

The diversity of plants and animals you enjoy in many national parks often depends on fire. What may look like devastation soon becomes a panorama of new life. Fire can start natural processes by breaking down organic matter into soil nutrients. Soil, rejuvenated with nitrogen from ash, provides a fertile seedbed for many grasses and wildflowers. With less competition and more sunlight, seedlings grow quickly.

There are three different types of fires. A ground fire burns organic matter along the subsurface or underground. A surface fire burns the floor of the forest, such as pine needles, leaves, sticks, and logs. A crown fire burns the tops of the trees and often races through the canopy.



Take a hike on either the Roof Trail or Canyons Trail and make observations about what you see.

1. What type of fire do you think came through here? What evidence is there?

2. What are some of the positive effects you see from the fire? What about the negative effects?

3. What are two things you learned about fire at Jewel Cave National Monument?



Animal Match-Up

Many different species of animals live at Jewel Cave National Monument, both in the cave and on its surface. Below are some clues to help identify the various animals. Can you match them?

- Hunts at night and can eat up to 1,500 insects.
- Flies and uses echolocation to hunt its prey.
- Often sleeps during the day and hibernates in the winter.
- The only flying mammal.

This describes what animal? _____



Mountain Lion

- Lives in large herds.
- Is a herbivore, which means its diet is made up of mostly plants.
- Males have large antlers that are shed each year.

This describes what animal? _____



Coyote

- A carnivore that preys on small mammals at night.
- Flies and has large eyes so it can see in the dark.
- Has excellent hearing.

This describes what animal? _____

- Males are called a ram, females are called an ewe.
- Males have large horns that curl around and are not shed.
- They have eyes on the sides of their head to watch for predators.

This describes what animal? _____



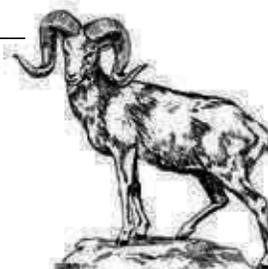
Elk

- A carnivore that often hunts elk, deer, and bighorn sheep.
- Has a golden coat with a white belly and throat.
- Is the largest cat in North America.

This describes what animal? _____

- An omnivore, eating both plants and animals.
- Has a long bushy tail that is half of its body length.
- Howls and yips to communicate with the rest of their pack.
- The state mammal of South Dakota.

This describes what animal? _____



Big Horn Sheep



Great Horned Owl



Little Brown Bat



Finding a Cave

Frank and Albert Michaud discovered a blowing hole in the side of Hell Canyon in the fall of 1900. After riding their horses back to their father's ranch, they returned with materials to enlarge the opening and entered Jewel Cave.

Help the brothers explore the passageways below to find their way to the Dungeon Room.

Explore and Discover: If you take part in a Historic Lantern Tour, you may see the "Dungeon Room" along one of the routes.



Going Caving

Volunteer cave explorers continue to map Jewel Cave. Even some park staff volunteer their time to explore the extensive cave system. Help the caver below get ready to explore Jewel Cave by drawing five things needed before entering the unknown. When you are done, explain why the caver would need those five pieces of equipment.

HINT: Use the caver in the visitor center display for ideas.

ITEMS:

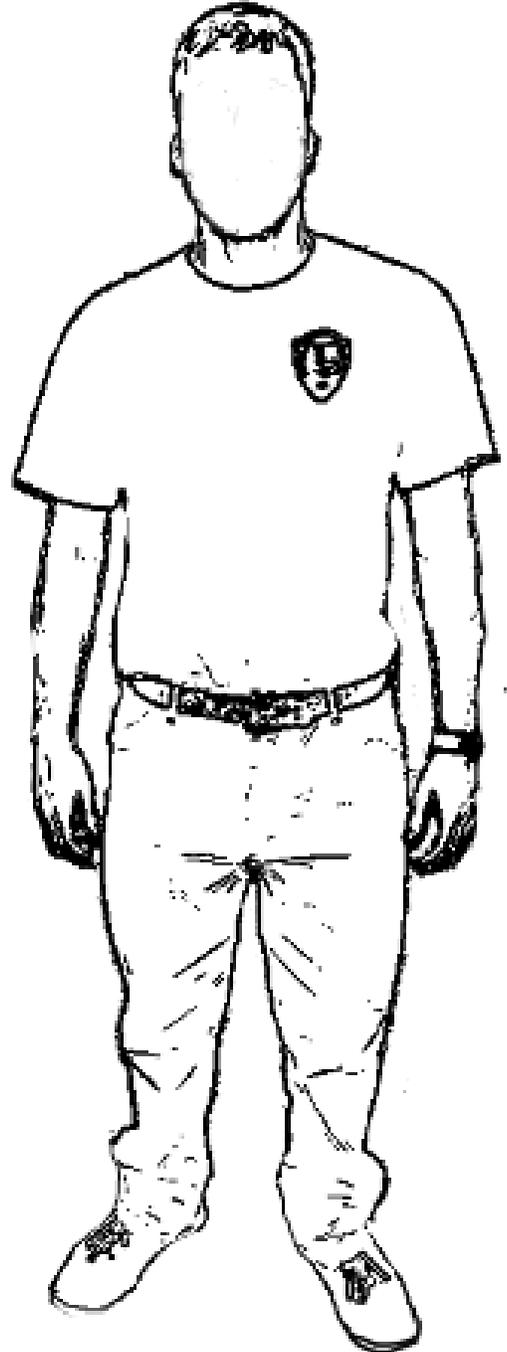
1)

2)

3)

4)

5)

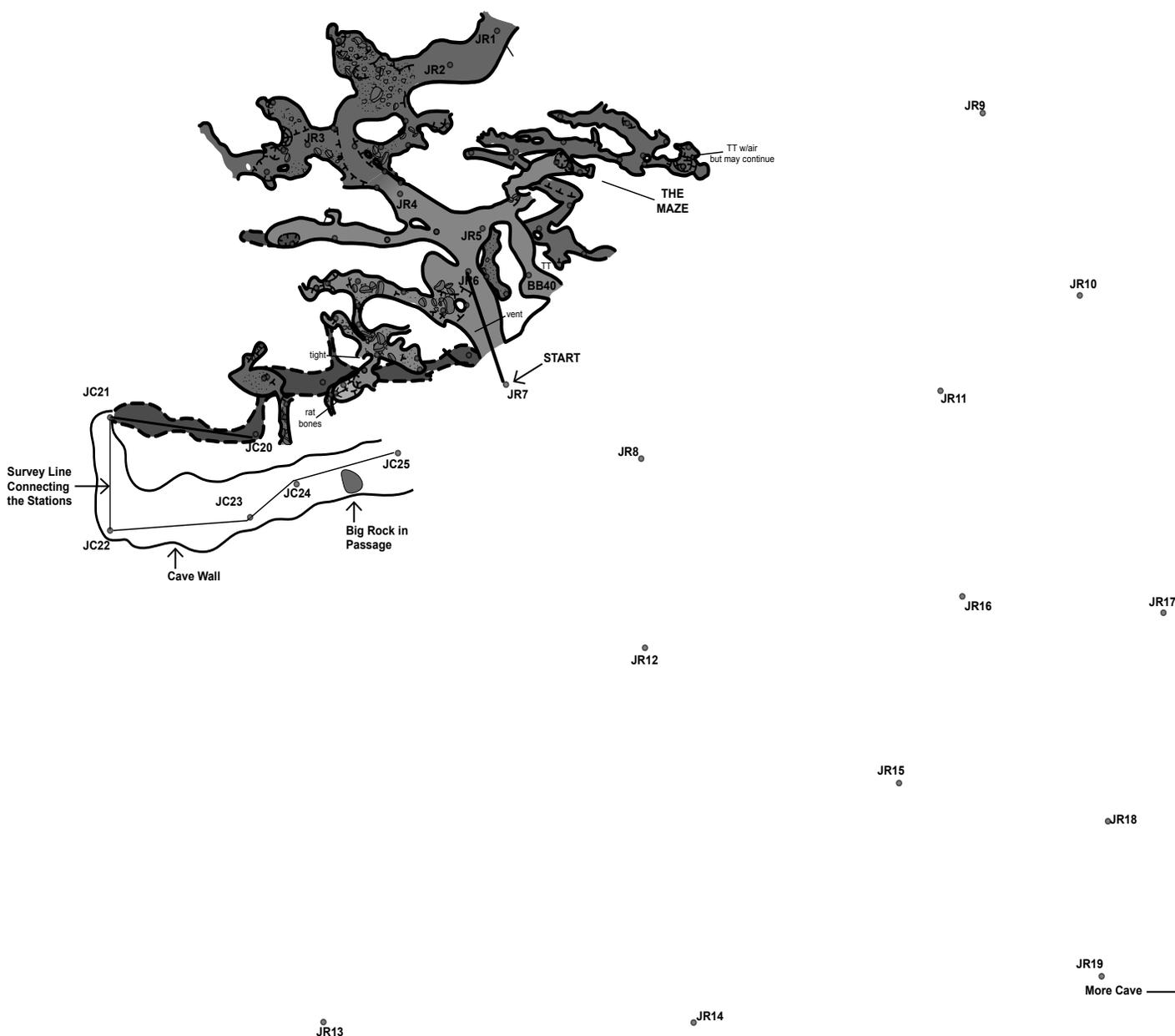


Connect the Survey Stations

There are several different ways to “measure” a cave: by how long it is, how deep it is, or how big it is. Jewel Cave is currently one of the longest caves in the world with over 177 miles mapped. The passages within the cave twist and turn, making it a complex maze. Cavers measure how long a passage is by the distance between survey stations placed in the cave. They also use these stations to find their way throughout the cave.

Today, cavers have mapped some new areas in the Maze section. They have already marked all of the survey stations, and they are relying on you to use your imagination and draw the passageways. Simply connect the Junior Ranger (JR) survey stations in order (just like connect the dots). Then, draw the cave wall around the survey line, and create the cave. Remember to add some details such as rocks on the floor, formations on the ceilings, and any other creative features often found in caves.

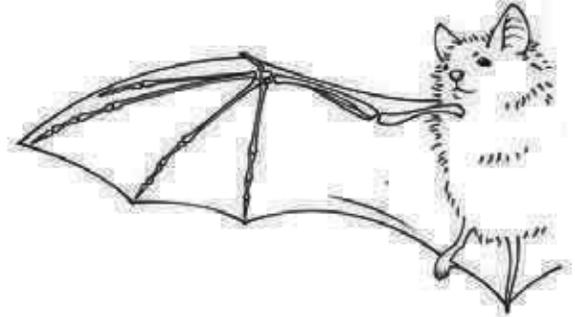
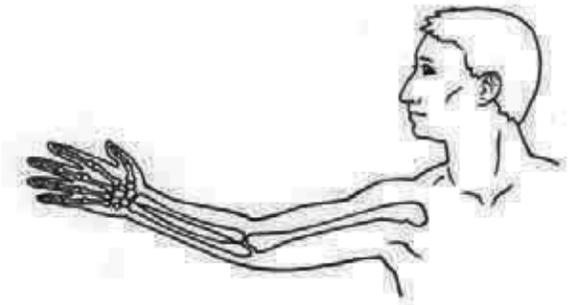
Hint: Look at the Jewel Cave (JC) survey below for more ideas.



Humans vs the Bats of Jewel Cave

Bats are commonly feared and are often misunderstood. However, humans have more in common with these creatures of the night than you might think.

Take our test to see how you compare!



My Name _____

Bat's Name.... *Townsend's Big Eared Bat*

Type of animal I am...

Type of animal.....*Mammal*

Amphibian, Reptile, Mammal, Bird, Fish (Circle one)

1) Townsend's Big Eared Bats have wingspans of 11 inches, which is about the same length as this book. Using this book, how many "pages" is your "wingspan?" Hold your arms straight out to your side and have someone else measure your "wingspan" from fingertip to fingertip.

My "wingspan" _____

Bat wingspan.... *One page length*

Number of fingers _____

Number of fingers..... *10*

2) A bat flaps its wings up to 600 times a minute. How many times can you flap your "wings" in one minute? Have someone time you as you flap your "wings" and count. Use both arms to flap!

My wingbeats per minute _____

Bat wingbeats per minute..... *600*

Townsend Big Eared Wing Span



White Nose Syndrome Notes

Listen to the park ranger in *THE BATS OF JEWEL CAVE* video at the Bats Take Shelter display inside the visitor center. Use the information to help answer these true or false questions about White Nose Syndrome (WNS) and the different bats we have living at the monument. If the answer is false, please explain your thoughts.



1) True False

Jewel Cave National Monument is home to nine species of bats that live in and around the cave entrance.

2) True False

Every national park and national monument has a cave.

3) True False

The majority of bats that hibernate in the cave during the winter months take refuge in the first 1,000 feet from the entrance.

4) True False

There are over 5,000 bats that hibernate at Jewel Cave in the winter.

5) True False

Since White Nose Syndrome wakes bats up from their hibernation by irritating their skin, they use precious energy reserves trying to find food...which may cause starvation.

6) True False

There are many steps we can take to help protect the bats at Jewel Cave from getting WNS. These include educating one another about the disease, screening those who have been in other caves, closing caves to help protect the bats, and disinfecting shoes and clothing that have been in other caves.



Explore the Roof Trail

Take a hike along the one-quarter mile Roof Trail. Make observations of what you see around you and fill in the blanks on the postcards below. You may find that there is more to this monument than just a cave.

Draw a picture of yourself at your favorite spot!

POSTCARD

Dear _____

I am writing to you from Jewel Cave National Monument. Here is a picture of me at my favorite place at the monument. As you can see, I am having a _____ time.

I decided to take a hike on the Roof Trail and the weather was _____.

While I was on the hike I saw a pretty _____, some really weird looking _____, and a _____ which I have never seen before.



POSTCARD

All around me were rocks that were _____ as well as some deep canyons.

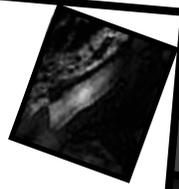
It was _____ to think that the cave was deep below us.



POSTCARD

I saw some really cool plants and animals, too. One plant had _____ leaves and was _____ colored. I thought it was a cool plant because _____.

The animal I liked best in the area is a _____ because it _____.



POSTCARD

One of the things I learned while hiking was _____.

My trip to the monument was really _____! I hope you can come visit this place someday, too!!

Yours Truly, _____

P.S. _____

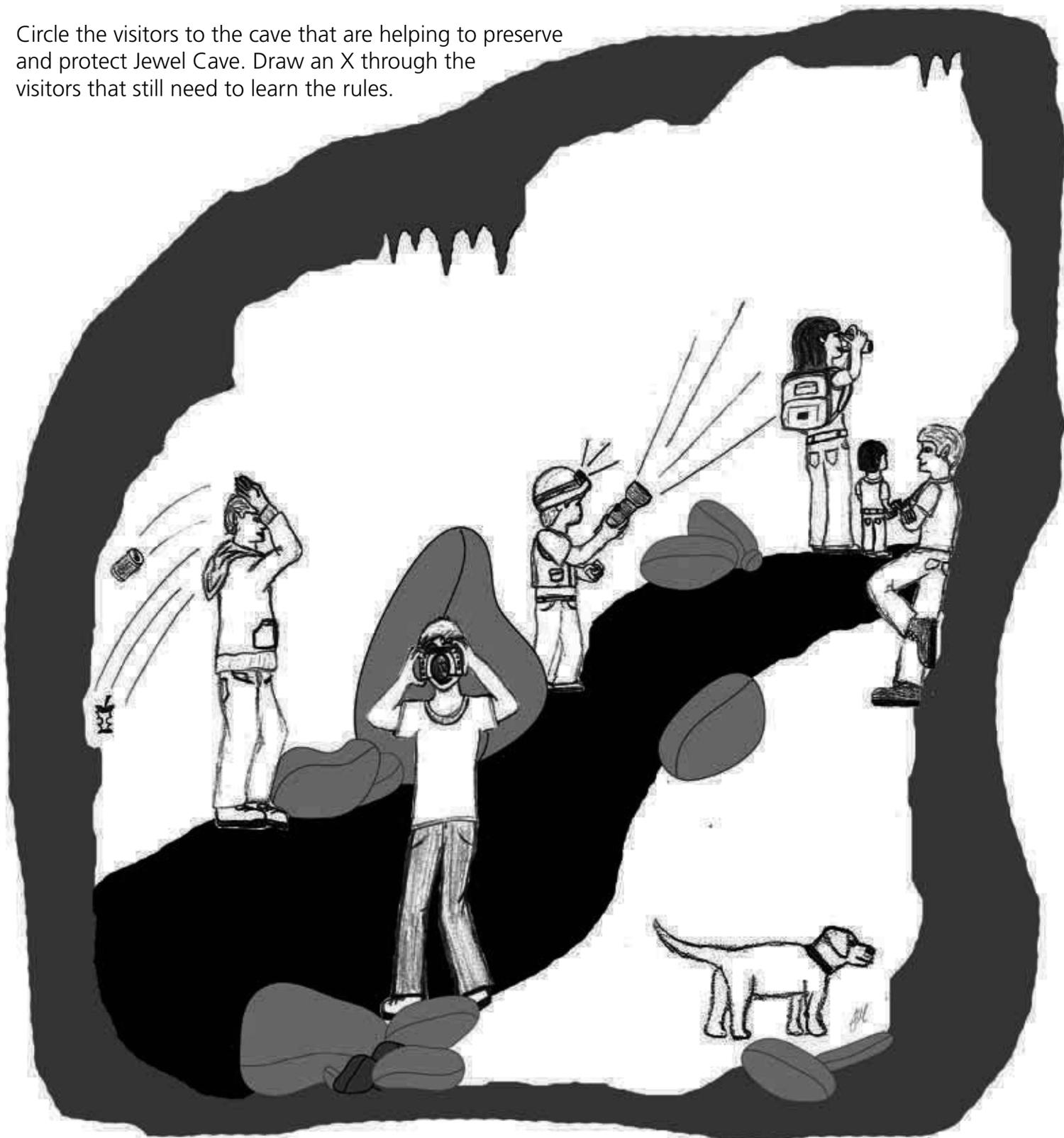




How Do I Protect Jewel Cave?

There are many ways to protect a cave. You may even have the chance to protect it as well. Did you know that touching the walls leaves behind lint and oils which can stain the rock black? Or that large backpacks can knock crystals off the wall?

Circle the visitors to the cave that are helping to preserve and protect Jewel Cave. Draw an X through the visitors that still need to learn the rules.



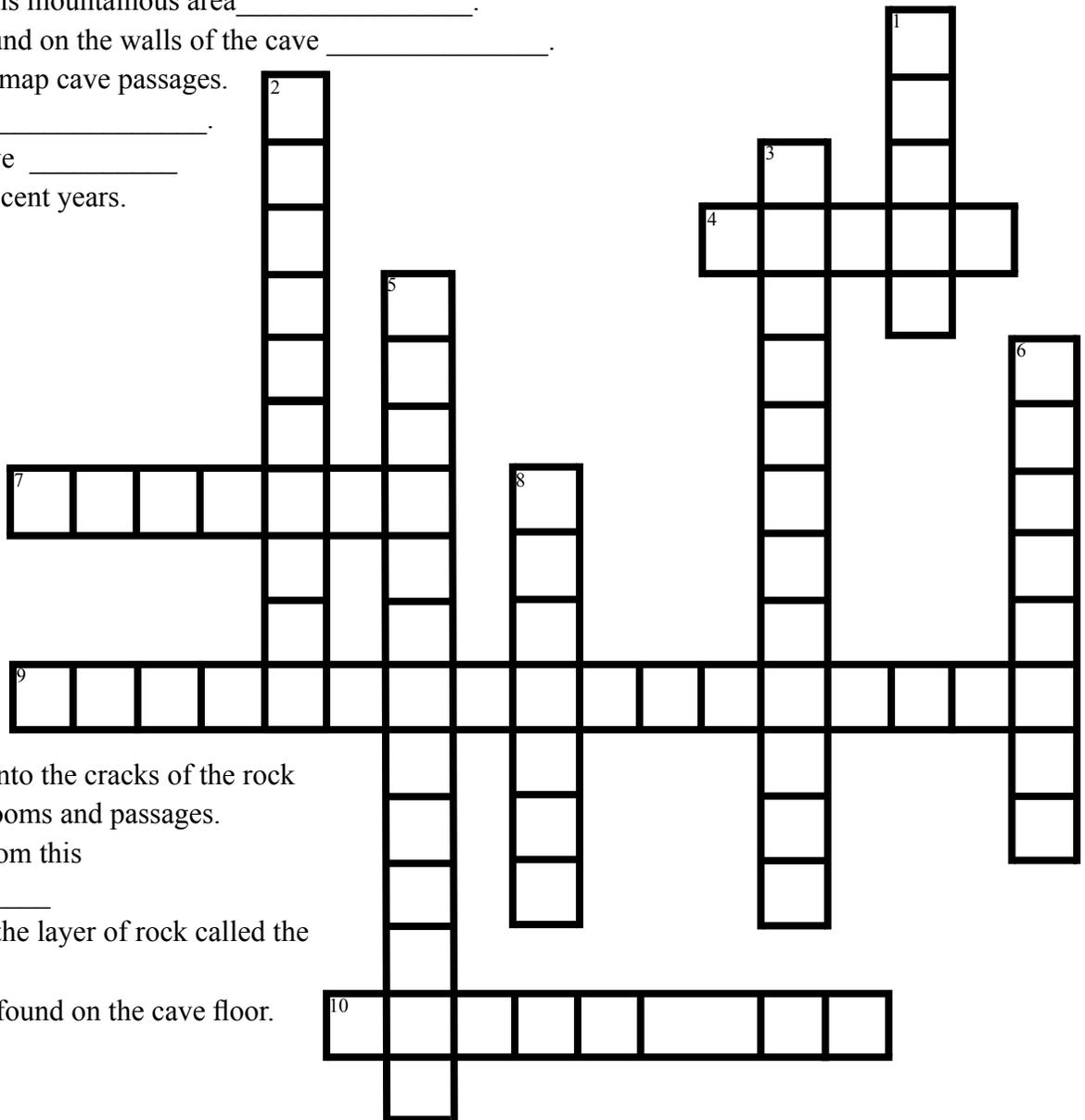
Jewel Cave Crossword

Welcome to Jewel Cave National **Monument**, home to one of the longest caves in the world. On average, **cave explorers** discover and map about **three** miles of cave passages each year. The cave formed in a layer of rock named the **Paha Sapa Limestone**. When the **Black Hills** area uplifted into mountains, cracks began to form in the limestone. **Water** seeped into these cracks, and after a very long time, dissolved the surrounding rock into the rooms and passageways that we see today. As the climate changed and became drier, water stopped flowing into the cave. As the cave slowly began to dry out, **nailhead spar** was deposited on the walls. As this **calcite** layer became thicker, some of it could no longer hold its own weight and fell to the floor. This created **breakdown**. Our understanding of cave **geology** has changed greatly in recent years, partly because of cave exploration. Who knows what remains to be found?

Hint: The answers are bolded in the paragraph above.

Down:

- 1) Every year about _____ miles of cave are discovered and mapped.
- 2) Jewel Cave is found in this mountainous area _____.
- 3) This type of crystal is found on the walls of the cave _____.
- 5) _____ discover and map cave passages.
- 6) Jewel Cave is a National _____.
- 8) Our understanding of cave _____ has changed greatly in recent years.



Across:

- 4) _____ seeped into the cracks of the rock and dissolved open the rooms and passages.
- 7) Nailhead Spar is made from this mineral. _____
- 9) Jewel Cave is formed in the layer of rock called the _____.
- 10) _____ is often found on the cave floor.



Caves offer an environment where the strange becomes familiar and the familiar becomes strange. As this mysterious underground landscape is explored, many different types of speleothems or "cave formations" add their own wonder to the cave. While Jewel Cave is well-known for its array of crystals, a number of other formations can be found here as well.



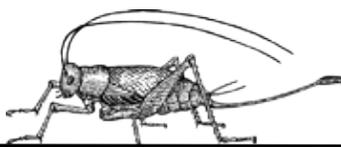
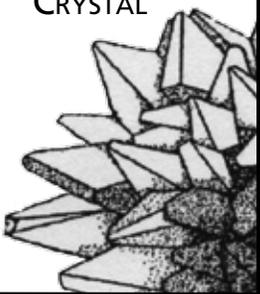
C	O	L	U	M	N	I	E	A	I	D	Y	L	Z	S
P	I	K	L	V	E	F	A	T	F	A	Q	A	Z	T
S	X	E	D	C	R	S	L	X	V	M	B	U	G	A
I	B	R	A	P	S	T	A	O	K	P	U	C	G	L
B	R	L	P	H	U	A	D	W	W	S	L	M	K	A
N	E	J	O	V	O	L	E	A	R	S	K	N	A	C
A	A	H	G	K	O	A	A	L	E	O	T	C	N	T
D	K	K	Y	F	T	G	K	I	O	H	F	O	Y	I
N	D	R	X	U	E	M	R	E	O	L	L	E	N	T
E	O	O	C	I	S	I	Q	E	S	E	I	I	N	E
R	W	I	O	B	F	T	A	T	T	Y	R	E	A	Q
B	N	I	N	B	S	E	S	R	C	A	H	D	S	N
P	U	H	T	O	O	T	G	O	D	D	N	L	O	G
S	O	D	A	S	T	R	A	W	N	O	K	Y	H	F
U	T	E	C	Y	A	C	N	O	T	D	A	N	A	E
G	O	T	H	M	D	R	A	P	E	R	Y	E	V	W

STALACTITE	BREAKDOWN
STALAGMITE	DRAPERY
COLUMN	DOGTOOTH
SODASTRAW	NAILHEAD
FLOWSTONE	SPAR



Scavenger Hunt Bingo

While hiking or taking a cave tour at Jewel Cave National Monument, pay close attention to the things around you. When you see any of the objects listed on the bingo card, put a X through it. Get four in a row, diagonal, or four corners to get a BINGO!

<p>FLAG</p> 	<p>GRASSHOPPER</p> 	<p>HISTORIC CABIN</p> 	<p>CRYSTAL</p> 
<p>ANIMAL TRACKS</p> 	<p>ARROWHEAD</p> 	<p>CAVING HELMET</p> 	<p>COTTONTAIL RABBIT</p> 
<p>LEAST CHIPMUNK</p> 	<p>BIG HORN SHEEP</p> 	<p>PINE TREE</p> 	<p>BIRD</p> 
<p>WILD FLOWER</p> 	<p>LANTERN</p> 	<p>BUTTERFLY</p> 	<p>RANGER HAT</p> 

Black Hills National Parks Trivia



Match the trivia with the correct park. Hints are underlined.

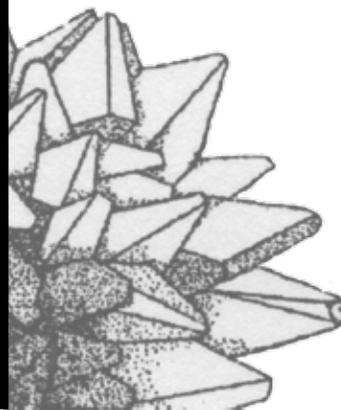
- 1) With over 244,000 acres of sharply eroded buttes, spires, and pinnacles, this land looks like a bad and inhospitable place. Despite this, it has supported human life for over 11,000 years.

- 2) This site holds remnants of the Cold War, including an underground launch control center and a missile silo. _____
- 3) Discovered in 1881 by the sound of wind whistling through a hole in the ground, this park not only protects underground geologic wonders, it also offers over 33,851 acres of grasslands and forests.

- 4) Washington, Jefferson, Roosevelt, and Lincoln sit atop this memorial, also known as the Shrine of Democracy. _____
- 5) Known as one of the longest cave systems in the world, this monument was named after the jewel-like formations found inside, called nailhead spar. _____
- 6) Proclaimed as the first national monument in 1906, this tower rises to a height of 867 feet.

*To learn more about these and other National Park Service sites, visit www.nps.gov





Jewel Cave National Monument Certifies that

_____ has completed all of the requirements for
becoming an official

JUNIOR RANGER

and pledges to preserve and protect all National Parks
and Monuments for the enjoyment of future generations.

Park Ranger's Signature

Date

