

Chapter 1: Lost in the Cave

The rain pelted down so hard they could hardly see. The two children ran through the heavy rain. They held their arms over their heads, but it was no use. “I’m soaked!” Jenny yelled to Carlos, “My clothes are all wet!”

“Me too!” Carlos yelled back. “We’ve got to get out of this rain and away from the lightning!” He clapped his hat on his head. The two friends ran on down the muddy path.

Frantically, they searched for somewhere to take shelter. All they could see was rainwater pouring down a grassy hill.

Carlos and Jenny were at science camp. They had taken a walk to the camp headquarters, just half a mile away. Now, coming back, the short walk seemed like a 10-mile trip. They could hardly see the path before them.

Deep thunder rolled overhead. “Look, Carlos!” shouted Jenny. She pointed to a shadow under a huge, flat rock sticking out of the hill. She ran over to the rock. Under it was a space not big enough to stand in. Jenny kneeled down and crawled in. Carlos followed her.

Sitting under the rock, they caught their breath and rested. Their tiny shelter kept the rain off, but it was uncomfortable and small. Carlos turned his head and noticed a large hole behind them leading into the hill. “I bet it’s nice and dry in there,” he said. He crawled into the hole. Jenny shook her wet hair and crawled after him.

The dark shelter felt pleasantly dry and warm. “This is neat!” Carlos said.

“Carlos!” Jenny cried. “Did you hear that *echo*?” They both listened.

. . . *that echo . . . echooo . . .* The sound bounced back and forth around them.

“Let’s check it out,” Carlos said. “This might be a CAVE! It’s getting bigger, I think.”

. . . *biggerithink . . .*

The children laughed to hear the echo again, and then to hear their laughing echo. They crawled farther into the cave and soon they could stand up. They walked along a stone wall. Slowly, the light got dimmer and dimmer.

Carlos and Jenny turned around a rocky corner. Suddenly, they were in total darkness. They reached out to touch the wall. Instead, they touched empty space. They turned around and touched another wall. Was it the same wall? They couldn’t tell. What was going on? Suddenly they couldn’t find their way back.

Where was the cave entrance? They backed up, looking for something familiar. But everything was black.

“Oops!” Jenny bumped into Carlos, who fell down hard on the cave floor.

“Sorry, Carlos!” Jenny could hear Carlos brushing off his pants as he got up. “Here’s my hand,” she offered.

Carlos groped in the dark until their fingers touched. “I’m scared Jenny. I think we’re lost.”

They stood still, listening. They could no longer hear the sound of the storm. How had they come so far inside the cave so quickly? Which way should they go to get out?

Out of the silence they heard the trickling sound of water. It sounded like a small stream, along with dripping sounds. Was it raining that hard outside?

Flap! Flap! Flap!

“What was that?” cried Carlos.

“Something flew over my head” Jenny screamed. “Something’s flying around in here.” She waved her arms over her head.

Squeak! Squeak! Squeak! The two children looked up toward the sound. They couldn’t see anything, but a tiny voice squeaked at them.

Calm down! I’m just over your head. Be careful!

“Huh?” Carlos reached up. His fingers briefly touched a small, warm animal, with short, silky fur.

Don’t touch me! said the squeaky voice.

“I don’t want to touch you!” Carlos said. “What are you?”

I’m a bat, of course. Who else would be flying around in a cave? Batman?

Carlos and Jenny both laughed. They explained to the bat that they were lost and had to get back to science camp. Could the bat help?

There was a long silence. The two friends realized that this bat could be their only hope of getting out of the cave. Would he help them?

Finally, the squeaky voice replied, *I guess I'll help you. I like talking to people. I can take you to another cave entrance that will be a shortcut to your camp. That way you can stay out of the rain. I can show you the rest of the cave, too.*

Carlos wanted to go right back to camp, but he loved adventures. Besides, it was probably still pouring rain out there. "Gee, Bat, that would be great. I'd love to see the cave, too."

"But Bat," protested Jenny, "how can we see the cave? We can't see anything in the dark. And aren't you blind as a bat? How can you see anything either?"

Good point, said Bat. But . . . my eyes are quite good actually, when there's some light. In the dark, I use another way of seeing . . . my bat sonar helps me find my way around. Maybe I can teach you to see in the dark without your eyes.

"You gotta be kidding," said Jenny.

No, said Bat, Just follow me!

The children heard Bat's wings flapping off into the darkness.

"Bat! Stop!" Jenny cried out. "We can't see you! How can we follow?"

Flap, flap, flap.

Bat flew back. *I'm sorry, he squeaked. I forgot. Can you two hold hands and follow my directions?*

Carlos was shy about holding hands, but he grabbed Jenny's belt and waited. Bat told them to walk 10 steps forward.

Hurry up, the bat squeaked.

BANG!

"Ow!" First it was Jenny, then Carlos. "I bumped my head on the cave ceiling! Bat, your directions are lousy."

Oh, I'm sorry again, the bat squeaked. I forgot how big you are. I just flew into this tunnel here. I forgot that you have to bend over to get in. Oh, I am so sorry.

Jenny rubbed her sore head and remembered hearing the bat flapping above their heads. Everything about bats and people seemed different. "It's OK, Bat," Jenny said. "Just try to remember that we can't see and we're much bigger than you."

OK, kids. Up ahead, you're going to have to kneel down and crawl. It's a long tunnel and it's muddy because of the rain.

The children crawled through the blackness. Jenny complained about getting mud on her clean jeans. Carlos didn't like the moldy smell. They both hated the cold, slimy mud on their hands.

Stop! squeaked their tiny commander. *Jenny, look for a nice surprise on the floor, just in front of you.*

Jenny stretched out her hand.

"A flashlight!" she yelled happily. "Oh thank you, Bat! Oh I hope it works!" She wiped the mud off the flashlight with her T-shirt.

Flap, flap, flap. Time to rest. They heard Bat's voice from above them somewhere.

Some cave explorers were here a few weeks ago, drawing a map of the cave. They dropped the flashlight.

"Turn on the light, Jenny!" cried Carlos. "Turn it on! Let's see the cave!"

<i>Grade Levels</i>	K, 1, 2, 3
<i>Science Topics</i>	Earth science Geology Biology
<i>Disciplines</i>	Science Reading/writing

LESSON 1.1 Reading Follow-up Activity

Activity Summary

Students will discuss preliminary concepts of the unit, including cave safety. A coloring handout illustrates a cave entrance.

Educational Goals

Students will be able to:

- State the first safety rules of cave exploration.
- Discuss what they think a cave is.
- Explain why it is so easy to get lost in caves.
- Explain that cave entrances may be small and inconspicuous, even if the cave is very large.

Materials Provided

- Handout 1: Reading Follow-up Coloring Page

Materials Required

- Crayons

Procedure

1. Distribute Handout 1: Reading Follow-up Coloring Page.
2. While students are coloring, talk about Discussion Questions.
3. Incorporate New Words into writing and vocabulary lessons.
4. Assign writing topics to advanced students.

Discussion Questions

1. The first rule of caves is “Never go into a cave without a guide.” Why is this rule important?
2. The second rule of caves is “Never explore a cave without learning cave safety rules and methods.” Why is this important?
3. What is a cave?
(Brainstorm ideas in preparation for Lesson 1.2.)
4. Have you ever been in a cave? Would you like to visit a cave? Would you be scared?
5. Some places have lots of caves. Other places have none, or few caves. Do we live in an area with caves? Do you know why? *(Depends on the rock formations in your area. See Lesson 1.3.)*
6. Why would it be hard to find your way in a cave? *(If you don’t have a map of the cave, you could get lost in its complicated structure, even if you had a flashlight. Darkness makes it even harder.)*
7. How big are cave entrances? *(Some caves have tiny entrances, others have large entrances. Cave entrances may be hidden by large stones, tree trunks, plants.)* Show where the cave entrance is on your picture.
8. Have you ever seen a bat? What time of day was it? *(Bats fly at night and rest during the day. Even in cities they can be seen overhead. The best time to look for them is at dusk, just after sunset.)*

9. In real life, do bats talk? (*No, but they do make squeaky noises.*) Why do you think that writers make animals talk? (*It makes it easier for writers to tell the story.*)

New Words:

All grades bat, cave, echo, entrance, tunnel

Kindergarten black, feel, floor, hat, hill, lost,
top, wet

Grade 1 breath, camp, crawl, dark, feet,
drip, over, night, rain, stream

Grade 2 bump, darkness, fur, fly, lightning,
field, squeak, storm,

Grade 3 adventure, entrance, silence,
thunder, dimmer, blind

Writing Assignment

Write one paragraph (three to five sentences) on one of the following topics:

- Name three reasons why you think caves are exciting places.
- List three reasons you would visit a cave.



<i>Grade Levels</i>	K, 1, 2, 3
<i>Science Topics</i>	Earth science Geology Mineralogy Biology
<i>Disciplines</i>	Science Reading

LESSON 1.2 What Is a Cave?

Activity Summary

In this activity, students will explore their existing concepts of caves and match them with a working definition to use during the unit.

Educational Goals

Students will be able to:

- Define the word “cave.”
- Name the two types of rock formations in which most American caves occur.
- Define “show cave” and “wild cave.”

Materials Required

- Samples of lava, limestone rock, and marble, if possible. Lava and limestone gravel can be obtained at hardware stores or lumber yards.
- Large newsprint pad

Procedure

1. Write “What is a cave?” on the blackboard.
2. Ask students to brainstorm words they associate with caves. Use the following questions to stimulate some of the information:
 - Where do we find caves?
 - Are special kinds of rocks found in caves?
 - Do certain kinds of animals live in caves?
 - Do people use caves for some activities?
 - What makes caves?
 - Name some famous caves you have visited.

3. Refer to the poster (side 1) as children discuss what they already know about caves.
4. From the discussion, write a definition of caves that the class agrees upon. (Explain to younger children what a “definition” is.)

5. The class definition should include the following points:

A cave is:

- A hole, tunnel, or series of branching openings. These are often called caverns or rooms.
- Underground or underwater, mostly in darkness.
- Usually formed in rocks called limestone, marble, or lava.
- Usually created by water dissolving limestone (over periods of thousands of years). Rivers and streams sometimes go underground as part of their course. Then, they are called “sinking streams.”
- Often the site of unusual rocks (stalagmites, stalactites, flowstone) formed by water dripping onto or flowing through a cave.
- Often home to people and animals, including some animals that can live without light (bats, crickets, blind fish).
- Often very large. (One cavern in Carlsbad Cavern, New Mexico, is longer than 14 football fields. A series of caverns in Flint Mammoth Cave, Flint, Kentucky, is roughly 190 miles long. The deepest cave in the world, Reseau Jean Bernard, in France, is 5,035 feet deep — nearly a mile underground.)

- A place sometimes open to the public, on government-administered land or in commercial areas for pay. Such public caves are called “show caves.” Some caves are on private or other land where the general public cannot go. These are called “wild caves.”

6. Write the class definition on newsprint. Post on the wall for the duration of the unit.

<i>Grade Levels</i>	2, 3
<i>Science Topic</i>	Geology General
<i>Discipline</i>	Science Reading/literature

LESSON 1.3 Cave Stories — Tales of Adventure

Activity Summary

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. As recently as the Civil War, cave minerals were used secretly to make ammunition in caves. 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 colors 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 the List of Multimedia 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, colors, smells
- danger.

Materials Required

- Stories, books, videos, comics, and other materials on caves and cave animals and people.
- One piece of notepaper, envelope, and first class postage stamp per student.

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. Contact the National Caves Association (See List of Multimedia Resources) for places to obtain free information. Ask students to write letters to request brochures or pamphlets on "show caves." (Send multiple letters to the same cave in one package to speed up handling).
5. 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 very 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, leaving out the important role U.S. bats play in insect control. Movies, by necessity, make caves appear to have more light than they really do. Students will learn more of these realities as the unit progresses.)

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.)

<i>Grade Levels</i>	K, 1, 2, 3
<i>Science Topics</i>	Geography Mapping
<i>Disciplines</i>	Geography

LESSON 1.4 Find a Cave

Activity Summary

This activity shows the “big picture” of caves in the United States and provides a geography lesson. Students will see that limestone caves are not isolated oddities of nature but part of larger natural systems. They will find out how close or far away they live from a major cave and perhaps consider visiting a cave some day.

Educational Goals

- Students will be able to locate their own communities and the nearest caves on a map of the United States.
- Intermediate and advanced students will be able to calculate the distance to their nearest cave, using a rough scale.

Teacher Background

Your class may live near rock formations rich with caves. Or, you may have no nearby caves. Caves are concentrated in areas of the United States rich with limestone formations. These areas are located in parts of the Northeast, Midwest, and Western regions of the country.

Materials Provided

- Handout 2: U.S. Map With Cave Locations

Materials Required

- Wall map of the United States
- Ruler

Procedure

1. Post U.S. map on the wall.
2. Distribute Handout 2: U.S. Map With Cave Locations. Explain that the dots represent major caves in general, not just the “show caves” that people can visit. Some “show caves” are in parks; others are commercial. You must pay to get into most “show caves.” Caves that are on private land, undiscovered, not visited, or closed to the public are called “wild caves.”
3. Point out or ask a student to indicate the location of the class’ community (city, region, or State, depending upon student’s background) on the large wall map. Ask students to mark the same location on their desk maps with a small “x.” Circle the nearest cave or caves.

The following activities are for more advanced students.

4. Tell students to draw lines around two big areas of the United States where there are many caves. Tell them that they have probably just mapped two “limestone areas.” Most U.S. caves are found in limestone rock areas. A few are also found in volcanic lava areas.
5. Ask students to use their rulers to measure the distances between their hometown and various caves, as the crow flies. With younger students, explain that the ruler distances help to figure out real distances. Short distances on the ruler are short *actual* distances on the land. Which cave is the nearest? What cave is farthest away?

Find the name and location of the nearest cave. Have students write for more information about that cave and others that interest them. You may be able to pull up information on the cave on a Web page also.

6. Have older students multiply the ruler distance times the scale factor to find out the distance in miles. Can they also figure out how many miles across the whole United States?

Caverns in the United States

