

ZERO!

The Number That Almost Wasn't

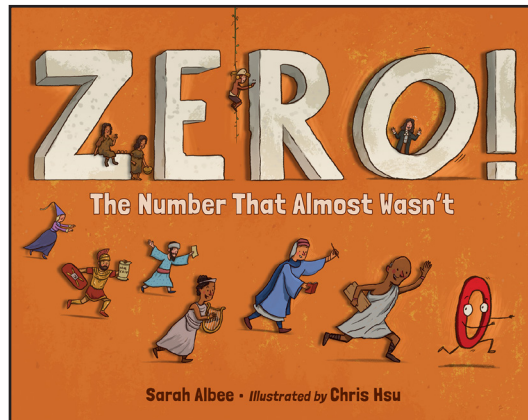
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★ “[A] unique and attractive STEM offering.”

—Booklist, starred review



978-1-62354-432-4 HC
by Sarah Albee
illustrated by Chris Hsu

About the Book

Zero has had quite a journey. Symbols for “nothing” and supporting concepts such as place value were created, abandoned, and recreated over thousands of years across the globe. Respected children’s author and consummate researcher Sarah Albee lays out the history of zero alongside the complications that initially hampered its development, including Western imperialism. A riveting nonfiction kids’ book with a playful feel, *Zero!* unravels a complicated history in thrilling detail.

About the Author

Sarah Albee is the *New York Times* best-selling author of more than 100 books for kids, including *Troublemakers in Trousers* and *Accidental Archaeologists*. Prior to being a full-time writer, Sarah worked at Children’s Television Workshop (producers of *Sesame Street*) for nine years. She lives in New York City with her husband, a high school history teacher and administrator. They have three grown kids.



About the Illustrator

Born in Taipei, Taiwan, and raised in Jacksonville, Florida, Chris is incessantly inquisitive about and heavily influenced by history, art history, science, classical music, psychology, and sports. In addition to book illustration he is an animation background artist, having worked on animated series such as *Archer* and *Hit-Monkey*. He is based in the Southeast with his wife and two daughters.



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Discussion Questions

Use these conversation starters to get kids thinking and learning.

Pre-reading

1. Show kids the cover of the book and have them read the title. Then ask them what they think *Zero!* is about. Write their responses on chart paper.
2. Where do students see and use zero in their daily lives? Can they define zero? What would it mean for them if zero didn't exist?

Post-reading

1. Revisit the predictions kids made before reading. What predictions (if any) were correct? Did *Zero!* surprise them?
2. In what times and places did ideas about zero develop? Where does the modern zero come from?
3. Why did the Babylonians need place value and a symbol to mark an empty place? What did the Maya use zero for? Why do most modern humans not use the Babylonian or Mayan zero?
4. The Romans had no zero in their number system. How did they solve math problems without it?
5. Why did some Europeans resist the introduction of zero and the Hindu-Arabic numerals? What changed their minds?
6. Trade played a big role in the development and spread of zero. Why do kids think that is? If they were traders in the ancient world, how would they use zero?
7. Read the "What's in a Name?" section of the back matter. Do kids know any other names for zero or words for nothing, in English or other languages?
8. Look at "Zero: A Blurry Time Line" in the back matter. Why is this called a "blurry" time line? How do you think historians know some events took place in specific years, when other events are given in a range or approximate year? What are some of the ways that historians find evidence for when things occurred?

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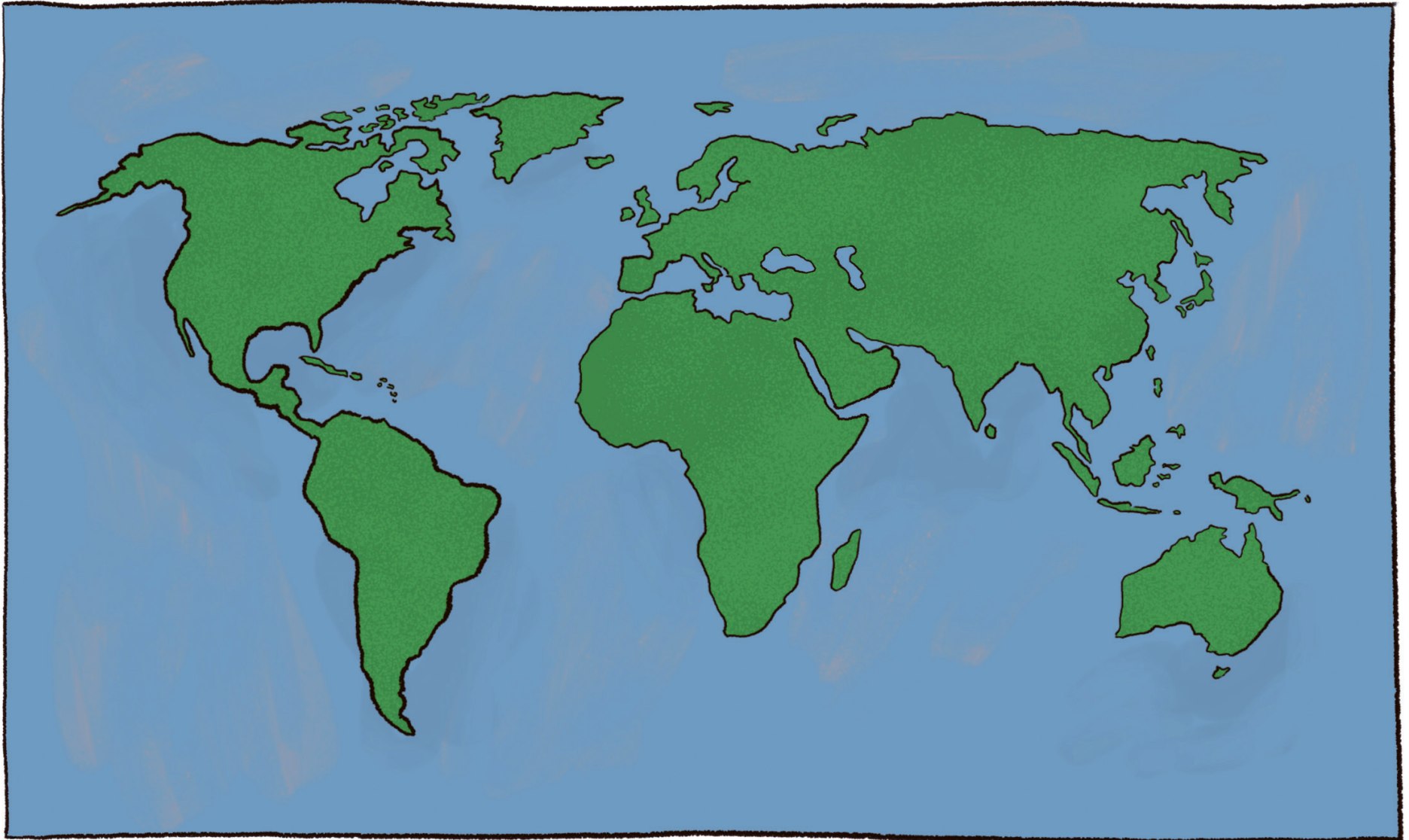
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Mapping Zero

On the map below, mark the places where zero emerged with dots. Use a star for the place where the modern zero comes from.

Name: _____

Date: _____



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Time Lines

Use this collaborative classroom activity to explore the concept of a time line and contextualize historical events leading to the emergence of the modern zero.

Materials

- A long sheet of roll paper
- Markers

Procedure

1. **Connect to the text.** As a class, look at "Zero: A Blurry Time Line" in the back matter. Why is this called a "blurry" time line? What are some other places that students have seen time lines? What can you learn by making a time line?
2. **Review the procedure.** Unroll the long sheet of roll paper and tell students that you will be working together to create a time line about the invention of zero. Use a marker to draw a long horizontal line along the center of the roll paper.
3. **Fill out the time line.** Call on students in turn to read entries from "Zero: A Blurry Time Line" aloud and ask the class where on the time line they think each entry should go. Use a dot on the time line and a vertical indicator line to connect the name and short description of each event. Some events may need a bracket indicating the range of possible dates rather than a dot indicating a specific year in which they occurred. Once the events are laid out on the time line, ask students to help you place the Babylonian empty place symbol, the Mayan zero, the Indian zero, and the modern zero on this time line. Use a dot on the time line and a vertical indicator to connect a large box depicting each symbol to its corresponding temporal location.
4. **Reflection.** Lay the time line out on the floor and walk along it as a class, stopping at each event. What, if anything, can you see about the development of zero when it's laid out in a time line that you couldn't see in a book? What do you notice about the events that are attributed to a specific year versus the events that happened over a span of time or could have happened at any point in a span of years?
5. **Optional extension.** With the time line displayed on the floor, invite students to add other historical events to the time line, whether or not they're strictly related to the development of zero. You can use color-coding to categorize these events by type or region of the world, or simply leave color up to students' choice. Once these events have been added, stand back and discuss: What else was happening in the world at the times zero was being invented? Did these events also influence the creation and adoption of zero? Why or why not? Display your time line on a classroom or hallway wall and refer to it during history lessons throughout the year.

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Further Reading

Enrich the reading experience and extend learning by pairing *Zero!* with these other resources!

Math Concepts

Adler, David, and Edward Miller. *Place Value*. Holiday House, 2016.

Barton, Bethany. *I'm Trying to Love Math*. Viking Books for Young Readers, 2019.

Franco, Betsy, and Shino Arihara. *Zero Is the Leaves on the Tree*. Random House Children's Books, 2009.

LaRocca, Rajani, and Chaaya Prabhat. *Bracelets for Bina's Brothers*. Charlesbridge, 2021.

LaRocca, Rajani, and Archana Sreenivasan. *Seven Golden Rings: A Tale of Music and Math*. Lee & Low Books, 2020.

LoPresti, Angeline Sparagna, and Phyllis Hornung. *A Place for Zero*. Charlesbridge, 2003.

Stuart, Colin, and Ximo Abadia. *The Language of the Universe: A Visual Exploration of Mathematics*. Big Picture Press, 2020.

Ulmer, Wendy, and Laura Knorr. *Zero, Zilch, Nada: Counting to None*. Sleeping Bear Press, 2010.

History of Math

Becker, Helaine, and Dow Phumiruk. *Counting on Katherine: How Katherine Johnson Saved Apollo 13*. Henry Holt and Company, 2018.

French, Vivian, and Ross Collins. *From Zero to Ten: The Story of Numbers*. Oxford University Press, 2002.

Gifford, Clive, and Michael Young. *Quick History of Math: From Counting Cavemen to Big Data*. Wide Eyed Editions, 2021.

Heiligman, Deborah, and LeUyen Pham. *The Boy Who Loved Math: The Improbable Life of Paul Erdős*. Roaring Brook Press, 2013.

Wallmark, Laurie. *Ada Byron Lovelace and the Thinking Machine*. Creston Books, 2015.