

Sample Lesson #1

Underground Wonderland

Most national parks have a striking natural feature, for example, scenic amphitheaters filled with golden orange hoodoos and pinnacles. Bryce Canyon National Park has these, along with an odd-looking assortment of shapes, known as tent rocks, fairy chimneys, toadstools, and tea tables. Over thousands of years, water seeped into the rock at Bryce Canyon. In a process called frost wedging, water froze and expanded, pushing away chunks of rock and creating these dramatic formations.

In Arches National Park, the landscape is filled with bridges made of rock. Time and gravity worked with the relentless forces of weathering and erosion to form these arches. Grand Canyon is yet another example. For millions of years, the Colorado River meandered through Arizona desert land, gouging an ever-deepening gash into the landscape and creating the canyon. These and other amazing features, formed by the forces of erosion and weathering, are the centerpieces of some of today's national parks. But sometimes a park's natural wonder is not visible. Instead, it lies below the ground visitors stand on.

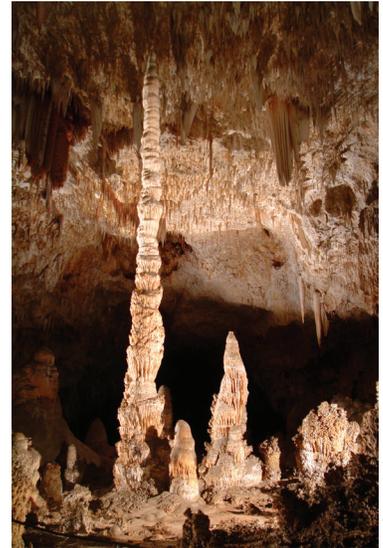
In New Mexico's Carlsbad National Park, visitors have to look underground to find the park's defining features. Carlsbad was declared a national monument in October of 1923. Plunging 75 stories down, it is one of the deepest cavern systems in the world. Visitors must descend by elevator more than 750 feet to reach a cave called Big Room with its one-and-a-quarter mile trail. A shop and restaurant are also underground.

In 1986, another Carlsbad cave, full of fantastic, never-before-seen features was discovered. It remained hidden until explorers heard the sound of wind roaring below them. After years of digging, they found one of the world's longest and deepest caves. They charted 136 miles of passages to a depth of over 1600 feet. There, as in other Carlsbad caves, they found an array of magnificent formations that had names like chandelier, hair-and-beard, soda straw, rusticle, cave pearl, and j-loop. Some scientists believe the cave holds a rare rock-eating bacterium that may have contributed to its size.

Most caves are formed by the action of rainwater slowly dissolving limestone near Earth's surface. Carlsbad Caverns, however, were created by an inland sea that covered the land more than 250 million years ago. Sulfuric acid dissolved limestone deep below Earth's surface and left deposits of gypsum, clay, and silt.

About a century ago, Carlsbad was used to mine guano.¹ However, things have changed since then. There is no mining, but bats are among the most interesting mammals living there. On summer evenings, swarms of bats swirl up and out of the cave openings, producing a spectacular sight. After eating their fill of mosquitoes and other insects, they navigate home, often dive-bombing through cave openings from hundreds of feet in the air.

Carlsbad Caverns was declared a UNESCO² World Heritage Site in 1995, and today, it is treasured as one of the geologic wonders of the world.



Credit: NPS Photo/Peter Jones

Totem pole formations are created by the steady drip of water.

1 bat excrement

2 United Nations Educational, Scientific, and Cultural Organization

- RI.8.3 1. Both totem pole formations and hoodoos (see Lesson #1) are created over time but in different ways. Explain how each is created.

- RI.8.4 2. Use context clues to match each term with the way it is used in the passage.

- | | |
|-------------------|--------------------|
| _____ relentless | A) unceasing |
| _____ centerpiece | B) steer carefully |
| _____ chart | C) bat excrement |
| _____ guano | D) focal point |
| _____ navigate | E) map out |

- RI.8.2 3. One of the main ideas of this passage is _____.

- A) erosion causes hoodoos and arches to form in many national parks
- B) dripping water creates totem pole formations
- C) bats live in Carlsbad National Park
- D) Carlsbad National Park's centerpiece attraction is a unique cave system

- RI.8.3 4. Think about the connection between hoodoo formations and frost wedging. Write C for *cause* and E for *effect*.

_____ Hoodoo formations continue to fill the landscapes of national parks
 _____ because of frost wedging, an erosion process that persists over thousands of years.

- RI.8.3 5. Complete the Venn diagram. Write the letter of each descriptor in the proper place.

- | | |
|--------------------------------------|---|
| A) site of an ancient civilization | D) features formed over thousands of years |
| B) provides an elevator for visitors | E) has one of the world's longest and deepest caves |
| C) high above Earth's surface | F) became a national park in the early 1900s |

