



EXPLORING THE PAST

A FIELD TRIP INTO MAMMOTH CAVE

GRADE LEVEL: 6 – 12

TIME REQUIRED: Depends upon the methodology selected

SETTING: Mammoth Cave, Mammoth Cave National Park

GOAL: A field trip into the Mammoth Cave system or a computer simulated field trip into the cave to locate, photograph and identify marine and vertebrate fossils

OBJECTIVES: At the end of the lesson the student will:

- Develop an appreciation of fossils as a non-renewable resource
- Articulate the value of preserving fossils
- Locate and photograph a fossil for identification
- Document where the fossil was found
- Theorize an ancient environment for the fossil
- Identify the fossil

KERA GOALS: Meets KERA Goals 1.1, 1.2, 1.3, 1.4, 1.7, 1.10, 1.11, 1.13, 1.16, 2.1, 2.3, 2.4, 2.6, 2.9, 2.11, 2.13, 2.23, 3.4, 3.6, 3.7, 4.2, 4.3, 4.6, 5.1, 5.2, 5.3, 5.4, 5.5, 6.1, 6.2, 6.3



*This lesson is a summation activity based upon knowledge acquired through previous lessons and learning situations. **Students need to have** an understanding of the basic concepts of paleontology and an understanding of the geology of the Mammoth Cave region in order to successfully complete this activity. Specifically, they will need to understand the concepts of deposition, fossilization, and erosion prior to their field trip. Students need to be able to identify the primary rocks found in the Mammoth Cave area and be familiar with the types of fossils found in South-central Kentucky.*

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BACKGROUND INFORMATION

Fossils provide valuable information about ancient environments. They are a vital link to our past. A fossil is a non-renewable resource. These resources are fragile and threatened by both natural forces and the impact of humans. As fossils are collected and/or destroyed, a part of the earth's history is lost. A collector needs to be responsible in the search for and the collection of fossils. In order not to destroy important information, fossils should not be disturbed without the assistance of an expert in the field of paleontology. Careful documentation is vital to provide the necessary clues to understanding the time in which the fossil might have lived. Documentation includes where the fossil was found, the type of rock in which it was found, and how the surrounding area looked. The surrounding rock is often the best clue as to when the fossil lived. Vertebrate fossils need to be left in situ (in their original location) until they have been evaluated and photographed. It is important to know how the bones lay in relation to one another and in relation to the environment.

The rocks of the Mammoth Cave area are sedimentary rocks. A broad shallow sea covered this part of North America with rivers entering from the northern land area. The rivers picked up fragments of weathered rock and deposited them in areas where the rivers emptied into the sea. These areas are called deltas. Soluble rocks, such as limestone, were dissolved by water and carried in solution. When the concentration of the dissolved materials was great enough, it precipitated as sediment on the sea floor, forming new layers of sedimentary rock. Plants and animals used some of this calcite to form hard body parts. When these organisms died, these parts accumulated as sediment that solidified into sedimentary rock.

Today, shells and other preserved hard parts of ancient plants and animals can be found in the rock. These preserved hard parts (fossils) tend to resist weathering and often extrude from cave walls.

Vertebrate remains are often found within caves. Most bone remains are found near an entrance. The entrance may be one that is used today, or it could be an old entrance that was destroyed long ago by the earth's movement.

During times of flooding bones might be washed into the

cave, or floods may trap animals such as hibernating bats. Flooding or a change in surface drainage patterns may also redeposit bones far from their original deposition site.

An animal may wander into a cave, become lost, and die far from a cave entrance. Vertical shafts leading into cave passages may act as pitfalls for unsuspecting animals.

Species that are found in cave deposits may now be extinct, still living in the area, or extralimital (no longer living in the local area). Bones, tracks, trails, nests, scratch marks, and burrows may also be found in the cave environment.



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PROCEDURE

Schedule a field trip to Mammoth Cave. You may schedule a trip to the resource or you may elect to have a member of the Environmental Education staff come to your classroom to share fossil replicas. In either case, plan ahead. You will need to make arrangements several months before your trip.

OPTION ONE – A TRIP TO THE CAVE

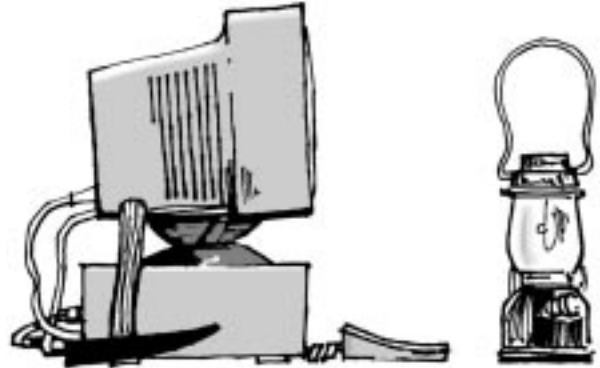
A trip to Mammoth Cave National Park requires that students come with some basic background knowledge. Students need to understand the concepts of deposition, fossilization, erosion, and the process of extrusion prior to their field trip. Students need to be able to identify the primary rocks found in the Mammoth Cave area. Students need to be familiar with the types of fossils found in South-central Kentucky.

During their visit, students will experience fossil hunting within the cave environment. Students will use photography to document their fossil find. Each student will keep detailed notes about the depositional environment, identify the type of rock in which the fossil is located, and theorize how the fossil was deposited in its present site. Students will either identify the fossil in situ or they will take photographs to aid in later research. The photographs will become part of the student's written report.

OPTION TWO – A RANGER VISITS YOUR CLASSROOM

An instructor from the park will bring fossil replicas to your classroom. Each student needs to have some prior understanding of the basic concepts of geology and paleontology to have a meaningful experience. The computerized walk through the cave will not only include a three-dimensional view of the cave, but it will also allow the student to view each fossil from several angles. All students will make the same observations as were expected in the walk through the cave.

To schedule either method of presentation, you should call the Office of Environmental Education at Mammoth Cave National Park. Please follow the directions for scheduling located in the front of this guide.



EXTENSION

1. The student could research and write a paper on the ethics of fossil hunting.
2. The student could research the fossil he or she photographed or identified either in the cave or on the computer screen. This research should include information of the geologic era and the environment in which the fossil lived.
3. The student could present findings about his or her fossil orally at a classroom "science conference". At this time students may present background information on the geologic era and prehistoric environment along with the type or species of fossil found, details of the species life cycle, food preferences, predators, life expectancy, and other details uncovered through research and/or observation. These presentations could be enhanced by the use of visual aids.