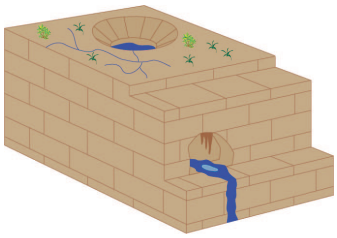
# Karst Topography Paper Model



**Grade Level: Grades 9-12**

**Lesson Objectives:**
Students will
- Learn about karst topography including sinkholes, caves, and springs
- Recognize that karst terrains are integrated systems and are vulnerable to human activities
- Understand the movement of water in underground systems

**Timeframe:**
- Two class sessions for introducing the concepts and building the model

**Materials:**
- Scissors
- Glue or tape
- Color pencils, crayons, or markers
- Cave pattern

Learn more about caves and karst;

visit the NPS Cave and Karst Program

www.nature.nps.gov/geology/caves/index.cfm

U.S. Department of Interior
U.S. Geological Survey
National Park Service

USGS science for a changing world

NATIONAL PARK SERVICE

## *Overview:*

Create a paper model that depicts karst terrains. Interpret and understand that karst systems are dependent upon the relationship between water, land, vegetation and soils.

**Before**


**After**

# Karst Topography Paper Model continued...

## Background:

Karst landscapes denote a specific type of terrain formed by the dissolution of carbonate rocks and are characterized by the presence of sinkholes, caves, springs, and sinking streams among other landforms. It is estimated that as much as a quarter of the world's population uses water supplies that are drawn from karst aquifers. Karst terrains are fragile environments vulnerable to ground water contamination. Understanding groundwater flow in karst terrains is critical for maintaining healthy and safe drinking water.

Caves are naturally occuring subterranean voids large enough for human entry. In general, they provide environments with constant temperature and humidity levels. They are natural traps for sediments and have the potential to provide detailed paleoclimate archives. Some caves provide habitat for rare or endangered species, and support unique bacteria not seen on the surface of the Earth.

## Procedure:

**1.** Students should read the **Karst Topography Paper Model Reading Guide** and answer the pre-activity questions included.

**2.** Color cave patterns 1, 2, and 3 (on pages 4-6). You should pick colors that are realistic and exhibit a real karst environment.

**3.** Follow steps 1-9 on the **Cave Assembly** instructions on pages 7-9.

**4.** Answer the **Conclusion** questions on page 3.

## Helpful Hint:

You can use the **"Helpful Hints for Constructing Model"** on pages 10-11 to assist you with building the model.

***Note:*** *This report has been modified from the U.S. Geological Survey Open-file Report 97-536-A "Karst Topography Computer animations and paper model". The original report was created in 1997, and included the paper model and a floppy disk or diskette version. Because the paper model continues to be a great example of karst topography, we decided to modify and update the report and omit the diskette version of the document.*

## Conclusion:

1. Look through the cave opening. Describe what features you see.

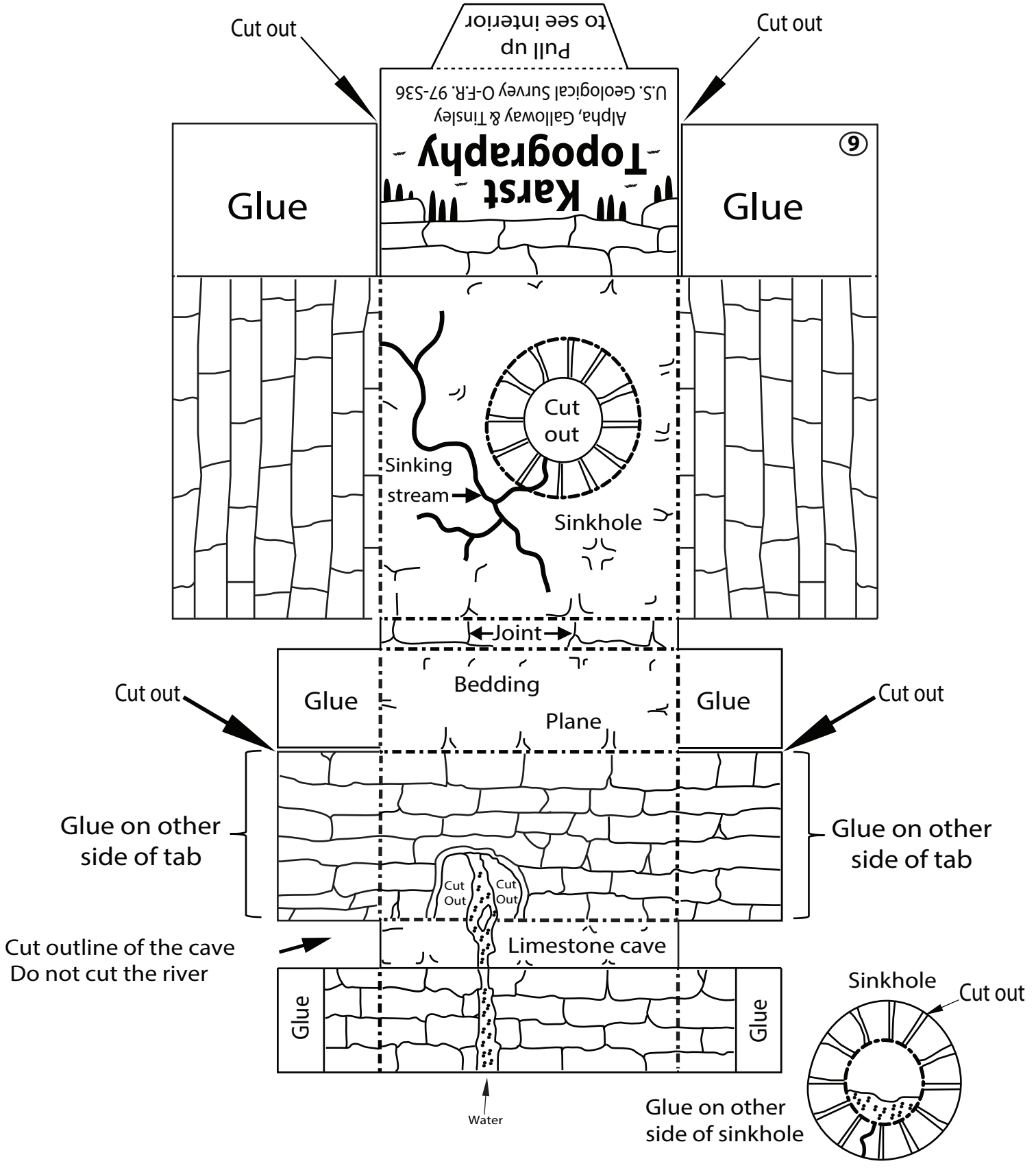
2. Describe the relationship between the sinking stream and the sinkhole as the waters drains through the bedrock. What direction is the water flowing?

3. As the water flows through the cave what features are forming on the cave walls?

4. A truck carrying fertilizer crashed near the stream within a few miles from this karst feature. The fertilizer spilled into the stream and was carried towards the sinkhole. What effect will this have on the karst aquifer? Would you want to drink the water from the aquifer?

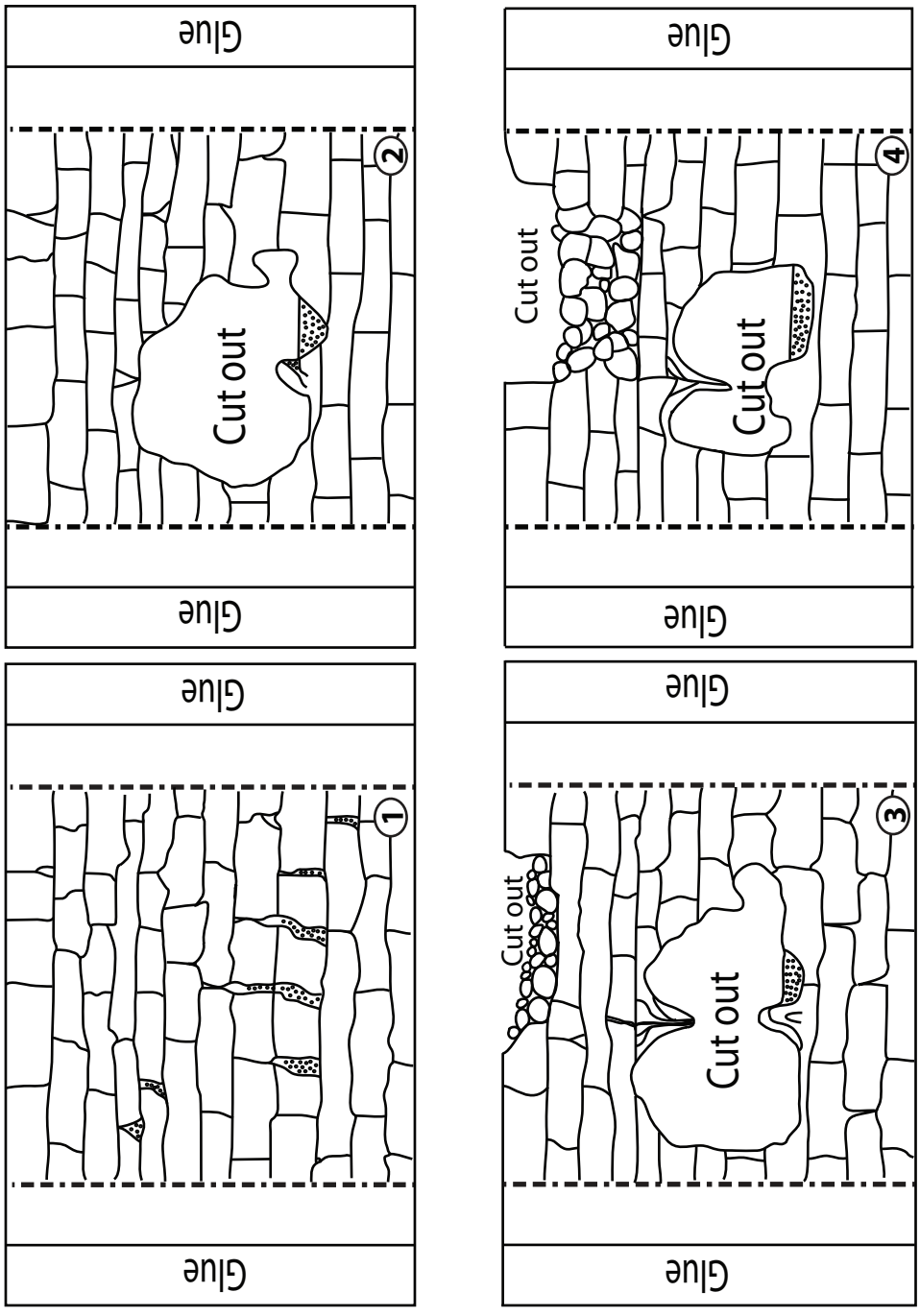
# Karst Topography
# Paper Model continued...

## Cave Pattern 1 of 3



# Karst Topography
# Paper Model continued...

## Cave Pattern 2 of 3



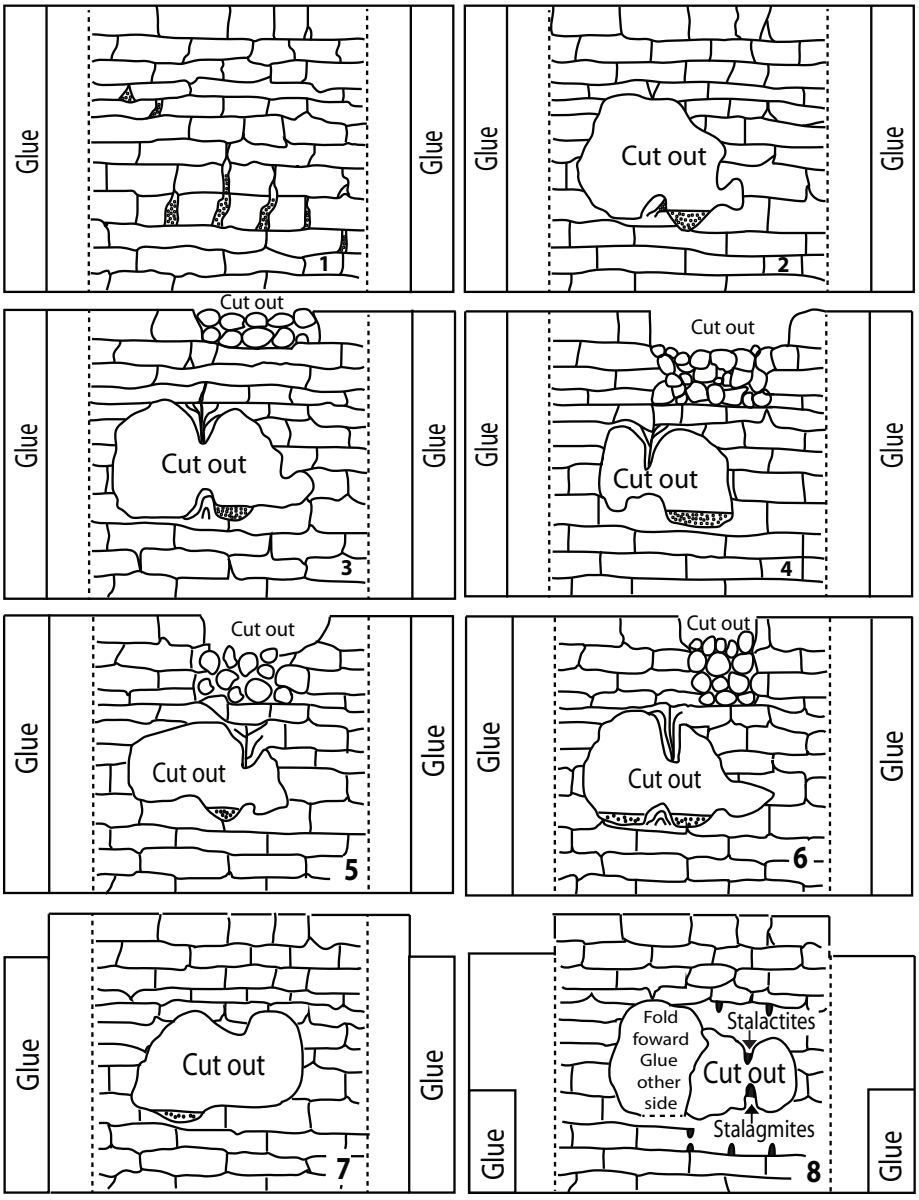
# Karst Topography
# Paper Model continued...

## Cave Pattern 3 of 3

# Karst Topography
# Paper Model continued...

## Cave Assembly 1 of 3

Note: For additional photographic instructions see pages 10 and 11.

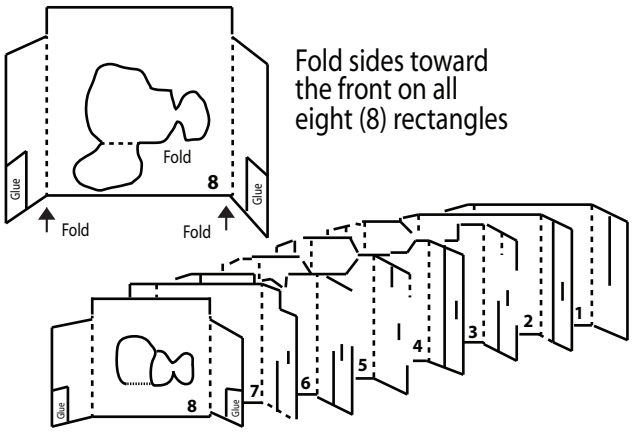



Step 1. Cut out eight (8) rectangles from pattern pieces 2 and 3. Cut out "cave" hole on rectangles 2 through 8. Do not cut the water area represented by dots. Cut out around the "rock" area on rectangles 3 through 6.

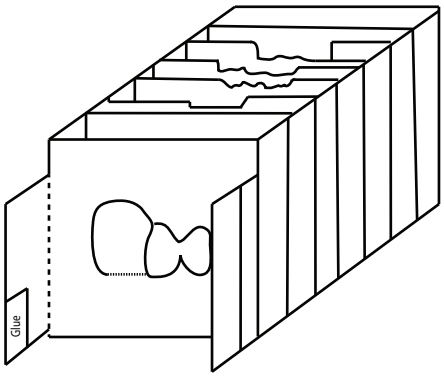
# Karst Topography Paper Model continued...

## Cave Assembly 2 of 3

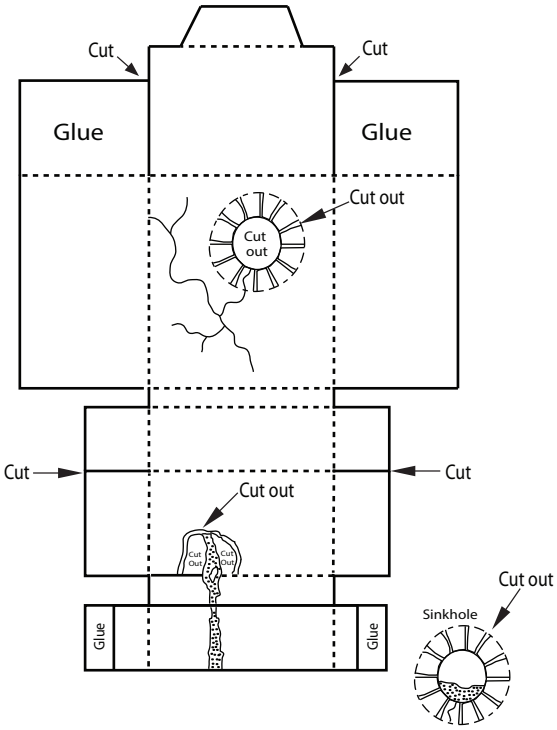
Note: For additional photographic instructions see pages 10 and 11.



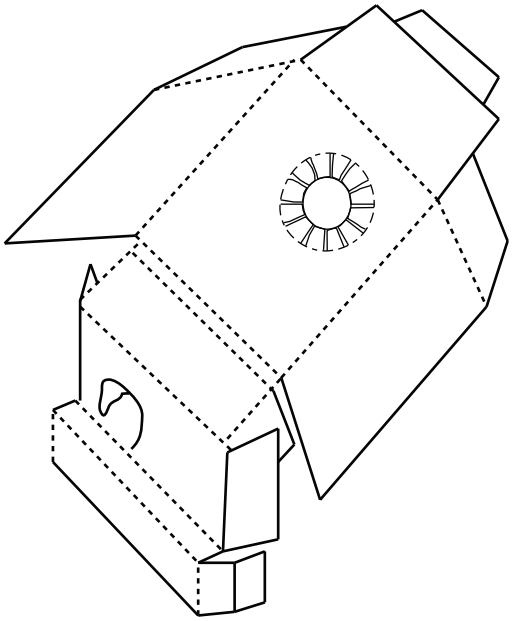

Step 2. Fold sides toward the front on all 8 rectangles.




Step 3. Assemble the 8 rectangles in descending numerical order with cave wall number 8 in front. Glue tabs.




Step 4. Cut out karst topography box and sinkhole. In the sinkhole only cut out the small columns, in order to be able to fold the tabs.

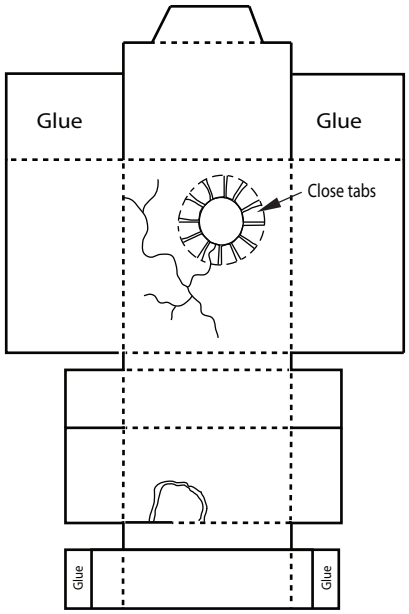


Step 5. Fold karst topogaphy box by following the dotted lines.

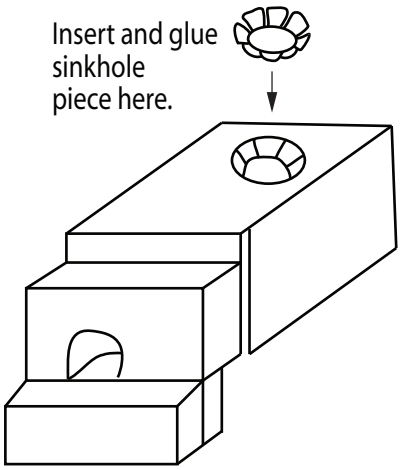
# Karst Topography Paper Model continued...

## Cave Assembly 3 of 3

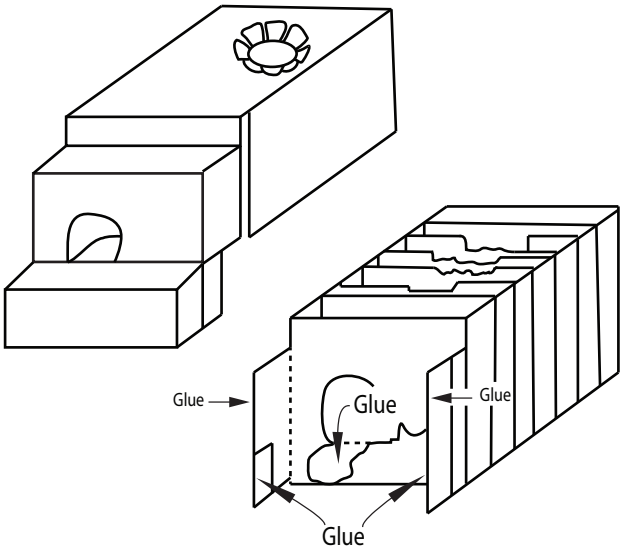
Note: For additional photographic instructions see pages 10 and 11.



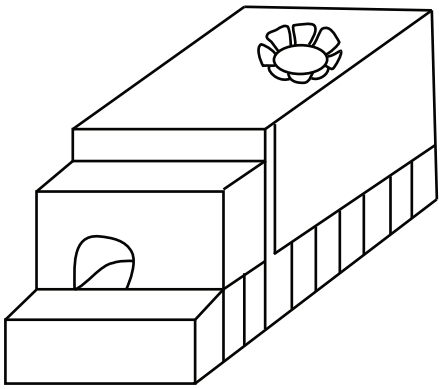

Step 6. Glue karst topography box and sinkhole tabs.




Step 7. Assemble karst box as shown.



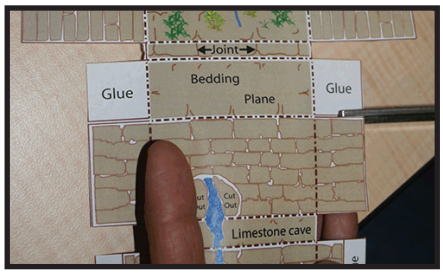

Step 8. Glue karst box over the 8 rectangles.



Step 9. Finished cave model should look like this.

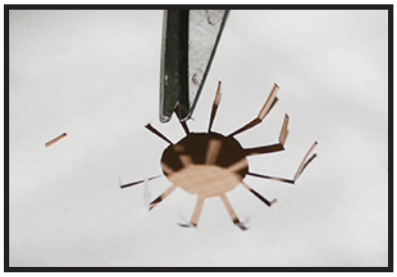
# Karst Topography
# Paper Model continued...

## Helpful Tips for Constructing Model:



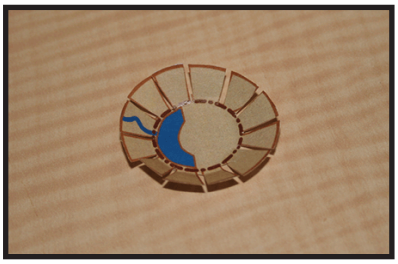

Cut along all solid lines and fold along dotted lines.


Cut out inner circle of the sinkhole in the model.



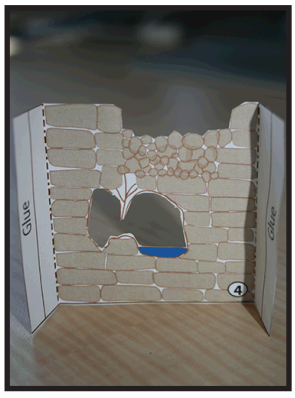
Cut out the small slits of the sinkhole in the model.


Fold the flaps downward.



Cut out sinkhole piece and small slits between the flaps fold upward.


Glue flaps of the sinkholes together and line up the flaps with the stream.



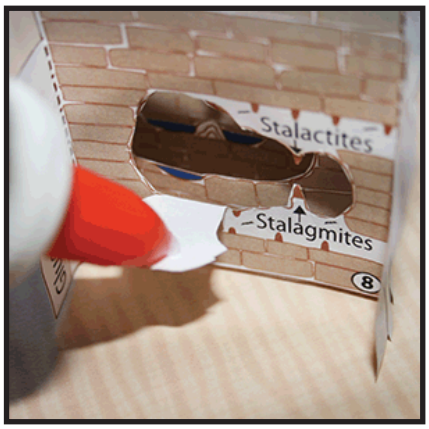

Fold forward along the dotted line on all 8 caves walls.

Glue the walls in numerical order.

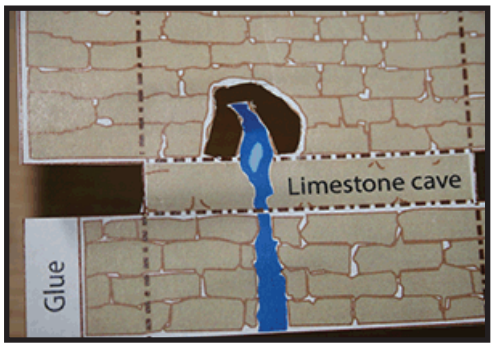
# Karst Topography
# Paper Model continued...

## Helpful Tips for Constructing Model:

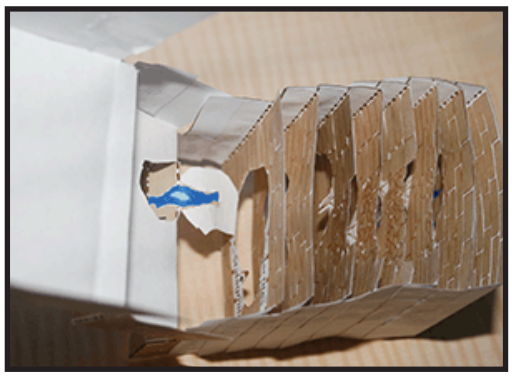

Fold flap forward on wall 8.




Place glue on end of flap.




Fold stream.



Glue stream to flap on wall 8.