

## Caves and Sinkholes

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Hello and welcome to the Kentucky 4-H Virtual Experience. My name is Joey Barnard and I am the Extension Specialist for 4-H Camping, a part of the University of Kentucky's College of Agriculture, Food, and Environment. Today, we'll be visiting Lake Cumberland 4-H Camp where Krystal, the Camp Director, will be sharing with us a video and information about caves and sinkholes. We hope you Enjoy.

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Hello everyone, my name is Krystal Johnson and I am the camp director here at Lake Cumberland. Our beautiful camp has so many things I could talk about today, but a main topic of interest is the cave! The term cave is given to an underground open space, and usually implies that there is a connection to the surface large enough for a person to enter. Some caves measure a few hundred feet, while others extend for many miles and reach hundreds of feet in depth.

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Caves exist in almost every state in the U.S. Mammoth Cave is a very large and popular cave you may have heard about in Kentucky. The most common caves are solutional caves, often called limestone caves. Most of these form through the dissolution of soluble rocks by a weak, natural acid in groundwater. The minerals which make up the rock actually dissolve into the groundwater, like sugar into hot tea. Karst is the name for a landscape with topographic features such as caves, sinkholes, streams, and springs underlain by soluble rock. About 20% of the area of the United States is karst. In addition to caves, there are many other landscape features characteristic of karst. Sinkholes are closed topographic depressions, resembling funnels in shape, formed by the collapse of underlying voids. Sinking streams occur where surface streams flow directly into underlying voids. Karst springs form where water emerges from underground voids and caverns and are frequently found where the water table intersects the land surface.

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Most karst is formed where carbonate rocks such as dolostone and limestone are exposed at the earth's surface. The largest and greatest number of caves are found in areas of extensive deposits of limestone. Limestone is composed mainly of the mineral calcite ( $\text{CaCO}_3$ ), with minor amounts of insoluble minerals (e.g. clays, quartz, feldspar). Limestone is rather soluble as rocks go, but only in acidic water. Raindrops reaching the earth's surface are generally not acidic enough to cause significant dissolution except in rare cases of acid rain caused by industrial emissions or volcanoes. People who live in karst areas and depend on well water can see evidence of the dissolved rock first-hand, shown by mineral deposits which form in their tea kettles and hot water heaters. These minerals were originally part of the underlying bedrock.

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A creature common to our caves is the cave cricket. They are widespread in the United States and have a lifespan of about one to two years. They do not possess sound producing organs, and therefore cannot chirp. Additionally, the adults do not have wings, unlike other cricket species. Though lacking wings, they possess large hind legs and a lengthy set of antennae that helps them navigate dark environments. Using their long limbs, and when they easily get frightened since it's the only defense mechanism they have is jump. They also do not pose any health threats to humans, as they lack fangs or the ability to bite.

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Now let's talk about the structure of caves, Stalactites hang from ceilings of caves and form as mineralized water drips into the cave. Stalactites generally begin as soda straws, which are hollow, translucent, vertical tubes formed by precipitation of calcite along the outside of a water droplet. Eventually, these tubes become plugged by calcite deposited on the outside of the structure. The deposition of calcite continues around the outside of the structure, widening and lengthening it over a long period of time. Stalagmites, on the other hand, rise from the muddy floor and are often but not always, formed by the water dripping from stalactites above, growing taller as further stalactite precipitated water comes from the ceiling. Thank you for joining us today and we look forward to seeing you in person at Lake Cumberland 4-H Camp.