

Years K-6 Lesson 2

One reason children are so fascinated with caves is that nearly every culture has stories and legends, modern and ancient, about caves and cave creatures. The purpose of this activity is to sharpen student appetites for scientific learning by hearing cave stories.

Educational Goals

Students will be able to:

- List three things about caves that interest them.
- List reasons why writers choose caves as settings for stories.

Background

Caves and cave animals figure in numerous popular stories. Why?

There are many reasons. Caves have often served as secret hiding places for people, treasures, or other secrets. Caves are inherently dangerous. Their darkness guarantees both danger and mystery.

Caves also offer extraordinary beauty, as any geologist or caver will testify. The bizarre shapes and colours fascinate people of all ages. Then, of course, there are bats, providing a rich lore of legend in nearly every culture. Oddly enough, in our culture, the legends have built up around vampire bats. Vampire bats are found only in the American tropics and are a tiny fraction of all bat species. In China, on the other hand, graphic symbols of bats represent good luck rather than evil. To prepare for this activity, please consult your library for resources. See what you can find in your school and local library.

In many children's stories, caves bring together all the elements of good stories:

- interesting characters
- mystery, hidden things
- unusual and bizarre animals
- history and legend
- bizarre shapes, colours, smells
- danger.

Materials Required

- Stories, books, videos, comics, and other materials on caves and cave animals and people.

Procedure

1. Consult resource list to collect cave-related materials.
2. Ask class to name stories that relate to caves.
3. Invite students to read stories or watch videos during the unit.
4. Discuss questions below.

Discussion Questions

1. Suggest some reasons why caves show up in so many stories. (This asks students to combine two factors - the cave environment and elements of good fiction.)

2. Why do caves make good places for fantasy and adventure stories? (Teacher may wish to read from *Tom Sawyer*, *Ali Baba and the Forty Thieves*, or other works.)

3. Are the caves shown in popular cave stories real? What gets left out? (Popular cave stories tend to leave out the unpleasant detail, the danger, the mud, etc. Bat stories emphasize false or unpleasant details. Movies, by necessity, make caves appear to have more light than they really do.)

4. Many bats are in stories too. What makes them exciting characters for stories? (Their unusual bird/mammal appearance, their night habits, their specialized sonar sensory perception, vampire bats and legends, etc.)

Years K-6 Lesson 3

This activity takes a closer look at limestone cave geology and hydrology, using a cutaway drawing of a cave system. Students will learn additional cave vocabulary, and consider the implications of underground structures on planning human communities.

Educational Goals

Students will be able to:

- Define dry cave, wet cave, underwater cave, sink hole, shaft, and water table.
- Describe at least two ways that pollution can enter cave systems.
- Explain why it is important for communities in limestone areas to map their cave formations.

Students will be able to explain that bats are not blind, and how they use sonar to navigate in the dark.

Background

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Materials Provided

- Use attached Cave Diagram
(Diagram shows polluted stream runs down to the sinking stream and into a wet cave. Also shows sink holes, shaft, tunnel, dry cave, and underwater cave.)

Procedure

1. Ask the question: Why is cave mapping important? Discuss answers.
(Maps prevent cavers from getting lost. They also keep road and building

constructors from building on sink hole areas, and maps help prevent pollution of underground water.)

2. Distribute copies of Cave Diagram. Locate and discuss new features that have not been discussed before:

Dry cave: a cave with no standing water or streams.

Tunnel: a long, narrow, horizontal passage.

Shaft: a long, narrow, vertical passage, going up and down or sloped, which may require special climbing equipment. Vertical shafts are often located at the bottom of sink holes.

Sink holes: places where a cave used to be near the surface. When the limestone roof of the cave collapses, a sink hole is created. On the surface, a sink hole might just look like a steep hole.

Sinking stream: a stream suddenly disappears underground into a cave system.

Water table: the level below which all openings in rock are filled with water.

Wet cave: a cave with underground standing water, seepage, streams, or ponds.

Underwater cave: a cave that develops below water level. Cave divers explore these caves.

3. Ask students to use a blue crayon to trace all the ways that water can get into the caves. Remind them that water will seep through soil. Ask them to colour all bodies of water above and below ground.

Use a red crayon to show how pollution could move from the factory, through cave passages, to the ocean.

4. Ask students to identify underground features that could be dangerous to people.

Sink holes: If people do not have good cave maps, they won't know where sink holes are developing. Because of this, many houses, roads, animals, and farmlands have fallen into sink holes.

Shafts: Good cave maps will show where shafts are. Cavers can use climbing equipment to get in or out of shafts. Maps will also keep people from falling into shafts in caves.

5. Ask students to identify dangers to caves.

Sinking streams: If streams are polluted, they can carry pollution to cave fish and other animals. Pollution can come from houses, from factories, and from roads.

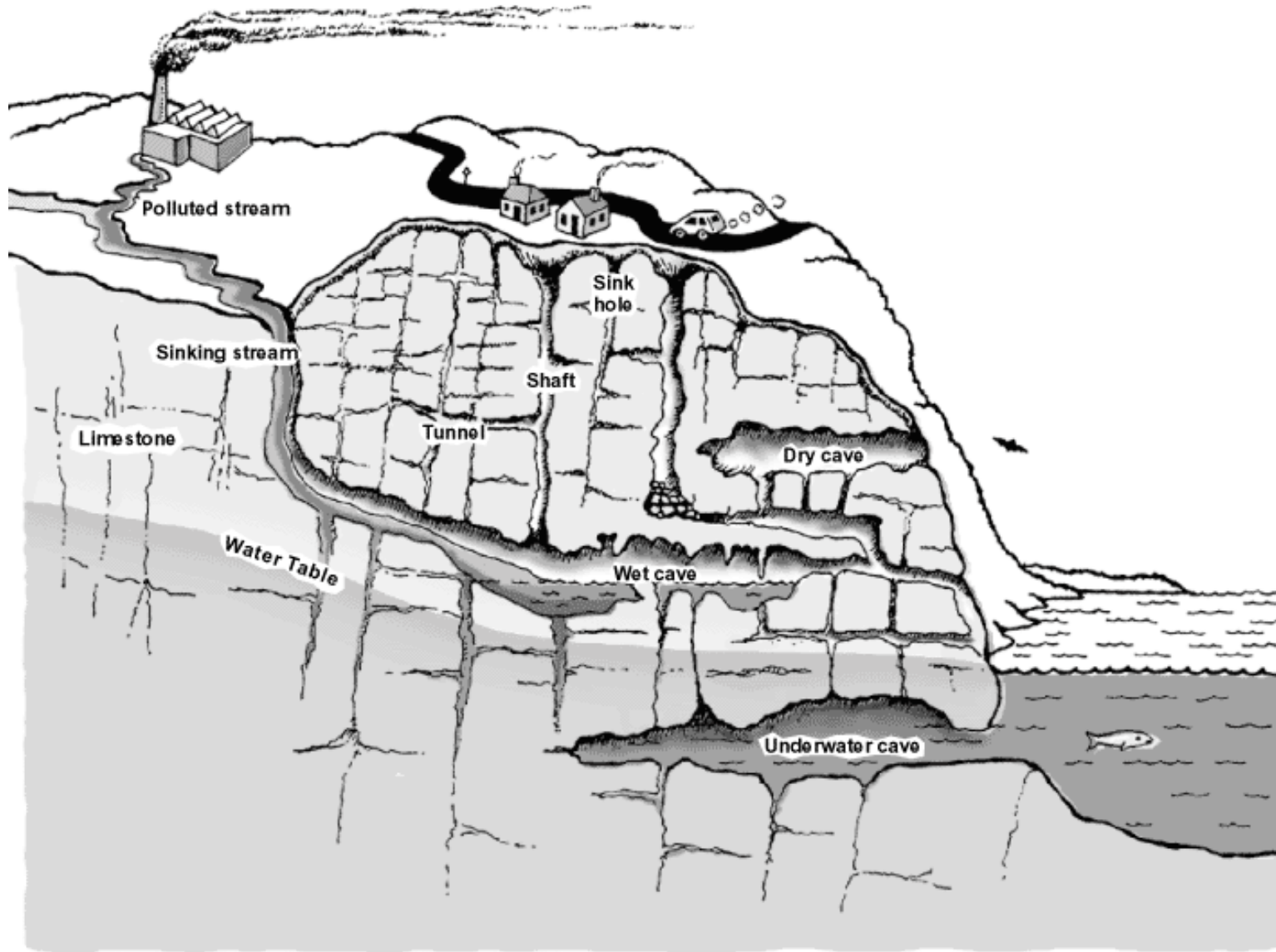
Sink holes: Many people use sinkholes for dumping garbage. Pollution from garbage can harm cave animals.

6. Ask the students what they would change about the drawing if they were in charge of where to build factories, houses, and roads. Discuss.

Discussion Questions

1. If bats are not blind, how do they find their way in the dark?
2. Why are no two caves the same shape?

Years K-6 Lesson 3 – Handout



Years K-6 Lesson 4

Materials Provided

- See attached colouring in handout

Procedure

Allow students to colour handout. While students are colouring, discuss questions below.

Discussion Questions

1. Can you think of other places where you have seen water acting as a sculptor?
(cliffs, river beds, mud slides)
2. Many cave rock formations take tens of thousands of years to form. Should visitors break or collect cave formations?
3. Why is garbage harmful in a cave?
4. What things besides limestone dissolve?
(salt, dyes, sugar, baking soda)
5. When people paint or write on walls or other things, it's called "graffiti." Do you have graffiti in your community? Discuss.
6. What kinds of damage can people do in caves?
(drawing on walls, leaving garbage, breaking rock formation and crystals, collecting rock formations and crystals)
7. Where on the colouring page is human damage shown?
8. How could you see crystals growing in a cave? Would crystals grow slower or faster?

CLASS DEMONSTRATIONS

Materials Required

- 4-6 cups all-purpose flour
- Water
- Large mixing bowl and mixing spoon

Procedure

1. Form hard dough with flour and water in mixing bowl. Knead dough until it is stiff.
2. Run water (gently) over the dough. Gradually, the dough ball will get smaller, until only a small nub of sticky material is left. Explain that this is how water dissolves rock formations in the cave, changing both their size and shape

Years K-6 Lesson 4 – Handout

