

Guided Tour Museum and Flint Ridge Description and Curriculum Resources

Location:	Flint Ridge State Memorial, Glenford (Licking), Ohio
Guided Tour:	Grounds and Museum
Availability:	Wednesday, Thursday, and Friday September, October, March, April, and May by appointment
Time Allowance:	1½ hours
Cost:	\$3.00 admission per student
Grades:	2 nd , 3 rd , 4 th , 6 th , adaptable to all

Description:

This tour incorporates the grounds and museum in recognition of the uniqueness of Flint Ridge. Beyond the 525-acre park, the scope of the Ridge is enormous, following the ridge tops from extreme southeastern Licking County well into Muskingum County. The Museum concentrates on how flint was formed, how it can be predictably shaped into tools, as well as prehistoric associations with the highly colored Flint Ridge material that found its way into their ancient trade routes. A network of hiking trails compliments the context of the museum by emphasizing the uniqueness of a mature hardwood forest, that is affected by the thin soil and abundance of flint. Equally unique is the ecosystem created by flooded ancient quarry pits on what is otherwise a dry, upland ridge top where only the hardiest of trees and plants can survive. Typically following the museum and the trail tour, students are offered the opportunity to hurl a long dart with a levering tool called an atlatl. This will provide them the opportunity to experience a significant advancement in ancient tool and hunting technology by experiencing the magnitude of force enhanced by the atlatl. This activity may be followed by the use of a pump drill, which students employ to appreciate the technology developed by prehistoric culture to drill holes in objects needed for survival. In this case it is employed by students to make necklaces. The entire field trip experience therefore emphasizes some of mankind's first greatest inventions so important for survival and the continuation of the culture. Interwoven with this is an appreciation of the natural world and the uniqueness of a forest with multiple ecosystems. The museum and restrooms are wheelchair accessible. Some assistance may be required on the nature trails. As part of the experience will be outdoors, we suggest that students dress appropriately for the weather and wear sturdy walking shoes.

Social Studies Academic Content Standards Addressed:

History (Daily Life)

2nd. Use historical artifacts, photographs, biographies, maps, diaries and folklore to answer questions about daily life in the past.

History (Settlement)

4th. Describe the earliest settlements in Ohio including those of prehistoric peoples.

People in Societies (Cultures)

4th. Describe the cultural practices and products of various groups who have settled in Ohio over time [including]: the Paleoindians, Archaic, Woodland (Adena and Hopewell) and Late Prehistoric (Fort Ancient) cultures; historic Indians of Ohio (Ottawa, Wyandot, Mingo, Miami, Shawnee and Delaware)

Economics (Scarcity and Resource Allocation)

2nd. Explain how resources can be used in various ways.

4th. Explain how the availability of productive resources in Ohio promotes specialization in the production of goods and services and leads to trade.

Science Academic Content Standards Addressed:

Earth and Space Sciences (Earth Systems)

3rd. Compare distinct properties of rocks (e.g., color, layering and texture).

3rd. Observe and investigate that rocks are often found in layers.

3rd. Describe that smaller rocks come from the breakdown of larger rocks through the actions of plants and weather.

3rd. Observe and describe the composition of soil (e.g., small pieces of rock and decomposed pieces of plants and animals, and products of plants and animals).

3rd. Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth).

3rd. Investigate that soils are often found in layers and can be different from place to place.

6th. Describe the rock cycle and explain that there are sedimentary, igneous and metamorphic rocks that have distinct properties (e.g., color, texture) and are formed in different ways.

6th. Explain that rocks are made of one or more minerals.

Life Sciences (Diversity and Interdependence of Life)

3rd. Use examples to explain that extinct organisms may resemble organisms that are alive today.

3rd. Observe and explore how fossils provide evidence about animals that lived long ago and the nature of the environment at that time.

4th. Observe and explore that fossils provide evidence about plants that lived long ago and the nature of the environment at that time.

Physical Sciences (Nature of Matter)

4th. Identify characteristics of a simple physical change (e.g., heating or cooling can change water from one state to another and the change is reversible).

4th. Identify characteristics of a simple chemical change. When a new material is made by combining two or more materials, it has chemical properties that are different from the original materials (e.g., burning paper, vinegar and baking soda).

Flint Ridge Glossary

Geology Garden:

adzes. Axe-sized tools with a chisel- shaped edge, used for shaping and smoothing wood.

calcium. A hard mineral, that is the main ingredient in bones and shells.

Decomposed. Disintegrating, broken down, biodegraded (returned to soil through decay or rotting processes).

erratics. Boulders transported by natural forces from their point of origin to another location, often quite far away.

flint. A type of very hard sedimentary rock composed mainly of silica, often shaped into tools and weapons by prehistoric people.

fossils. Ancient animals or plants, whose bodies have been mineralized, (that is, turned to stone).

glaciated. Covered by ice sheets.

glaciers. Huge, (often very thick) ice sheets which covered thousands of square miles during the Pleistocene.

granite. An igneous rock composed of several different minerals combined together.

hammer stones. Fist-sized, rounded granite pebbles used for pounding or grinding.

Ice Age. One of several periods during the Pleistocene epoch, when temperatures dropped and glaciers formed, followed by warmer periods of thawing and melting.

igneous. Rocks formed by volcanic heat.

limestone. A sedimentary rock containing a lot of calcium and formed from layers of mud from ancient lake or sea bottoms.

maul. A larger version of a hammerstone, often made of granite, and used to quarry flint or other hard substances.

quartz crystals. The crystallized form of a mineral which is silica- based, like flint.

sandstone. A sedimentary rock composed mainly of ancient sand, compressed together.

sedimentary. A class of rocks formed as layers of material which settles to the bottom of a body of water.

silica. A very hard mineral which is the main ingredient of quartz, flint, sand, and obsidian (volcanic glass), to name only a few examples.

spicules. Small, hard structures composed of silica and which form the “skeleton” of the sponges growing in

weathering. A natural process of breaking down and wearing away stone, bone, or other materials exposed to the elements (wind, rain, ice, etc.).

Museum Exhibits:

archaeologists. Scientists who study the cultures and peoples of the past.

arrowheads. Much smaller stone or bone projectile points mounted on arrow shafts.

artifacts. Anything made, modified, or used by humans.

burial mound. A heap of dirt and/or stones covering the remains of dead people.

core. A chunk of flint with flakes taken off the outside edges and (sometimes) shaped for making tools.

dart tips. Slightly smaller stone or bone projectile points mounted on cane or wooden shafts.

flint quarry pit. A location where people have dug underground to obtain the good quality flint for tools, etc.



flint knappers. People who practice the art of making stone tools using the techniques of ancient peoples.

hardness scale. Geologists' method of ranking minerals from 1 to 10, in terms of relative hardness.

historic period. The period after native peoples came in contact with Europeans, and significant events or observations began to be written down.

impurities. Small traces of minerals included in a rock, in addition to the main ingredients.

millstones. Large grinding stones ("buhrstones") for processing grain into flour.

obsidian. Volcanic glass, composed mainly of silica (like flint).

spear tips. Stone or bone projectile points mounted on cane or wooden spear shafts.

talc. The softest known mineral (# 1 on the hardness scale).

topographical map. A type of map, which shows the different elevations (mountains, valleys, plains, etc.) in a geographic area.

vanport flint. The geologists' technical name for Flint Ridge flint.

wastage. The leftovers debris (or, debitage) from flint knapping.

Pre/Post Classroom Activities (on following pages)

Stories in Stone worksheet

Brief History of Flint Ridge

Flint Ridge is operated by the Ohio Historical Society, a nonprofit organization that serves as the state's partner in preserving Ohio's history, archaeology, and natural history.



WORKSHEET: Stories in Stone

This printable handout includes a series of questions, the answers may be found in the geology garden, just outside the museum entrance, and throughout the museum's exhibits.

GEOLOGY GARDEN:

*A. Behind the patio of the museum, you will find a collection of different, large rocks. The big, round boulders of pink, brown, and charcoal, are **granite**, a hard **igneous** rock from mountain ranges in Canada. These granite **erratics** were brought into Ohio by **glaciers** that flowed into the western (**glaciated**) region of Ohio. When the glaciers melted, they left the granite behind. These rocks tell the story of Ohio's **Ice Age**. Native Americans used this hard rock to crack and grind seeds and nuts. They shaped it into axes and **adzes** to cut down trees and shape the wood. They also used large, rounded **mauls** of granite to hurl at **flint** outcroppings and break flint into smaller, more workable pieces. Hand-sized, rounded stones of granite were called "**hammer stones**".*

1. Why do you think we would call them that? _____

*B. Behind you, is a tan-colored boulder with moss growing on it. You may touch it, gently. The moss is soft, but the rock feels gritty. You may notice some sparkly particles stuck to your fingertips. This is **sandstone**, a **sedimentary** rock. It is made from sand, which is from the mineral **silica**, and when it **weathers**, it will become sand again. Native Americans used sandstone, much like we use sandpaper, to smooth and shape things, such as the shaft of a spear or to sharpen an axe edge. When sand (silica) is heated at very high temperatures it melts and becomes glass. If you want to make strong, transparent glass you add some flint to the sand that you melt. Licking County has had several glass factories in the area.*

2. Why would Licking County be a good place to have a glass factory? _____

*C. Turn around again and you will see a light-gray colored, stone slab with bumpy parts. This is another sedimentary rock, called **limestone**. Look closely at the bumpy shapes. These are **fossils**. You may touch them very gently. Fossils are the remains of the hard-shelled animals that lived in an ancient, shallow sea that covered part of North America 300 million years ago. When they died, the animals dropped to the ocean floor and lay in the mud. After their bodies **decomposed**, the hard shells became imbedded under many heavy layers of sediment. The mineral, **calcium**, which made the hard shells of these animals, formed this limestone rock.*



3. Do any of these fossils look like animals or anything else you recognize today?

4. Draw some of the fossils you see in the limestone.

*D. Walk to the collection of rocks near the museum entrance. These rocks are called flint. Flint is another sedimentary rock. It is similar to the other sedimentary rocks (sandstone and limestone) in some ways. It was formed at the same time the fossils (in the limestone) were forming (300 million years ago) in the ancient sea. The silica mineral (like the sandstone) that formed the flint came from tiny, internal hard structures, called **spicules**, in sponges that lived in the ancient sea. When these creatures died, their bodies decomposed but the spicules turned into a Jell-O-like goo that eventually crystallized into flint.*

5. Look closely at the flint samples. Do you see something sparkling on them? _____

6. What do you think the sparkles are? _____

*E. We often find **quartz crystals** with flint. They are made from the same mineral as flint.*

7. That mineral is called _____

MUSEUM EXHIBITS

*F. As you enter the museum, notice the pit located in the center, to your left. This is an actual **flint quarry pit** dug in prehistoric times by Native Americans. Behind the statue of the Native American miner, are the tools he will need to get and work the flint. One of these objects is a maul.*

8. Describe the object. _____

G. Look at the photographs (on the display to your left) of our Flint Ridge flint, taken with a special, high-intensity light camera.

9. Why do you think the Native Americans called it “rainbow flint”? _____

H. To your left, is a display that depicts the ancient sea that was once here, 300 million years ago. You can see something inside the flint, through the magnifying glass (be careful not to bump your nose).

10. What is inside the flint? _____

I. The picture beside that exhibit shows you what the floor of that ocean may have looked like and the process with which flint formed from the sponge spicules.

11. What is the name of this geological epoch (time period)? _____

*J. In the exhibit behind you, you can see that Ohio has many other kinds of flint besides our Flint Ridge (**geologists** call it **Vanport**) flint. Look at all the places flint can be found through out Ohio.*

Name three other kinds of flint in Ohio:

12. _____

13. _____

14. _____

*K. When silica is heated inside a volcano, a natural glass is formed. This volcanic glass is called **obsidian**. Find the display of obsidian. It has the same kind of predictable **fracture** that flint has, and can be chipped with the same techniques as flint to create similar tools.*

15. What kind of fracture does both flint and obsidian share? _____

*L. The colors found in Flint Ridge flint are due to **impurities** that mixed with the silica as flint was forming.*

Name the impurities which cause the following:

16. Grays, browns, and blacks _____

17. Reds and yellows _____

18. Blues and Greens _____

*M. Geologists use a "**hardness scale**" to measure the hardness of minerals. The scale is from one to ten, **talc** being the softest mineral (one) and diamonds are the hardest minerals (ten). Glass is right in the middle at number five.*

19. What is the hardness number for steel? _____

20. What is the hardness number for flint? _____

21. Is steel harder than flint? _____

N. When flint is struck against steel something special happens.

22. Describe this special property of flint. _____

O. The frontiersmen and settlers used this special property in two ways.

Name the two ways

23. _____

24. _____

P. Turn the handle on the rotating silica display. Many stones are made of silica.

Name three stones made of silica.

25. _____
26. _____
27. _____

Q. Some of these minerals are pretty and used as gemstones in jewelry.

28. Which of the gems in our geode display do you like the most? _____
29. Why is it your favorite? _____

R. Native Americans used the Flint Ridge flint to trade for materials they could not get in Ohio. Study the Hopewell trade route map carefully.

List two places of trade and what they traded.

30. Place: _____ Trade item: _____
31. Place: _____ Trade item: _____

*S. If you were a great eagle, flying over the eighteen-mile long ridge of flint here in Licking County, and there were no buildings or trees to block your view of the flint vein, you would see what our **topographical map** depicts. The yellow is the flint outcropping.*

What colors show the following:

32. Flint quarry pits? _____
33. Flint workshops? _____
34. Enclosures? _____

*T. A workshop area is the place that Native American **flintknappers** spent several days, chipping and working flint into tools and weapons. The evidence of their activity is the **wastage** they left behind. **Archaeologists** study this to learn how the flint was worked and what they made.*

35. What is a “core?” _____
36. What would be flaked from the core? _____

U. Rocks and points aren't the only things archaeologists look for to learn about prehistoric people, they study trash pits from ancient dwelling sites to learn about daily life.

Name two other artifacts are featured in the next display?

37. _____

38. _____

*V. The Hopewell built a **burial mound** near Flint Ridge. It is called the Hazlett Mound.*

Name two artifacts that were found in this mound?

39. _____

40. _____

W. Native Americans did not live at Flint Ridge because there was no permanent source of water for daily uses. They lived near ponds, rivers, and streams. Legends tell us that Flint Ridge was considered "common ground", a resource to be shared by all. Prehistoric Indians began mining flint here more than 14,000 years ago and continued to quarry it up through the historic period. The Hopewell Culture group used this area the longest.

Look at the timeline chart and tell when the Hopewell lived here.

41. from _____ to _____

X. The touch-screen computer tells how flint was formed, its properties, and where it is found in Ohio. Try this program.

42. What did you learn about flint that you did not know before? _____

*Y. Look at the diorama of the flint knapper. He has been busy making the tools you see in the display. The largest points are for **spear** tips, the medium points are for **dart** tips. The smallest points are called **arrowheads**.*

43. What do you think the smallest points are for? _____

Z. The board with the red buttons allow you to explore how Native Americans used flint (it also tells you how they did not use flint).



True (T) or False (F). **Flint was used for...**

- 44. T F Making bone tools
- 45. T F Axes to cut down trees
- 46. T F Grinding seeds or nuts
- 47. T F Scraping animal hides
- 48. T F Sewing hides for clothing
- 49. T. F. Hunting animals

AA. Flint is Ohio's state gemstone. The Native Americans did not use flint for jewelry. They thought of it as tool-making material (like we think of steel).

50. What is special about flint that makes it a favorite of many modern jewelers? _____

BB. Early settlers found that flint made excellent millstones for grinding grains such as corn or wheat. Try turning the wheel to see how these stones would have worked in a water-powered mill.

51. According to the exhibit, what is another name for millstones? _____

CC. Flint Ridge is not only an archaeological site, but also a nature preserve for many species of plants and animals. The touch-screen computer helps you identify some of the birds in this area and their songs.

Name three of the bird species commonly found at Flint Ridge:

52. _____

53. _____

54. _____

55. Which songbird has the best song? _____

DD. Digging for flint for thousands of years left many quarry pits. When it rains, a layer of brown shale below the flint prevents most of the water from being absorbed into the ground. This has resulted in the formation of shallow ponds and wetlands in some areas on the ridge.

Name 3 wetland dependant plants and animals that can live here, because of the presence of water?

56. _____

57. _____

58. _____
EE. The computer program called, “What’s the Point” informs you about the early cultures in Ohio through their flint artifact types. Use the mouse to explore this interesting program.

Name three types of flint points:

59. _____

60. _____

61. _____

FF. *The flint-knapping video shows Richard Stallings, an archaeologist, using some of the ancient techniques of Native Americans to produce a dart-point. After making the tool, there are leftover pieces of flint lying on the ground.*

62. What are the leftover pieces of flint called? _____

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