

CAVES

OF THE NATIONAL PARKS



SUBTERRANEAN SCIENCE



HYDROLOGY



GEOLOGY



MINERALOGY



PALEOCLIMATOLOGY



PALEONTOLOGY



BIOLOGY



ARCHEOLOGY



CAVES

OF THE NATIONAL PARKS

The National Park Service (NPS) manages over 4,900 caves, including four of the seven longest caves in the world. Cave scientists study archeology, biology, paleontology, mineralogy, hydrology, geology, and many other fields. Caves also have tremendous aesthetic value, and provide recreational and educational opportunities. Visit the NPS Cave and Karst website at <http://nature.nps.gov/geology/caves/>.

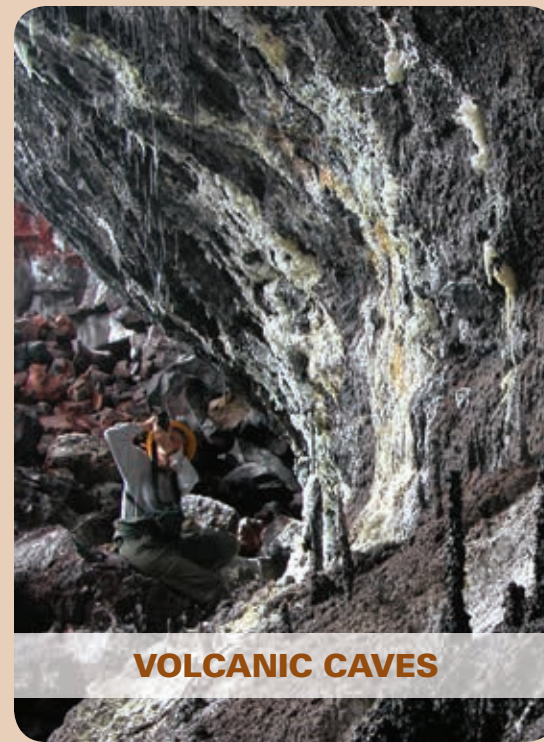
WHAT IS A CAVE?

A cave is a naturally occurring subterranean cavity large enough for a human to enter. Caves can hold clues about the lives of ancestral peoples and provide habitat for unique species. They preserve minerals, fossils, and records of past environments and climates.

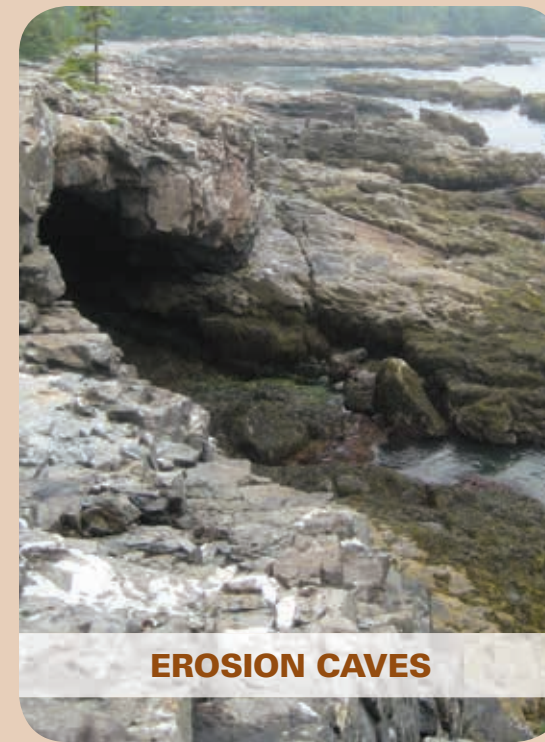
Mammoth Cave National Park hosts the longest known cave in the world (Mammoth Cave), which is at least 400 miles long (644 km). The deepest limestone cave in the United States, Lechuguilla Cave in Carlsbad Caverns National Park, is 1,604 feet deep (489 m).



SOLUTION CAVES



VOLCANIC CAVES



EROSION CAVES



ICE CAVES

TYPES OF CAVES

There are many types of caves varying greatly in size, origin, and appearance:

SOLUTION CAVES form where bedrock dissolves. These caves occur when slightly acidic water enters pores, cracks, or fissures and slowly creates empty spaces in the rock. Most solution caves are formed in carbonates (limestone, dolomite, marble, and gypsum) and are associated with karst landscapes.

VOLCANIC CAVES (lava caves or tubes) result when molten lava flowing from a volcano solidifies on the surface to form a crust. The

molten lava on the inside continues to flow until the lava is depleted, leaving an empty tunnel.

EROSION CAVES form in various settings, the most prominent being sea or littoral caves. These caves result from the erosive action of waves against rocks lining the shores of lakes and oceans and can be affected by tides.

ICE CAVES are caves that contain ice and may form in any type of rock. Ice caves are different from glacier caves. Glacier caves form entirely within glacial ice.

SUBTERRANEAN SCIENCE

WHY ARE CAVES IMPORTANT?

Caves hold essential information that is relevant to modern societies, providing unique settings for scientific studies and research. Cloaked in darkness, maintaining constant temperatures and humidity, and with low organic input, these “extreme environments” provide unique habitats for animal adaptations and mineral deposition.

ARCHEOLOGICAL AND CULTURAL RESOURCES

People have used caves as shelters for thousands of years. Artifacts and other items left in caves provide a glimpse into their lives and their interactions with the natural world.

BIOLOGY

Caves host a variety of animals. Some occasionally use caves, while others—troglobites—have adapted to spend their entire life cycle in a cave. Some troglobites have gradually developed bodies without pigments and eyes, unnecessary traits in a lightless cave environment.

GEOLOGY

Caves are ideal places to study geology because they provide windows into rocks and help scientists reconstruct past environments and landscapes.

HYDROLOGY

Karst hydrologists study the movement, distribution, and quality of water in karst areas. Karst areas and associated caves have provided



water to people since early historic times. The rapid movement of water and lack of filtering in karst terrains make these areas vulnerable to pollution.

MINERALOGY

Caves contain a large number of minerals. Calcite is one of the most common. As calcium-rich water seeps into an air-filled cave, the water loses carbon dioxide to the atmosphere and precipitates calcite to form speleothems.

Common speleothems (cave formations) include stalactites, stalagmites, helictites, cave popcorn

(cave coral), flowstone, and draperies (cave bacon).

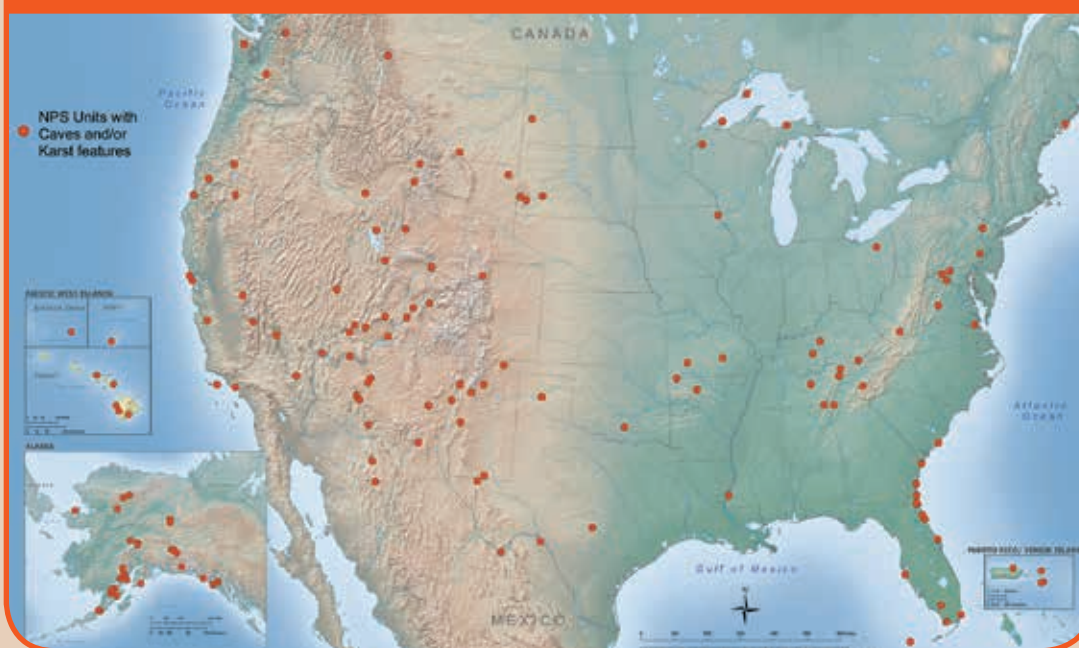
PALEOCLIMATOLOGY

Speleothems, dissolution features, and sediments in caves can contain detailed paleoclimate archives similar to those found in glacial ice, tree-rings, and deep-sea sediments.

PALEONTOLOGY

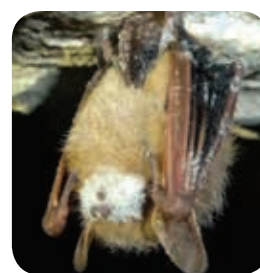
Sheltered from weathering and erosion, caves are prime environments for fossil preservation. Fossils can be found in the bedrock (cave walls) or as material that accumulated in cave entrances and passages.

LOCATION OF SELECTED NATIONAL PARKS WITH CAVES



WHITE-NOSE SYNDROME IN BATS

White-nose syndrome (WNS) is a disease affecting bats that hibernate in caves or mines. The disease was first documented in New York in the winter of 2006-2007. Since then it has spread rapidly and has killed millions of bats. WNS is caused by a white fungus, *Pseudogymnoascus destructans*, which appears on the muzzle and other body parts of hibernating bats.



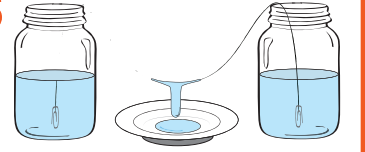
Bats pollinate plants and disperse seeds. They also eat insects—individual bats can consume hundreds of insects each night, making them a “natural insecticide.” The loss of millions of bats means the loss of these vital ecosystem functions.

Visit www.whitenosesyndrome.org/

Learning Activities

Growing Speleothems

Age Level: Modify for all ages
Source: National Park Service

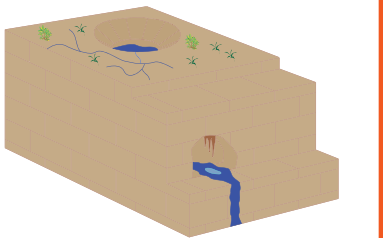


In this activity, students will grow their own speleothems, learn about the process of mineral formation, and record observations at the end of each day.

Visit <http://go.nps.gov/learncaveminerals>

Karst Topography Paper Model

Age Level: 9 – 14
Source: U.S. Geological Survey and National Park Service



In this activity, students will construct a 3-D paper model that shows the evolution of karst topography and how water flows through karst and cave systems. Peering into the model’s cave opening reveals a miniature diorama with many cave features.

Visit <http://go.nps.gov/learnkarst>



KARST LANDSCAPES

Karst landscapes result from the dissolution of soluble rocks such as limestone, dolomite, and gypsum. These terrains are characterized by sinkholes, caves, springs, and sinking streams.

KARST AND WATER

Karst is ideal for storing water as an aquifer and provides vast amounts of clean drinking water to people, plants, and animals. Because of the porous (Swiss cheese-like) nature of karst, water flows quickly through it and receives little filtration. Therefore, contaminants that enter a karst aquifer are rapidly transported, creating water quality problems. It is imperative for our health and safety to protect karst landscapes.

WHAT ARE SINKHOLES?

A sinkhole is a depression or hole formed when the land surface sinks due to underground bedrock dissolution or cave collapse. In developed areas, catastrophic sinkhole collapse can cause significant damage and loss of life.

About 20% of the United States is underlain by karst landscapes and 40% of groundwater used for drinking comes from karst aquifers.