

OCTOPUSES HAVE ZERO BONES

TEACHER'S GUIDE

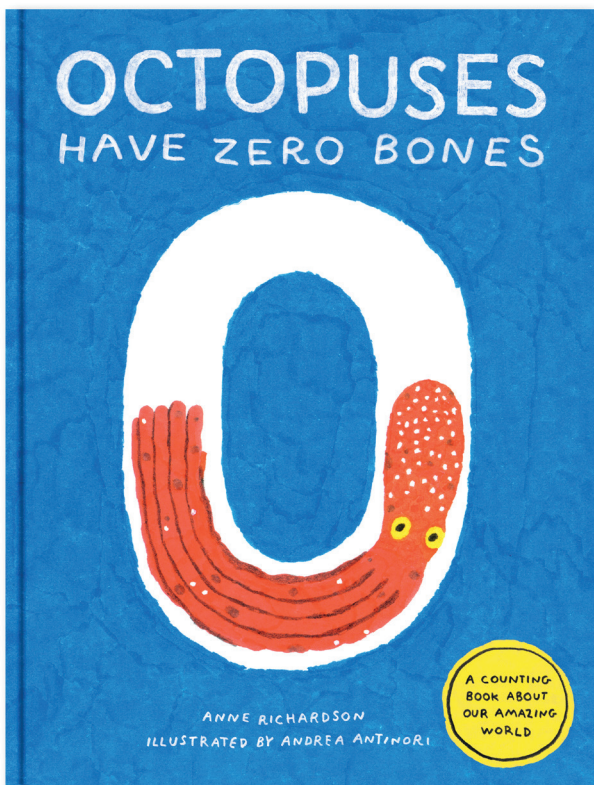
BOOK SUMMARY

Do you wonder...

- How many bones an octopus has?
- How many breaths you take a day?
- How many moons Mars has?
- How many miles a trip to the moon and back is?

The answers to these questions appear in this book—along with many more amazing facts that celebrate the numbers zero to nine and powers of ten. Starting with zero instead of one, this whimsical, fact-filled counting book will delight readers of all ages. Combining elements of traditional and advanced counting books with a sense of wonder and curiosity about the world, *Octopuses Have Zero Bones* encourages young readers to fall in love with numbers and the world around them. The book's layered content offers an easy and attractive point of entry as well as the possibility to explore and understand more at multiple levels.

An unconventional, engaging, and delightful counting book for curious minds that playfully uses numbers as an entry-point to discover the amazing, diverse, fact-filled world of wonders all around us. The book focuses on the numbers zero to nine and powers of ten counterparts of ten to nine billion.



ANNE RICHARDSON
ILLUSTRATED BY ANDREA ANTINORI



SENSORY COUNTING

Early Childhood through First Grade

When children begin to learn about numbers, it can be incredibly pleasurable to practice counting, especially when paired with something they can feel in their hands or bodies. Counting can happen at any time—as you take steps on a walk or go up and down the stairs.

Fill a bowl with small objects, with the amount of each object corresponding to a numeral one through nine (or higher if you're ready). This activity works best when the objects are things the child enjoys. For my daughter, I chose items from nature that she loves to examine (seven shells, five stones, three leaves, and six pine cones). I also chose beads of various sizes, materials from our craft bin, and corks because she loves how those feel in her hands.

THE INVITATION

Draw numbers on individual squares of paper or index cards. Place these on a tray or in another way that's enjoyable for your child. For example, some people place the numbers in the cups of muffin tins or other small containers.

Invite your child to arrange the objects with their corresponding numerals. Allow them time to sort them in whatever way is sensible to them and provide guidance when they look to you for support.

EXTENSIONS

My daughter loved to repeat this activity every day, even with the same materials. When your child is ready, change the numbers of each type of material or add more numbers to make it more interesting. Ask your child to collect and count objects to add to the bowl.

2

NUMBERS IN THE WORLD

Early Elementary Grades

Octopuses Have Zero Bones is full of examples of numbers in the world. If you look around, you can probably find many more examples for each of the numbers zero through nine.

THE INVITATION

An avocado contains one seed. What other examples can you find in the world of one?

Hummingbirds lay two eggs. What other examples can you find in the world of two?

And so on for numbers one through nine. Invite students to find examples of zero in the world for an extra challenge.

EXTENSION

Invite students to create their own counting books with the examples they collect. They can print photos, draw pictures, or create collages that represent their examples. You might have each student (or pair of students) responsible for collecting an example of a single number to contribute to a class collection. Or you might ask each student to find one example for each number.

Ask students to identify the units of measurement. In the hummingbird example, the unit is eggs. How might the numbers change if they were to choose a different unit of measure?

2

NUMBERS IN THE WORLD

Upper Elementary and Middle School

Octopuses Have Zero Bones is full of examples of numbers in the world. Looking around, you can probably find many more examples for each of the powers of ten.

THE INVITATION

Hermit crabs have ten legs. What other examples can you find in the world of ten? There are two hundred languages spoken in Los Angeles. What other examples can you find of two hundred?

And so on for each power of ten through nine billion.

EXTENSION

How do we know these things? Invite students to create visual presentations to describe or demonstrate how the examples were measured or counted. Are they directly measured, or do we need to use other methods to find these numbers, such as extrapolation, estimation, or modeling?

Be sure to notice the units of measurement and discuss how changing the units would change the numbers.

3

COUNT THE WAYS TO MEASURE AND COUNT Any Age (Early Childhood through Adulthood)

Measuring and counting are wonderful ways to begin exploring something new. When we focus closely on what can be measured and then go about actually measuring, we get to know that thing better and also begin to ask more questions.

THE INVITATION

Choose something, anything. It could be an object, a song, a friend... really, anything. Then, list all of the ways you can measure or count it. Try to come up with at least ten types of measurements for each item.

As an example, I chose my house key. Here is a list of ideas about what I could measure or count:

- How long is it?
- How wide is it?
- How thick is it?
- How much does it weigh?
- What is its volume?
- How old is it?
- How many times do I use it each day? Each year?
- How many notches does it have?
- How many degrees does it turn in the lock before the door unlocks or locks?
- How loud (in decibels) is the sound of the key when I drop it on the kitchen counter? What is its conductivity (in ohms)?

EXTENSION

Once you have a list, choose some of those things to measure or count. What did you try? What tool(s) did you use? What were your units of measurement? What did you notice? What do you wonder?

About the Author and Illustrator

Anne Richardson is an author of experiences that kindle your curiosity. In her work, everything in the world is astonishing and worthy of our attention, from a drop of rain to the way we figure things out together. She is the senior director of Global Collaborations at the Exploratorium, San Francisco, where she works with partners worldwide to imagine and create new science centers and other extraordinary learning experiences. Richardson holds a PhD and an MS in environmental studies from Antioch University New England, and a BA in art history from Northwestern University. She lives in the San Francisco Bay Area with her family, including two little explorers.

Andrea Antinori is an award-winning illustrator based in Bologna, Italy. Since he was a child, he has loved animals and he has loved to draw them. His favorite animal changes all the time. He likes octopuses very much, but right now, lemurs are the creatures he loves most. He wrote and illustrated the book *On the Lives of Lemurs: A Short Treatise on Natural History*. Other books he has illustrated include *A Book about Whales* and *The Great Battle*, the latter of which has received major international awards including: 2019 Best International Illustrated Book at the China Shanghai International Children's Book Fair, 2017 Selected Illustrator for Exhibition at the Bologna Children's Book Fair, 2017 Premio Andersen's Best Book for 6-9 Year Olds, and 2015-2016 IBBY Honor List.



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