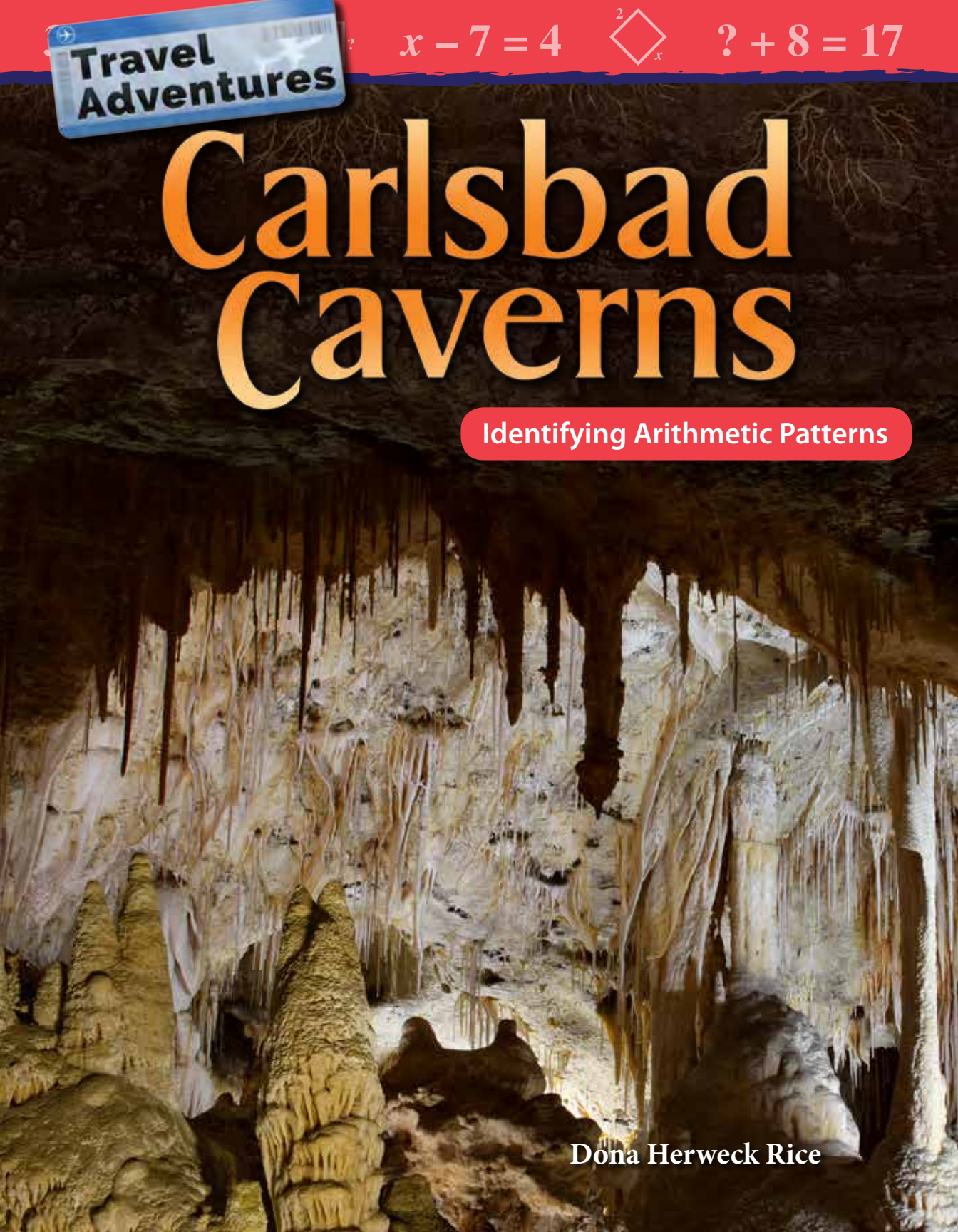
Travel Adventures

$x - 7 = 4$ $\square^{2}_{x}$ $? + 8 = 17$

Carlsbad Caverns

Identifying Arithmetic Patterns



Dona Herweck Rice

For teachers' inspection ONLY

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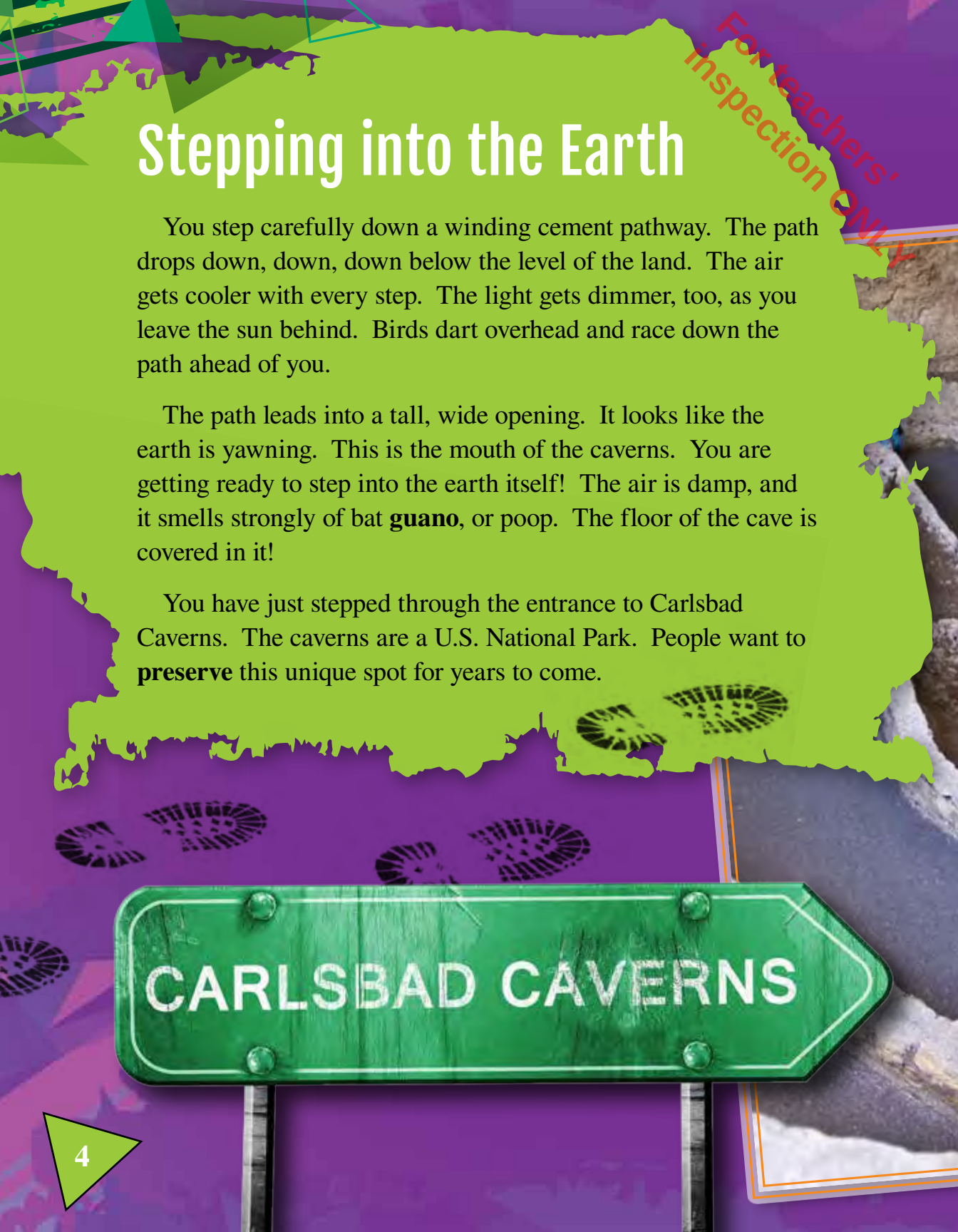
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Stepping into the Earth

You step carefully down a winding cement pathway. The path drops down, down, down below the level of the land. The air gets cooler with every step. The light gets dimmer, too, as you leave the sun behind. Birds dart overhead and race down the path ahead of you.

The path leads into a tall, wide opening. It looks like the earth is yawning. This is the mouth of the caverns. You are getting ready to step into the earth itself! The air is damp, and it smells strongly of bat **guano**, or poop. The floor of the cave is covered in it!

You have just stepped through the entrance to Carlsbad Caverns. The caverns are a U.S. National Park. People want to **preserve** this unique spot for years to come.

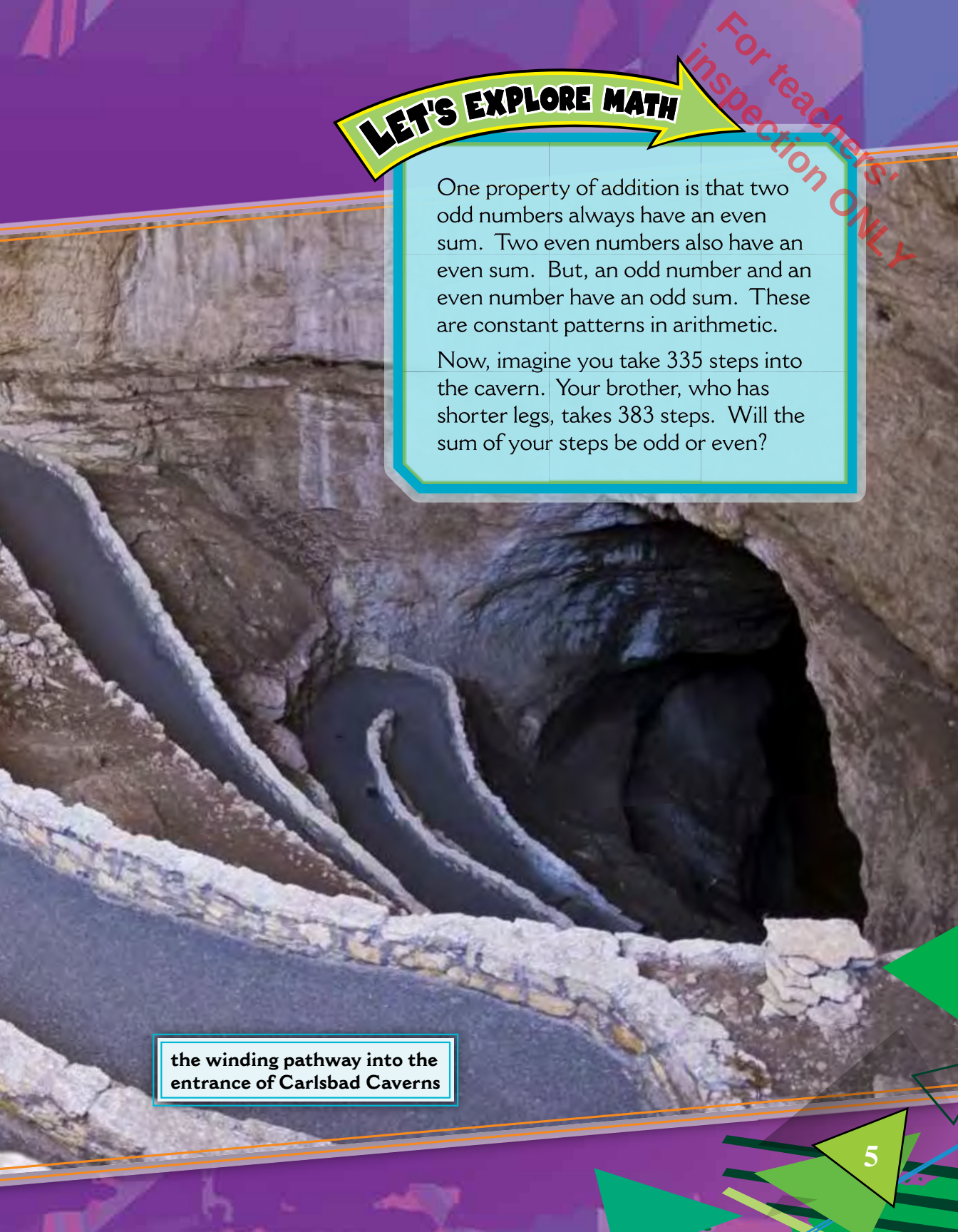


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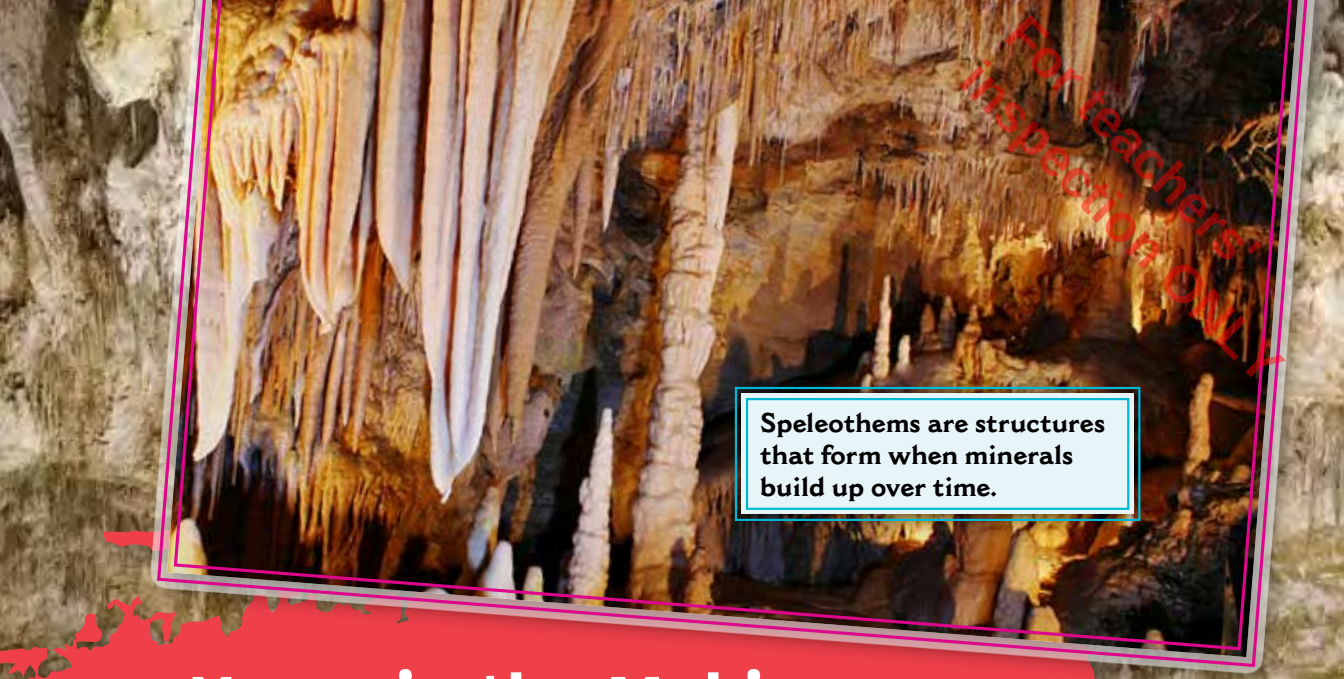
Let's Explore Math

One property of addition is that two odd numbers always have an even sum. Two even numbers also have an even sum. But, an odd number and an even number have an odd sum. These are constant patterns in arithmetic.

Now, imagine you take 335 steps into the cavern. Your brother, who has shorter legs, takes 383 steps. Will the sum of your steps be odd or even?



the winding pathway into the entrance of Carlsbad Caverns



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Speleothems are structures that form when minerals build up over time.

Years in the Making

The wonder that is Carlsbad Caverns took millions of years to form. Earth's **processes** shaped the caves. This has been slow. The right conditions had to occur in just the right way. These conditions are what make a cave a cavern. First, the rock that forms the cave has to be **soluble**. That means it can be dissolved. Second, the rock must be able to grow **speleothems** (SPEEL-ee-uh-thems).

The big deal about Carlsbad Caverns is not just that it is a system of caves. There are many caves in the world. Caves are openings in the ground in which at least some part is out of reach of sunlight. Caves are common where Carlsbad Caverns is found. But, few caves are equal to these caverns in size and beauty. People from all over the world visit just to look at them. They are the true definition of awesome! Visitors are awed by what they see.

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Let's Explore Math

Multiplying with even and odd numbers reveals patterns. Use the table to answer the questions without doing any calculation.

even x even =	even
odd x odd =	odd
even x odd =	even

There are at least 119 caves within Carlsbad Caverns.

1. Imagine that you visited each cave twice. Will the product of your cave visits be odd or even?
2. Now, imagine you visited each cave three times. Will that product be odd or even?
3. Finally, imagine there are 120 caves. Answer questions 1 and 2 again. Will the products be odd or even?

a colorful cave in New Mexico's Carlsbad Caverns

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A piece of limestone corrodes in acid.

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the edge of a waterpool in Carlsbad Caverns

Corrosion at Work

There are many ways for caves to form. For example, tubes of lava may form caves of many shapes and sizes. Caves may also form through the movement of Earth's **plates**. But, caverns like those at Carlsbad form when rock is dissolved. This happens through **corrosion**. **Acids** in water seep through cracks in rock. Over time, they wear away the rock. The openings they carve out grow deeper and wider. The caverns spread below Earth's surface. They look like the sprawling burrows dug by giant field mice!

Let's be clear. Water itself is not an acid. But rainwater may collect acid from Earth's atmosphere. When it does, the acid in water carves out the caverns. And it does a whole lot more as well!