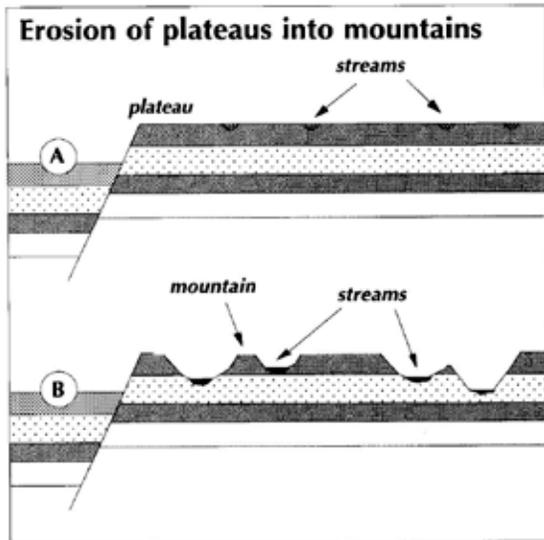


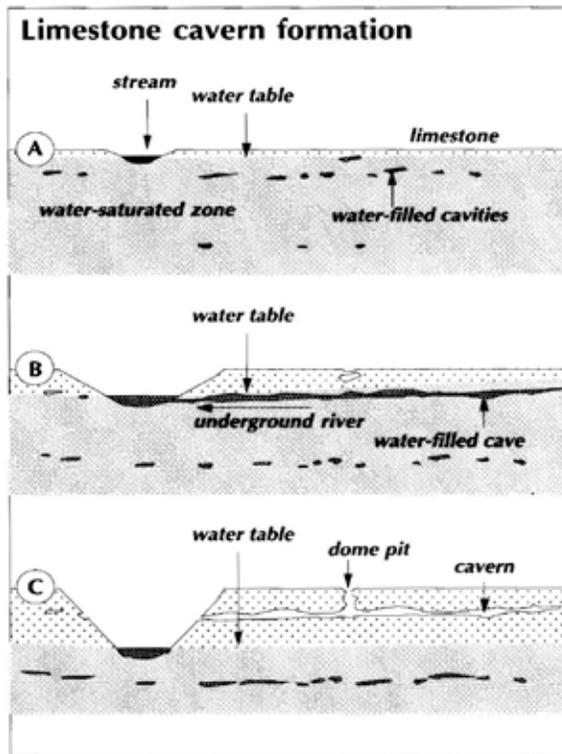
Karst Topography in the Arkansas Ozarks

A discussion guide by the Arkansas Natural Heritage Commission



Erosion of Ozark plateaus.

Illustration by Patt. Clark for *Arkansas and the Land*.



Formation of caverns in limestone.

Illustration by Patt. Clark for *Arkansas and the Land*.

The Ozarks Mountains are typically described as *plateaus*. They formed when the land was uplifted leaving high mountains with flat tops at approximately the same elevation. Though the Ozarks have relatively flat tops, they are known for their rugged terrain. Streams and rivers carved deep valleys into the plateaus creating the peaks, bluffs, waterfalls, and overlooks that are common in this scenic mountain range. The Ozark Mountains in Arkansas can be further subdivided into the Ozark Highlands and the Boston Mountains. The Ozark Highlands subdivision will be the focus of this discussion guide.

Approximately 300 million years ago during the Paleozoic Era Arkansas was covered by an ocean. As the creatures that lived in this ocean died, their skeletons and shells fell to the ocean floor. Their remains were compressed over time and formed a horizontally-layered, sedimentary rock known as *limestone*. These layers of marine organisms formed another sedimentary rock called *dolomite*. Though they are similar, dolomite consists of calcium magnesium carbonate, while limestone is simply calcium carbonate.

The Ozark Highlands are dominated by limestone and dolomite. Though neither is particularly permeable to water, both are water soluble. As rain falls, it dissolves carbon dioxide in the air. As it passes through soil, decaying leaves, and other organic material, the rainwater picks up other acids. This creates a weak carbonic acid that reacts with the calcium in limestone and dolomite, slowly dissolving the rock. As the water travels through breaks in the bedrock, cracks widen to form underground passages and caves. These underground passages allow water to move extensively underground.

Land characterized by water soluble bedrock is known as *karst topography*. Karst in the Ozarks includes features such as *caves*, *springs*, and *sinkholes*. This subterranean landscape provides habitat for a variety of animal species, some of which are found nowhere else in the world.

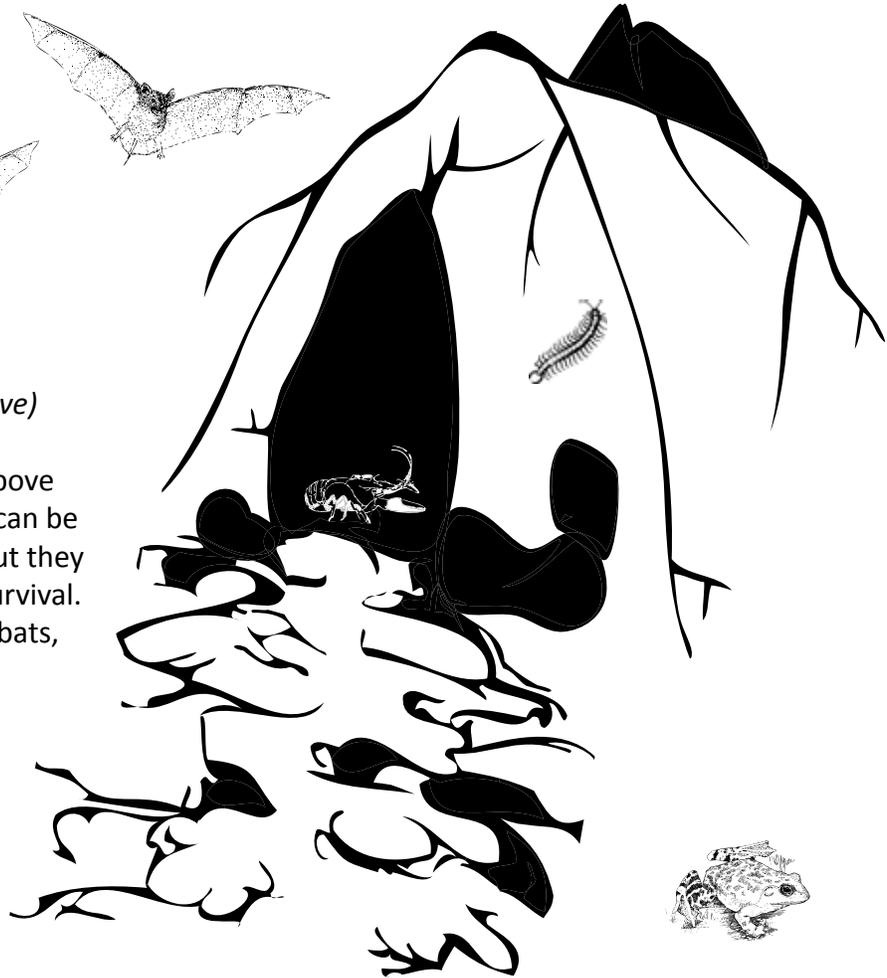
Karst Critters

Caves provide a habitat that is cool, damp, and dark. Animals who live permanently in the total darkness of caves have become specially adapted to this environment. In fact, many of these animals could not live anywhere else. Other animals may choose to take shelter in caves or only visit them for food or water.

Trogloxenes - Cave Guests

from the Greek words "troglos" (cave) and "xenos" (guest)

Trogloxenes are animals that live above ground but often use caves. Caves can be very important to these animals, but they do not depend on them for their survival. Some examples of troglloxenes are bats, bears, skunks, moths, and people.



Troglophiles - Cave Lovers

from Greek words "troglos" (cave) and "phileo" (love)

Troglophiles are animals who live their lives in a cave. They can live in the dark zones of a cave, but they also have the ability to live outside of the cave. These animals are not specifically adapted to the cave habitat, and they may even be found living above ground. Examples of trogllophiles are earthworms, beetles, cave crickets, frogs, daddy longlegs, and some types of salamanders.



Troglobites - Cave Dwellers

from the Greek words "troglos" (cave) and "bios" (life)

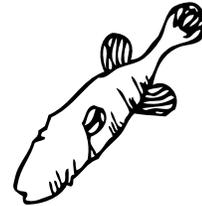
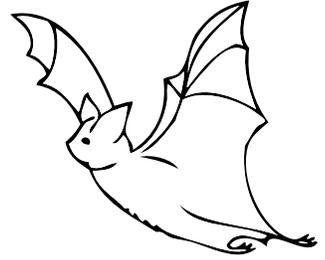
Troglobites spend their entire lives in the total darkness of caves. Over many generations, their species have specially adapted to help them survive in this environment. These animals could not survive outside of a cave habitat. Troglobites include species of flatworms, isopods, amphipods, and millipedes, as well as cave crayfish, cave shrimp, cave fish, and some cave salamanders.



Why is Karst Important?

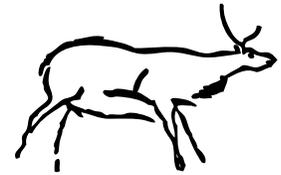
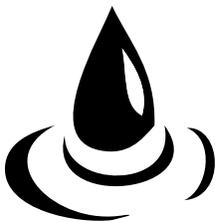
Habitat

Karst ecosystems often support rare, threatened, or endangered plant and animal species. Cave-dwellers often have special adaptations, such as enhanced sensory perceptions, that allow them to survive in these unique habitats. For example, the Hell Creek Cave crayfish is completely blind and has no pigment. A cave in Stone County, Arkansas provides habitat for the only known population of this endemic animal. It is not found anywhere else in the world. Other caves in Arkansas provide habitat for three endangered bats--the Ozark big-eared bat, the Indiana bat, and the gray bat.



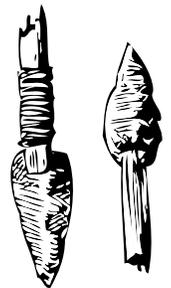
Hydrology

Approximately 25% of our nation's groundwater is located in cave and karst regions, making this unique landscape a valuable supplier of freshwater. These underground systems can move large quantities of water over great distances in a relatively short period of time. Because water travels so quickly through these systems, it undergoes very little filtration. Runoff containing pesticides, fertilizer, or sediments from developed areas, leaky sewage systems, and landfills can all pose significant threats. Contamination of karst *aquifers* can happen quickly and endangers sensitive plant and animal species, as well as humans.



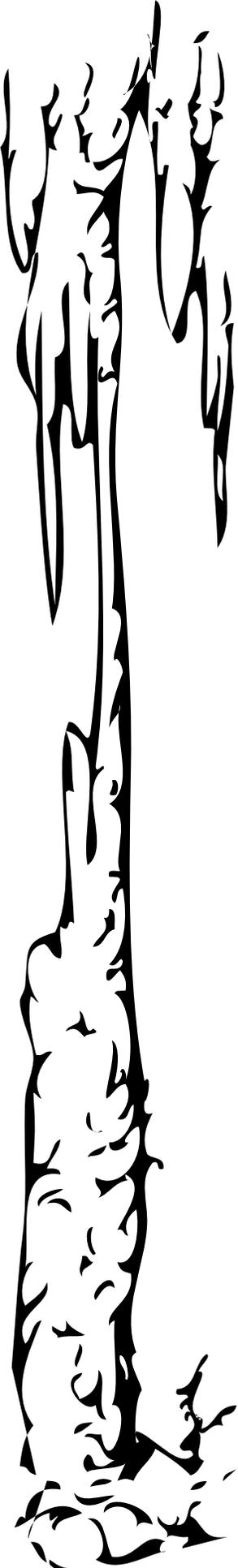
Archeology

Since the beginning of time, caves have been used by humans. We have taken shelter in caves, used them for burials and other rituals, and have even used them to store food. Steady temperatures and the lack of light also aid in preservation of ancient artifacts. Significant archeological discoveries such as tools, skeletons, pictographs, and pottery have provided important information about the lives of prehistoric peoples.



Recreation

Underground lakes and rivers, interesting rock formations, and unique plants and animals are just a few of the reasons humans enjoy visiting caves. Seeing Earth from under the surface is a thrilling experience we do not get every day. But since 2006, a fungus called White Nose Syndrome has been spreading across the nation. It has killed more than one million bats to date. Because little is known about how this fungus is spread, access to caves has become very limited, and most of Arkansas's caves have been gated and closed to all human visitation.



Keywords for Educators:

- **aquifer** - any geological formation containing or conducting ground water, especially one that supplies the water for wells, springs, etc.
- **cave** - an air-filled underground space large enough for human exploration
- **dolomite** - a sedimentary rock resembling limestone but consisting of calcium magnesium carbonate
- **karst topography** - an area in which the bedrock has been chemically weathered by the groundwater and features caves, sinkholes, and springs
- **limestone** - a sedimentary rock consisting predominantly of calcium carbonate, varieties of which are formed from the skeletons of marine microorganisms
- **plateaus** - a land area having a relatively level surface considerably raised above adjoining land on at least one side, and often cut by deep canyons
- **sinkhole** - a shallow depression or a vertical opening to a cave created when surface limestone erodes; sinkholes are sometimes referred to as sinks
- **spring** - a natural flow of groundwater, often found in a break in bedrock along a hillside

Learn more about karst in Arkansas:

Arkansas Natural Heritage Commission

http://www.naturalheritage.com!/userfiles/Ozark_Karst_a_fragile_landform.pdf

<http://www.naturalheritage.com>

The Nature Conservancy

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/arkansas/placesweprotect/ozark-karst-program.xml>

Encyclopedia of Arkansas

<http://encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=5969>

Sources:

Foti, T., & Hanson, G. (1992). *Arkansas and the land*. Fayetteville, Arkansas: The University of Arkansas Press.

National Park Service - <http://www.nature.nps.gov/geology/caves/program.htm>

Bureau of Land Management

http://www.blm.gov/wo/st/en/prog/Recreation/recreation_national/caves___karst_areas.html

U.S. Fish and Wildlife Service - <http://www.fws.gov/whitenosesyndrome/>

Project Underground: A Natural Resources Education Guide



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