assemblage**) that were stratigraphically below Paleo-Indian cultural materials that were radiocarbon dated to the same time as Clovis. These materials have been radiocarbon dated between 16,175 and 11,300 years ago, registering a cultural presence at least 4,000 years before Clovis. On top of that, the **lithic context**

of the so-called Miller Complex looked very different than Clovis **assemblages**. These Pre-Clovis Paleo-Indian finds are the most significant cultural materials at Meadowcroft

Meadowcroft was the first **archaeological** site to publish Pre-Clovis materials, giving rise to new theories about how and when North America was peopled. The fact that there remains a substantial unexcavated portion of early and later levels means the site has the potential for others to test the existing interpretations of the site and to yield even more data on the early inhabitants of the United States. Since publication of Meadowcroft's Pre-Clovis component in the 1970s, other sites using similar **methodologies** have reported similar findings in **artifacts**, **stratigraphy**, and **radiocarbon assays**. Together these sites demonstrate that **prehistoric** people were active in North America *at minimum* 5,000 years before Clovis peoples. Meadowcroft Rockshelter remains a critical piece of **evidence** in the understanding of these first peoples.

To learn more about the Cultural Significance of Meadowcroft, please visit the companion [Teacher's Guide to Cultural Findings](#).

To conduct a lesson, download the Cultural Findings Exploration.