



## Junior Ranger

Ages 13 & Up





# Welcome to Carlsbad Caverns National Park!

Become a junior ranger by completing **9 of the 15** activities listed below and **Create Your Own Pledge (page 14)**. Check the box next to each activity you complete. When you are finished, take it to the information desk to receive a junior ranger badge.

*This book belongs to:* \_\_\_\_\_



## Activity

- 1. Respect, Protect, and Enjoy (page 2)
- 2. Cavern Development (pages 3–4)
- 3. Take a Hike (page 5)
- 4. Bat Math Mania (page 6)
- 5. Those Who Came Before (page 7)
- 6. Stories in Stone (page 8)
- 7. Time to Explore (page 9)
- 8. Reflections (page 10)
- 9. What's the Word? (pages 11–12)
- 10. Interview with a Ranger (page 13)
- 11. Hike the Natural Entrance Trail
- 12. Walk Through the Big Room
- 13. Attend a Ranger-Guided Tour or Program
- 14. Watch the Park Movie
- 15. Create Your Own Pledge (page 14)

# Respect, Protect, and Enjoy



NPS / KELLI HOUSLEY

What are five ways to respect, protect, and enjoy Carlsbad Caverns National Park during your visit?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_



# Cavern Development

Use the key below to label the formations in the drawing.



NPS / DUSTIN BAKER ILLUSTRATION

- |             |             |           |            |               |
|-------------|-------------|-----------|------------|---------------|
| Soda Straws | Draperies   | Flowstone | Column     | Stalactite    |
| Lily Pads   | Cave Pearls | Popcorn   | Stalagmite | Rimstone Dams |

Answer the questions based on your observations in the cavern.

Do you think you could look at a formation and judge how old it is by its size alone? Why or why not?

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How else could you date a cave formation?

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Look around as you tour the cavern. Can you find evidence of formations falling? If so, how frequently do you think they fall? What (if anything) might cause them to fall?

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While speleothems look vastly different throughout the cavern, water formed them all. As you explore, take note of where these formations grow. Hypothesize how water created each of the following:

**Draperies**

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**Popcorn**

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**Lily Pads**

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**Flowstone**

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NPS / KELLI HOUSLEY



# Take a Hike

Walk the 1/2 mile (0.8 km) Nature Trail at the east end of the parking lot. Ask a park ranger for directions.

As you walk, look at the diversity of plants that are native to the Chihuahuan Desert. Use the signs along the trail and write at least one thing you learned about each of the plants.



**Cane Cholla**

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**Pinchot Juniper**

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**Catclaw Acacia**

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**Prickly Pear Cactus**

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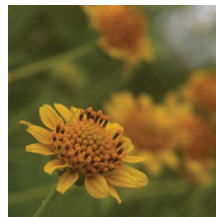


**Feather Dalea**

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**Skeleton Leaf Goldeneye**

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**Lechuguilla**

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**Sotol**

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**Ocotillo**

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**Torrey Yucca**

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# Bat Math Mania

Use the information to complete the problems below.

**During physical activity, a human heart beats an average of 120 times per minute. An active bat's heart beats an average of 900 times per minute.**

1. When compared to a human, how many more heartbeats does a bat have per minute?

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2. How many times does a bat's heart beat per second?

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**Insectivorous bats can eat half their weight in insects each night.**

1. If an average Brazilian free-tailed bat weighs 12 grams and a moth weighs 0.3 gram, how many moths can the bat eat in one night?

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2. If a bat ate only moths, how many moths could it eat from May to September (150 days)?

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**Brazilian free-tailed bats have been clocked at an average flight speed of 25 miles (40 km) per hour.**

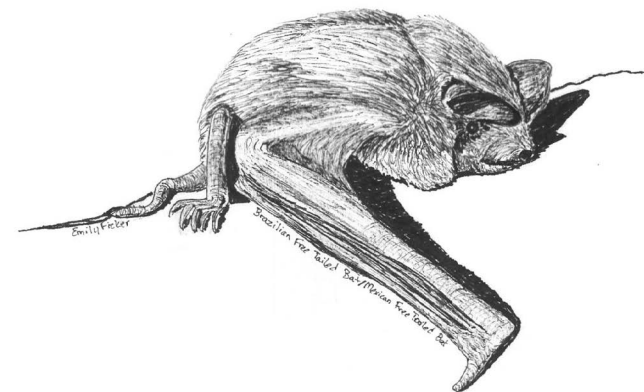
1. How many miles or kilometers can a bat travel over the course of 10 hours?

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2. How long would it take for a bat to fly 500 miles or 800 km from its roost in Carlsbad Cavern to the Congress Avenue Bridge roost in Austin, Texas?

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**Brazilian free-tailed bat**



**Cave Myotis**



EMF  
Emily Ficker  
Cave myotis bat



# Those Who Came Before

“Who discovered Carlsbad Cavern?” Many visitors ask this question, but the answer is “we don’t know.” The human history of this area spans over 10,000 years. Although artifacts have not been found deep within Carlsbad Cavern, other artifacts near the Natural Entrance suggest American Indians have known about and lived near Carlsbad Cavern for a long time. Even today, many tribes still have a deep connection to this cavern.

Watch the video *Our Sacred Grounds* in the visitor center to learn more about the connections several tribes have to this place and then visit the Natural Entrance. Use those resources to help you answer the questions below.

From the video or the panel nearby, name at least four of the 14 tribes that acknowledge affiliations with Carlsbad Caverns National Park:

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How did the Mescalero Apache get their name?

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Why were the Guadalupe Mountains a place of refuge for the Mescalero Apache in the 1850s?

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Why is this region sacred to American Indians?

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When you visit the Natural Entrance of Carlsbad Cavern, look at the large natural opening of the cavern and the surrounding landscape. Do you see any other evidence of American Indians nearby? Do you believe American Indians would have entered Carlsbad Cavern? Why or why not?

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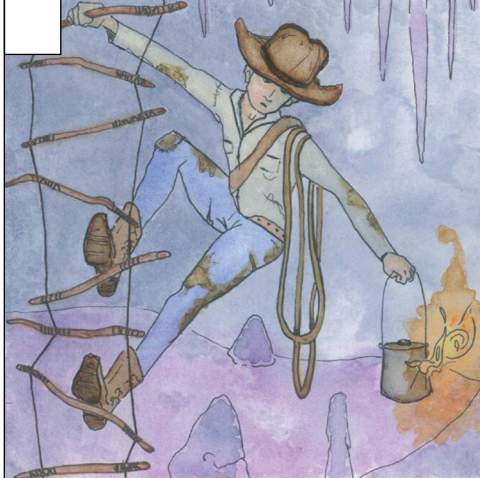

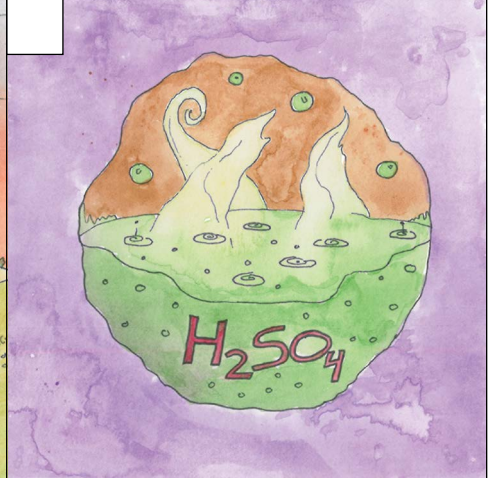
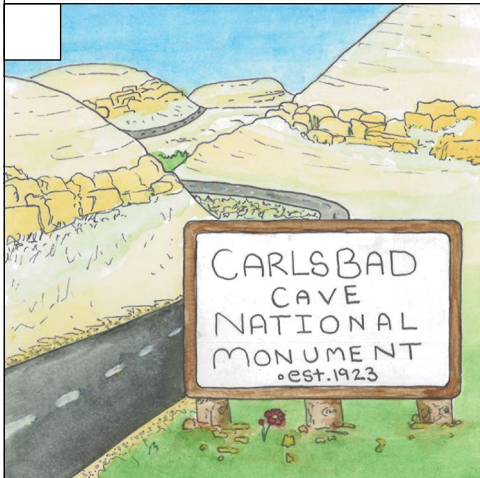
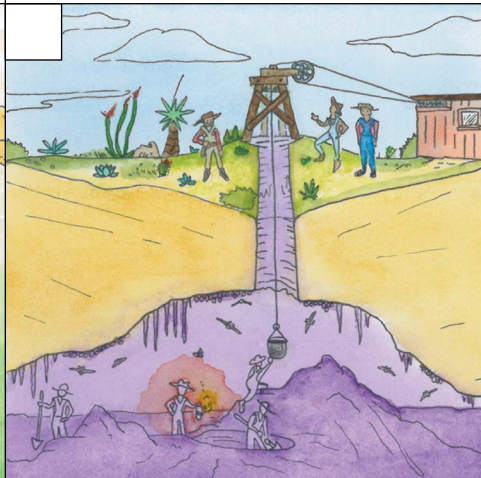
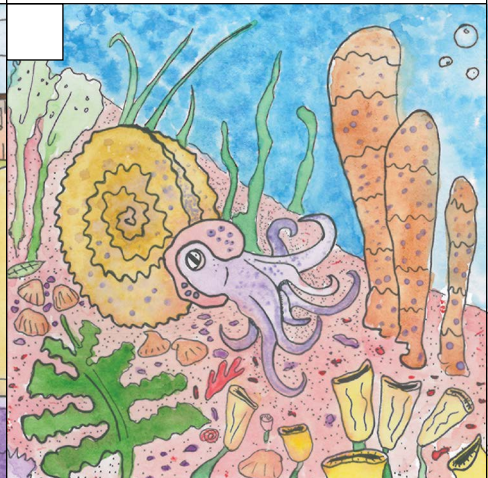
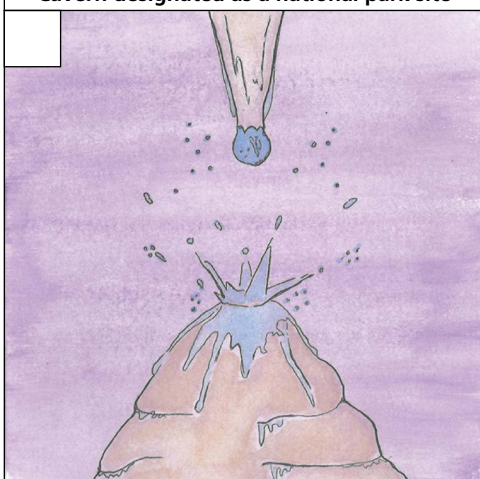
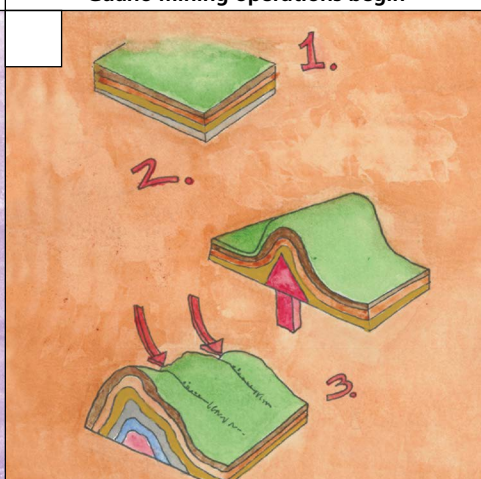
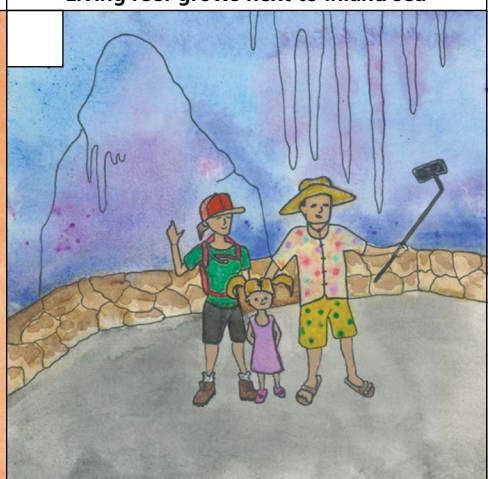
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# Stories in Stone

The story of Carlsbad Cavern began over 250 million years ago. Use the visitor center and exhibits in the cavern to piece together the history of this unique place. Number the following events chronologically (1–9).

		
Jim White explores Carlsbad Cavern	Apaches roast mescal near cavern	Sulfuric acid opens cavern rooms
		
Cavern designated as a national park site	Guano mining operations begin	Living reef grows next to inland sea
		
Cavern formations begin growing	Uplift of Guadalupe Ridge	Modern visitors tour cavern



# Time to Explore

With hundreds of wild caves in the Guadalupe Mountains, there are many opportunities to go beyond the paved trails of Carlsbad Cavern. Imagine you are a caver preparing to explore a wild cave. Your top priorities are to be safe and to protect the cave. Complete the following activities to ensure a successful trip!

In the space below, circle the necessary items to take with you for a safe adventure.



NPS / DUSTIN BAKER ILLUSTRATIONS

Cavers also follow the *Rule of Three*: carry at least three sources of light, travel in a group of at least three people, and tell three people on the surface where you are going and when you are expected back.

List two or three people who you'd like to cave with.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

### Cave Conservation Ethics: What Would You Do?

Imagine you are exploring a new cave. You are moving carefully to minimize your impact in the fragile environment. Suddenly, the passageway is blocked by extremely delicate soda straws. You can see plenty of cave on the other side of the formations. Do you break them to explore further? Why or why not?

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# Reflections

Pick a spot in the cavern, or on the surface, to sit quietly for 10 minutes. Observe your surroundings and draw what you see in the space below.

As you sit, look and listen for evidence of life in the cavern or desert. Do you see or hear any? Why or why not?

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What kinds of life might be found here? What adaptations do animals need to live comfortably in a cave or desert?

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Look around and listen again. Do you find any evidence of human impact around you? In your opinion, how is this human impact negative or positive?

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We can help protect and preserve our national parks together by practicing *leave no trace* – leaving these places as we find them so that others may enjoy them in the future. How are you following the *leave no trace* idea as you visit this national park?

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# What's the Word?

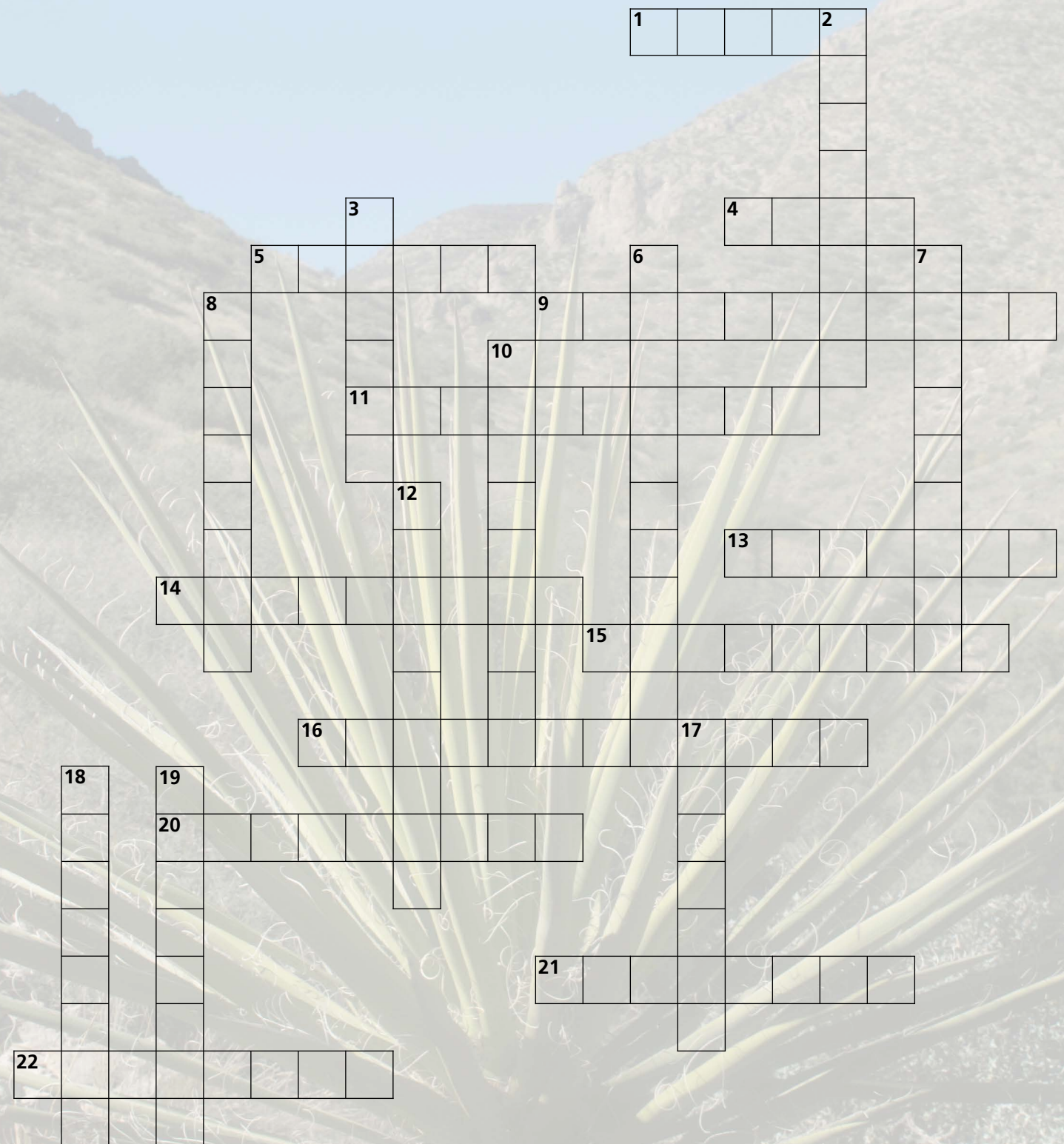
Use the exhibits in the visitor center to complete the crossword on the following page.

## ACROSS

1. Ray \_\_\_\_\_ was one of the first photographers in the cavern, taking pictures as early as 1915–1918. He and Robert Nymeyer produced many postcards for early visitors.
4. A handstone used in conjunction with a metate by American Indians to grind grain or agave hearts.
5. \_\_\_\_\_ Long filed the first claim on the cavern to mine guano in 1903.
9. Cave formations are alternatively called what?
11. Carlsbad Caverns National Park is located within this desert.
13. During the \_\_\_\_\_ Period, in the time of Pangaea, the inland sea which filled the basin was cut off from the rest of the ocean.
14. Like many caves, Carlsbad Cavern formed in this kind of rock.
15. \_\_\_\_\_ Canyon Cave was actively mined until 1957. Park rangers offer guided tours of this cave today as an off-trail experience.
16. The Civilian \_\_\_\_\_ Corps was a government-sponsored work program constructing buildings and roads in the 1930s, some of which are still used by staff today.
20. In the fall, Brazilian free-tailed bats from Carlsbad Cavern begin their annual \_\_\_\_\_ south to Mexico and Central America.
21. Over 250 million years ago, the Guadalupe Mountains were part of a reef system growing next to an inland sea called the \_\_\_\_\_ Sea.
22. In 1995, Carlsbad Caverns National Park was recognized as a World \_\_\_\_\_ Site.

## DOWN

2. A transparent variety of gypsum that makes up the chandeliers in the cave described in clue 6.
3. \_\_\_\_\_ scrapers were stone tools flaked on both sides. Used by American Indians, this could be a knife, scraper, or ax, depending on the need.
6. This cave is the longest and deepest in the park, mapped at over 135 miles so far and a depth of 1,604 feet (489 m).
7. This type of formation appears to defy gravity. Spurred by capillary action, it can grow sideways, down, or even straight up!
8. The caves of the Guadalupe Mountains are unique because they formed by \_\_\_\_\_ acid ( $H_2SO_4$ ) dissolution.
10. First discovered in New York, \_\_\_\_\_ Syndrome is a fungus that has devastated hibernating bat populations across North America since 2006.
12. Brazilian free-tailed bats return to Carlsbad Cavern each summer to give birth and raise their young. Therefore, these bats are often referred to as a \_\_\_\_\_ colony.
17. To count bats living at Carlsbad Cavern, researchers have used \_\_\_\_\_ imaging to record the heat signature of bats as they exit the cavern at night.
18. Bat droppings, or guano, are often used as fertilizer due to a high level of this nutrient.
19. Distantly related to modern squids and octopuses, this fossil is found frequently in the walls of Carlsbad Cavern.





# Interview with a Ranger

Find a park ranger or volunteer and ask the following questions about their job at Carlsbad Caverns National Park.

1. What is your job in the national park?

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2. What other jobs do park rangers do in national parks?

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3. What is your favorite part of your job?

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4. Why did you decide to work for the National Park Service?

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## Now It's Your Turn!

If you could be a park ranger, what job would you like to do and why?

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How do these jobs protect our national parks?

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# Create Your Own Pledge

The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.

However, the National Park Service is not the only one who takes care of these special places. We all must be stewards too. How will you protect Carlsbad Caverns and other national parks?

In the space below, create your own junior ranger pledge which includes a minimum of three ways you will help preserve these national parks for this and future generations.



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# Certificate of Achievement

\_\_\_\_\_ has successfully fulfilled the requirements of the Junior Ranger Program and is hereby proclaimed an official

**Carlsbad Caverns National Park**

**Junior Ranger**



\_\_\_\_\_  
Park Ranger

\_\_\_\_\_  
Date