Enduring Understandings
People have used caves and rock shelters for thousands of years for lodging and daily activities such as cooking and tool making.

Questions
What is shelter?
What are the characteristics of a good shelter?
What activities take place in shelters?

Students will
Define shelter
List the characteristics of good shelters
Analyze drawings of rock shelters to determine what activities took place in them
Create a shelter using the information they have learned

Materials
Drawings of the 5 rock shelter levels
Optional: pictures of shelters around the world
Two cardboard shoe boxes, 2 thermometers, black construction paper

Subjects
Language arts
Social Studies
Science

Common Core Standards - 5th Grade
English Language Arts: RSIT 2, 3, 4, 10 SLS 1
Missouri Grade Level Expectations: Strand 7 1. B. c., d.; 1. C. a., b., c.
**Uncover Prior Knowledge**

What is a shelter? Record the students’ ideas on the board or chart paper. Answers could include that it is protection from the elements, a place to sleep and eat, a secure place for our possessions.

Do all shelters look the same and have the same uses? Pictures of shelters around the world can be shown, including igloos, yurts, grass huts, etc.

In Missouri, what types of shelters do we have? Answers can include houses, apartments, mobile homes, and others.

What other types of shelters are there? Bus shelters and storm shelters are some examples.

In Missouri, what are the characteristics of good living shelters? Warmth in the winter, cool in the summer, a place to sleep and cook, storage for possessions.

Share the **Human Uses of Caves and Rock Shelters** with the students. Guide the students in a discussion about the shelter needs of past inhabitants being similar to our shelter needs today.

Why would Native Americans have chosen to use caves and rock shelters for their lodging? Answers could include that they did not have to stop and construct a shelter while they were traveling in search of food and the shelters offered protection from the weather and wild animals.

Caves, and to a lesser extent rock shelters, offer more than just protection from wind and rain. Cave temperatures in Missouri average between 55 and 58 degrees year round. They would be a cool relief in the summer and easier to heat in the winter. Most inhabited caves and rock shelters face south to take advantage of the warm afternoon sun. This passive solar heating would heat the rock of the cave or shelter and hold the warmth in during cold winter nights.

**Experiment to measure the effect of passive solar heating**

Materials needed: 2 shoeboxes, black construction paper, 2 thermometers

Line the insides and bottom of the shoe boxes with black construction paper. Put a thermometer in each box. Place one on the windowsill on its side with the open top facing the sun. Place the other in a corner of the room away from the windows and any other sources of heat. After about half an hour, read the temperatures in each box. The one facing the sunny window should be warmer than the one away from a source of light or heat.
Copy the drawings of the 5 rock shelter time period levels and the composite of all 5 levels. They can be copied on paper or on transparency film. Sets can be made for groups of students, or each group can be given one level. Use a document camera attached to a projector or an overhead projector and place the level papers or transparencies on the platform with the Paleo-Indian Period on the bottom, then the Dalton Period, then the Archaic Period, the Woodland Period, and the Mississippian Period on the top. Tell the students that when archaeologists begin an excavation, they start with the top layer, which is the most recent. They carefully scrape away very thin layers of soil to expose the artifacts. All artifacts are carefully measured and drawn on maps to document their location. When the style and types of artifacts change, the archaeologists know that they are entering a layer from a different time period. Remove the top sheet of paper or transparency, the Mississippian Period, and show the students what lies beneath. The artifacts from the Woodland period are different from the Mississippian layer and diagnostic of their time period. After the archaeologists have carefully uncovered and mapped in the Woodland artifacts, they know they are now in the Archaic Period layer (remove the Woodland layer). Continue in this manner until you are at the oldest, or deepest level, the Paleo-Indian Period. The stratigraphy of the oldest things being on the bottom and the newest things being on the top is called the Law of Superposition.

**Important Note**
The artifacts shown in the drawings are representative of each time period. They are not proportional to each other or the rock shelter! The assemblage may not all be found in the same shelter because they are examples of tools and pottery found throughout the state.

Have the students observe the drawings. Using the background information they read, they can make observations and inferences about the artifacts left behind. What activities were taking place in the rock shelter during this time period? (tool making, food preparation and storage, clothing construction, etc.) What technologies were they using? What foods were being eaten? How does each time period differ from the one preceding and following it? How does the technology change? (spears and atlatls to bows and arrows, baskets to pottery, foraging to cultivation). Why is tool making always taking place in the same location? (flakes are sharp and you wouldn’t want them throughout the shelter)

There is an excellent video about humans and caves on the Archaeology Channel. This cave is in Missouri and archaeologists have found evidence of human presence there. The video is 30 minutes long and can be watched online. http://www.archaeologychannel.org/video-main-menu/video-guide-main/video-guide-summary/242-footsteps-into-the-world-beneath
Extensions can include additional information about how caves in Missouri are formed. The topography in much of the state is called karst. This describes the type of landscape that is formed by water, enriched by carbon dioxide, dissolving layers of limestone. The result is caves, sinkholes, and underground rivers, along with other features. There are many websites that have experiments on how caves are formed that use sugar cubes to illustrate the process. See the bibliography for a list of some websites about caves for students.

Assessment
Students can write a report on the information they learned about caves and rock shelters as places of habitation for early Native Americans. Facts should include why these sites are favorable shelters and what types of activities took place in the shelters. Students could use the information they learned to design a home for themselves in a cave or rock shelter.

Preservation and Stewardship
Caves are delicate ecosystems. Plants and animals living in the cave can be damaged by people who are not knowledgeable about caves and careful in their explorations. Artifacts left by past inhabitants are irreplaceable in terms of the information that archaeologists can learn from them. Exploring caves on private property requires landowner permission. Caves are protected by state and federal laws. Artifact collection is prohibited on public land by state laws, and collection of artifacts from human burials is prohibited by federal laws. Students can discuss or debate the ethics of collecting, trading, and selling artifacts. Do they think it is right for some people to individually possess artifacts or should the artifacts be kept in museums to be viewed by the public and studied by scholars? Does collecting and selling artifacts encourage looting?
Human Uses of Caves and Rock Shelters

Native Americans have inhabited Missouri for at least 14,000 years. For much of this time, small groups of hunter-gatherers wandered the land, looking for game and edible plants. They did not have permanent settlements and used caves and rock shelters as temporary homes. In addition to sleeping, cooking and everyday activities, they were used as places for rituals and burials. A cave is defined as a space deep enough to extend past natural light at the entrance, it's depth is greater than its opening width. A rock shelter is a shallow opening at the base of a bluff or cliff. Missouri is known as “The Cave State” with over 6,500 known caves and innumerable rock shelters. Most of the caves and rock shelters in Missouri were formed by water dissolving the calcium carbonate in limestone. The Law of Superposition states that the youngest (most recent) layer is found on the top and the oldest layer is at the bottom of a site.

The Paleo-Indian Period (12,000 - 8,000 B.C.) The Early Hunters
Large animals, such as the mammoth, mastodon, and giant ground sloth were living during this time period. Paleo-Indians hunted these animals as well as deer and smaller game. They used spears and atlatls (spear throwers) in their quest for meat. Archaeologists have found evidence of Clovis points in contact with mastodon bones in the area that is now Mastodon State Historic Site. These early people also gathered edible plants. Their camps were temporary and relatively few artifacts have been found from this time period. Paleo-Indians used caves for shelter on their hunting and food gathering migrations.

The Dalton Period (8,000 - 7,000 B.C.) The Hunter - Foragers
The mammoth, mastodon, giant ground sloth and other big game were extinct by this time, so Dalton hunters continued to roam in search of deer and other smaller animals. They began spending longer periods in a smaller area. Foraging for plants continued. Seeds, berries, nuts, and edible roots contributed to their diet. Projectile point styles include the Graham Cave fluted and the Dalton serrated. The people were making clothing from the hides as evidenced by the flake scrapers for preparing the hides and bone needles. Other tools include knives, drills, adzes and other woodworking tools, and mortar and pestles. Caves and other rock shelters continued to be used seasonally. Archaeological evidence shows that Graham Cave was used by ancient people at this time.
**The Archaic Period (7,000 - 1,000 B.C.) Hunter - Gatherers**
During this time period, the people utilized more diversified food resources. Hunting and trapping animals as well as gathering plants continued to be the main staples of their diet. Fish and shellfish became a more important part of the menu. Vegetable plants increased in importance and toward the end of the period there is evidence of squash and gourd domestication. Because of the increasing dependence on plants, the people established semi-permanent camps where they returned after their hunting and gathering expeditions. Caves and rock shelters continued to be utilized during these trips. Some projectile points of the period include the Hidden Valley Stemmed, the Graham Cave Side Notched, the Rice Lanceolate, the Jakie Stemmed, and the Nebo Hill lanceolate. Other tools include drills, knives, scrapers, ground stone celts, and full grooved axes. The mano (pounding stone held in the hand) and grinding stone were used for plant food processing.

**The Woodland Period (1,000 B.C. - 900 A.D.) Potters and Traders**
As people began to spend more time in villages and depend more on agriculture, there was a need for sturdier cooking vessels, storage for food and seeds, and transportation and storage of water. Pottery technology developed and the use of pottery became common. At the start of this period, spears and darts were still being used with atlatls. Snyders and Manker points were used, among others. Deer, turkey, and smaller game, such as rabbits, were hunted. Corn and squash were being cultivated and nuts, seeds, fruits and berries were gathered. By the Late Woodland Period (400 B.C. - 900 A.D.), the bow and arrow replaced spears as the preferred hunting tools. Arrowhead types include the Scallorn, Crisp Ovate, and Rice side-notched. During this time period, there was widespread trade with groups in what are now the states surrounding Missouri. The people continued to use caves and rock shelters during travel while hunting and trading.

**The Mississippian Period (900 - 1700 A.D.) The Townspeople**
This period is characterized by large permanent villages and reliance on farming for food. Long distance trade continued and artifacts made of copper from the Great Lakes area and conch shells from the Gulf Coast have been found. The bow and arrow were used for hunting with Reed side-notched, Madison, and Huffaker arrowheads, as well as others. Antler flaking tools were used for flint knapping. Hoes and spades were used for cultivation as well as building mounds, embankments and house wall trenches. Decorative items, such as shell beads, stone gorgets, and pottery effigy figures indicate that the people had moved beyond a subsistence level and had the time and resources for art and personal adornment. Caves and rock shelters were still being used seasonally.
Woodland Period
1000 B.C. - 900 A.D.

Diagram of a shelter structure with labels for different areas:
- Front ledge
- Back wall of shelter
- Grinding stone
- Squash seeds
- Bone
Bibliography

Indians and Archaeology of Missouri (Revised Edition); Carl H. and Eleanor F. Chapman; University of Missouri Press; 1983

The Missouri Archaeological Society website http://associations.missouristate.edu/mas/ includes MacQuest with information on ancient Missouri history for elementary students. There are also downloadable brochures on Native American Pottery in Missouri and Stone Artifacts of Native American Missouri

Cave websites:
http://teacher.scholastic.com/lessonrepro/lessonplans/theme/caves01.htm
http://www.kidsdiscover.com/spotlight/caves-for-kids/
http://www.dnr.mo.gov/geology/docs/gcwinter8.pdf
http://www.watersheds.org/teacher/rd.htm
http://www.nps.gov/ozar/forteachers/skin-deep.htm
http://www.nps.gov/cave/forteachers/abcd_curriculum.htm
http://www.nps.gov/cave/forteachers/upload/geology_middle_school.pdf
http://www.geosociety.org/educate/lessonplans/sugarcube_karst.pdf

Missouri Department of Natural Resources Groundwater Protection Curriculum Guide