



CAVE OF THE MOUNDS®

National Natural Landmark

Educational Programs

SpeleoQUEST

Cave Mini-Course

Grade 9-12

Objectives:

At the end of this program, the student should be able to:

- Define cave related vocabulary
- Explain what a cave is
- Explain how a solution cave forms in general terms
- Name & Identify at least 5 cave features or formations
- Understand the connection between what is above ground and what is below ground

Wisconsin DPI Standards:

Science:

D.12.4, D.12.5, D.12.6, D.12.11, D.12.12

Social Studies:

A.12.3

Activities:

Times are approximate & specific reinforcing activities will vary based on the needs of each individual group.

- 30 minutes The interactive audio visual presentation provides the definition of a cave, process of the formation of sedimentary rocks, how caves form, and how cave formations are deposited.
- 30 minutes Outside Karst Tour shows above ground features that indicate the presence of caves, shows examples of local geology, and traces the path of Cave of the Mounds from above the ground.
- 50 minutes The Cave Tour fosters a connection between previously discussed cavern features and formations and an experience of the actual cave environment.

Pre-teach Vocabulary:

A glossary of terms is provided for your convenience

Cave	Flowstone	Physical Weathering	Lifeline
Speleothem	Fossil	Calcite	Calcium Carbonate
Stalactite	Sedimentary Rock	Mineral	
Stalagmite	Geology	Speleology	
Acid	Water Table	Cephalopod	
Dissolve	Joint	Crystal	
Column	Limestone	Cave Coral	
Chemical Weathering	Sinkhole	Erosion	

Learning Extension:

Try this after your visit to reinforce important concepts.

Each group will need:
 2 beakers
 20% solution muriatic acid
 (hydrochloric acid)
 sample - limestone
 sample - non-carbonate rock

1. Partially fill each beaker with the acid solution. Weigh & measure rock samples.
2. Place each rock sample in a separate beaker. Make and record observations.
3. Check the beakers every 15 minutes. The dissolving action may stop if the acid or calcite is no longer available to react. Add more acid or break apart the limestone to expose more calcite to continue the reaction.
4. After 45 minutes, the limestone sample should be noticeably smaller. Dry the samples and weigh & measure again. Record observations.

Discuss: Limestone dissolves in acids. Hydrochloric acid allows us to witness this reaction very quickly because it is a very strong acid. Carbonic acid forms when rain picks up carbon dioxide from the atmosphere and soil. As this weak acid moves through cracks and fissures (such as the lifeline) in the limestone, the rock is slowly dissolved leaving behind cavities. This process can take thousands, or millions, of years.

Glossary of Terms

Cave - A hole in a rock that was made by nature and is large enough for a person to fit into.

Speleothem - A general term for any mineral deposit or formation found within a cave, such as a stalactite or stalagmite.

Stalactite - A formation which develops when water deposits minerals in successive rings downward from the ceiling of a cave.

Stalagmite - A formation which builds upward from a cave floor as the result of water dripping from above. They are usually located beneath a stalactite.

Acid - A substance that produces ions when it is dissolved in water. Acids can breakdown (dissolve) rocks and minerals.

Dissolve - To breakdown a substance into smaller more dilute particles.

Column - A formation which is formed when stalagmites meet overhanging stalactites. Water flowing down the sides of the column gradually enlarges it by adding layers of flowstone to the surface.

Chemical Weathering - The wearing away of particles through a chemical change such as dissolution, evaporation or precipitation.

Flowstone – Sheets of calcite deposited in a cave as mineral rich water flows over the wall or floor.

Fossil - Any remains or traces of animals or plants that lived in the past. These can include bones, tracks, casts or imprints.

Sedimentary Rock - A solid, cohesive aggregate of one or more minerals or mineral materials formed from the compaction and cementation of sediments.

Geology – Scientific study of the earth and the materials that form it.

Water Table - The planar surface under ground below which all rock is saturated with water.

Joint - A fracture in rock, usually vertical to a bedding plane, along which no appreciable movement has occurred.

Limestone - A carbonate-rich sedimentary rock which usually forms from layers of the remains of marine life and other marine sediments.

Sinkhole - A circular depression formed by ground collapse into a solution cavity.

Physical Weathering - The wearing away of particles by some physical force of nature such as wind, water or gravity.

Calcite – A compound containing carbon and calcium (CaCO₃). Most cave formations are made of calcite.

Mineral - A naturally occurring, solid element or compound, with a definite composition and a regular internal crystal structure.

Speleology - The scientific study of caves.

Cephalopod – A mollusk with a distinct head and a foot divided into tentacles, such as a squid or an octopus.

Crystal - A solid whose atoms are arranged in an orderly, repeating, three-dimensional pattern. All minerals, such as calcite, are composed of crystals.

Cave Coral – Speleothem that forms at the surface of mineral rich pools of water in a cave.

Erosion - The set of processes by which materials are removed or transported by wind, water, ice or gravity.

Lifeline - A nickname given to a crack in the ceiling of a cave that permits mineral rich water to enter and deposit speleothems.

Calcium Carbonate - A natural inorganic compound with the chemical formula CaCO₃. This compound is present in most underground water, and is found in the solid form in the mineral calcite.