

Karst Cave Diorama Project

Lesson Summary: (Grades 5-12)

Students use assorted weblink resources to build background knowledge about Missouri caves and karst topography. These resources help students understand how human activities on the surface of the land can help or harm the water quality for humans and for cave life underneath. The students then design and construct a diorama out of an available cardboard box that displays this integral relationship. In the process students become acquainted with the unique cave life and dripstone features found in Missouri caves. By creating a karst cave diorama, they have the opportunity to be creative while showing their knowledge to others.

Weblinks Resources:

- [MOcaves02](#) MDNR Fact Sheet on Missouri Caves
- [Losing Streams | Missouri Department of Natural Resources \(mo.gov\)](#)
- [Sinkholes | Missouri Department of Natural Resources \(mo.gov\)](#)
- [Resources | Karst in the Ozarks](#) Online Videos: “Karst in the Ozarks” (18:08 minutes) for lower grades and “Karst in Perry County” (18:39 minutes) for higher grades. (Click on video title to read the description.)
- [Speleothems | Missouri State Parks \(mostateparks.com\)](#)
- [Missouri Caves | Missouri Department of Conservation \(mo.gov\)](#) Missouri Conservationist Article.

Suggested Materials:

- Base box: Corrugated cardboard box or flatboard box, such as a shoebox
- To adhere items to diorama: glue guns, glue sticks, Elmer’s Glue, assorted tapes, string
- Interior and Exterior Coverings: black spray paint, construction paper
- Speleothem Construction: Styrofoam, floral wet foam, tapered candles or candle wax to carve, pipe cleaners, straws, toothpicks, markers, chalk, clay, string, yarn, paper funnels, paper towel and toilet paper inside rolls
- Water representation: blue construction paper, blue yarn, blue transparent cellophane, tissue wrap
- Human activities items: miniature vehicles and farm animals, Legos for buildings, sand paper representing bare ground, tiny cut up plastics and such for trash, black markers for puddles of oil

Warm Up: Building Background Knowledge:

Ask students about their knowledge and experiences related to Missouri caves. Let them share with each other briefly. Then lead a short class discussion. Cave dripstone features are likely to come up in the discussion. Tell students they will be learning more about these “speleothems” later in the lesson.

Explain that they are going to learn about Missouri caves and then they will be assigned a Karst Cave Diorama Project (either in or outside of class). Add that before they can start their project, they need to build background knowledge on the subject.

Building Background Knowledge: (Use Weblinks above)

1. Have printed copies of the MDNR Missouri Cave Fact Sheet. Read and discuss the information. Read out loud in lower grades.
2. Show students the weblinks about Missouri losing streams and sinkholes. Ask them if they know of any of these karst types of features. Discuss accordingly.
3. Play the online video (see links) that best suited for the grade level. The videos show real life situations where human activities on karst terrain affected water quality and cave life below. Discuss the video afterwards. Ask student to explain how activities on the surface affect groundwater. Ask them what connects these two worlds (losing streams and sinkholes).
4. Refer back to the lesson warm up where students shared information about cave dripstone features. Use the provided speleothems link to go over the formation information and specific examples of speleothems.
5. For more detail on cave life read and discuss the online article “Missouri Cave Life” in the Missouri Conservationist Magazine from March 1, 2023.

Karst Cave Diorama:

This project can be a class project where students work in pairs or an at home project. Below is a general set of guidelines for consideration. It can be expanded or contracted as desired. Create a checklist for students of the chosen guidelines as well as grading criteria.

- a. Use the entire interior and exterior of the box.
- b. Consider spraying the inside of the box with black spray paint ahead of time. This should be done outdoors. Adult supervision is needed for lower grades.
- c. Make the outside “walls” of the box look like limestone bluffs. Use gray construction paper and grey markers to draw sedimentary layers.
- d. Determine how the top of the box is going to connect with the cave underneath via karst features. Decide how to display that relationship in the diorama. This will most likely require cutting into the top of the box. Adult supervision is wise.
- e. Determine what human activities are going to be displayed on the top of the box that could help and/or harm the groundwater and cave life. Decide what items to gather use to display these activities.
- f. Choose what material is going to be represented for water throughout the diorama.
- g. Determine what cave speleothems are going to be displayed inside the cave. Brainstorm how to construct them using assorted materials and how to display their names.
- h. Decide if any cave life and/or life zones is going to be shown in the cave. If so, determine what organisms and how they will be displayed in the diorama.

Wrap Up:

Have students display and share their projects. Follow up with a discussion about what they can do NOW to help keep groundwater safe for everyone. Use [No MOre Trash! | Missouri Department of Transportation \(modot.org\)](#)