

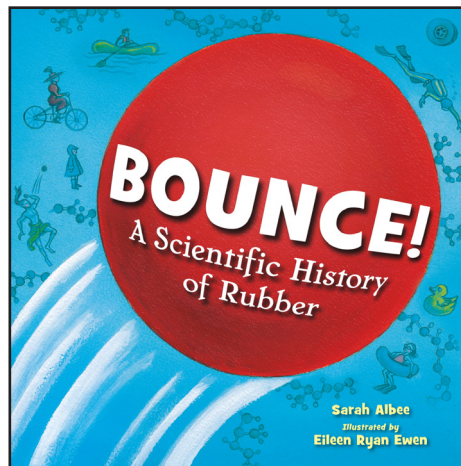
BOUNCE!

A Scientific History of Rubber

ACTIVITY KIT

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Sarah Albee
Illustrated by Eileen Ryan Ewen
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About the Book

Ever wondered what makes rubber bounce? With sidebars, graphics, fun facts, and more, the history of rubber reveals plenty of fascinating secrets and surprises. Elementary school readers will discover that early balls didn't bounce; that people in the rainforest made waterproof gear from rubber thousands of years before Europeans got into the act; and that sneakers, bicycles, and cars created demand for more and more rubber!



About the Author

Sarah Albee is the *New York Times* best-selling author of more than one hundred 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 played basketball in college, and then a year of semi-professional women's basketball in Cairo, Egypt. She lives in New York City.



About the Illustrator

Eileen Ryan Ewen is the illustrator of many books for children, including *H is for Honey Bee*, *Jonas Hanway's Scurrilous Scandalous Shockingly Sensational Umbrella*, and *Nature's Friend: The Gwen Frostic Story*.

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Before Reading

Pre-reading concept reviews help enrich students' learning experience!

For younger students (K-2nd):

- After looking at the cover of the book and reading the title, ask students what they think *Bounce!* is about. Write their responses on chart paper.
- Discuss rubber with the class. What items can they name that are made of rubber?
- Open the book and show the endpapers to the class. Can they name the sports associated with the balls depicted? How would those sports be different if the balls didn't bounce?

For older students (3rd and up):

- Based on the title and cover, ask students to describe what they think the book is about. Write their responses on chart paper.
- Have students discuss the following questions in small groups. Tape the questions to a wall and ask students to tape their answers beneath the questions.
 - What would your life be like without rubber?
 - Where does rubber come from?
 - Where would you look to find more information about rubber?
- Ask students to write in their journals about the subtitle of this book. What is a "scientific history"? How is it different from other kinds of history? What kind of information do they expect to find in this book? What other kinds of history could be written about rubber?
- Distribute rubber erasers to students and invite them to explore the rubber's properties. Ask them for adjectives that describe the eraser's color, texture, size, behavior, etc. List the adjectives on a piece of chart paper. Then ask them which of these properties are shared by other things made of rubber, such as tires or the inner core of a tennis ball. Circle the shared properties.

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After Reading

Post-reading discussion can help students develop greater understanding and connect them to curriculum activities.

For younger students (K-2nd):

- Revisit student predictions from the pre-reading discussion. What predictions were correct? Did *Bounce!* surprise them?
- This book begins and ends with a list of words that describe rubber—bouncy, stretchy, etc. Why did the author start and end the book with this list? Why are these words important? Go back to the first page and write down these words on chart paper, then reread the book and refer to the list when you learn more about one of rubber's properties—such as on pages 11-12, about why rubber bounces.
- Rubber has been a key material for many inventors. Invite the students to draw an invention they would make with rubber and share it with the class.

For older students (3rd and up):

- Revisit student predictions from the pre-reading discussion. What predictions were correct? Did *Bounce!* surprise them?
- Take a second look at student responses to the pre-reading discussion questions:
 - What would your life be like without rubber?
 - Where does rubber come from?
 - Where can you look to find more information about rubber?Talk as a class about how these questions are connected to the book.
- How has rubber production and processing changed over time? Why did inventors such as Charles Goodyear want to change how rubber behaved? What might a future inventor want to change about rubber?
- Read the author's note and discuss as a group. What are some of the social and environmental problems caused by the rubber industry? Why do kids think the author chose to write about these problems in the back matter rather than the main text of the book? What can be done to produce rubber more responsibly and ethically?
- Take a look at the bibliography in the back. What is the oldest book cited? What is the most recent book cited? Why do you think the author cited books written so far apart? If you sorted these books by topic, which topics would you use to sort them and which books would go together?

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PE Connection: Play Ball

How did rubber make the game of ulama possible?
Investigate rubber's properties with a comparative physical activity.

You will need:

- A large flat area like a grass field, blacktop, or gym floor
- A variety of sports balls, including:
 - Rubber handballs
 - Soccer balls
 - Footballs
 - Beach balls
 - Basketballs
- Writing materials for each student
- Optional: adult volunteers to help supervise

Procedure:

1. **Preview the game** of ulama with students by reading *Bounce!* and pointing out that the Indigenous communities who invented the first game to use a rubber ball still exist in what is now Central America. Watch one of the following short documentary videos about modern ulama players and their connection to the original Mesoamerican ball game: ["Reviving a 3,000-year-old Ancient Ballgame"](#) , ["The Ancient Mayan Sport Making a Comeback - BBC Reel"](#) , ["Group of Athletes Look to Bring Back Ulama, One of the World's Oldest Sports"](#)
2. **Pose an investigative question.** Which modern ball do students think would be best to use for a game of ulama? What kind of properties does the ball need for a successful game?
3. **Investigate.** Provide students with a large flat area set up with several testing stations, one for each kind of ball. Ask them to test each ball by hitting it with their knees and hips and write down their observations about each ball's properties. Once each student has had a chance to test all the balls, ask them to each write down which ball they think would be best for a game of ulama.
5. **Discussion.** Invite students to discuss the results of their investigation in small groups or as a full class. Which ball was the most popular student pick for a game of ulama? Why? What made that ball behave differently from the other balls?

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STEM Connection: Build a Launcher

Explore physics and material science by building a launcher powered by a rubber band!

Materials

- Short pencils or popsicle sticks
- Thin rubber bands
- Cardboard tubes such as empty toilet paper tubes or halved empty paper towel tubes
- Packing tape and painter's tape
- Scissors
- Cotton balls, balls of crumpled tinfoil, or other appropriate projectiles
- Single hole punchers
- A measuring tape

Procedure

1. **Prepare the room.** A day or two before the project, set up a launching gallery in your classroom where students can test their launchers. Use the painter's tape to mark a starting line and with the measuring tape, mark the floor in one-foot intervals along the length of the gallery.
2. **Preview the project.** Stretchiness and bounciness are key properties of rubber. Ask students what they use rubber bands for in daily life. Then explain that this activity will explore how a rubber band can be used to launch materials.
3. **Review the instructions.** Watch the video "[Cotton Ball Launcher - Fun STEM Activity](#)" by Science Buddies on YouTube. This will teach both you and the students how to make a launcher.
4. **Build the launchers.** Distribute materials (except the projectiles) and walk the class step-by-step through building their own launchers. It may be useful to have adult volunteers model building their launchers in small groups, answer questions, and troubleshoot building problems.
5. **Test the launchers.** Invite students to line up at the launching gallery. Ask them to first throw a projectile down the gallery with their hand, then use their launcher to launch the same projectile. Offer each student a few attempts and ask them to write down how far their projectile flew on each attempt.
6. **Reflect.** Invite students to reflect on the activity in their journals and then discuss as a class. Which method made the projectile move faster and farther, throwing or launching? What properties of rubber made it possible for the launcher to work? If they replaced the rubber with another material like string, would it still work? Why or why not?
7. **Optional homework extension.** Ask students to design a different launcher using rubber material. They should turn in a drawing of the launcher and a brief description of how to make and use it.

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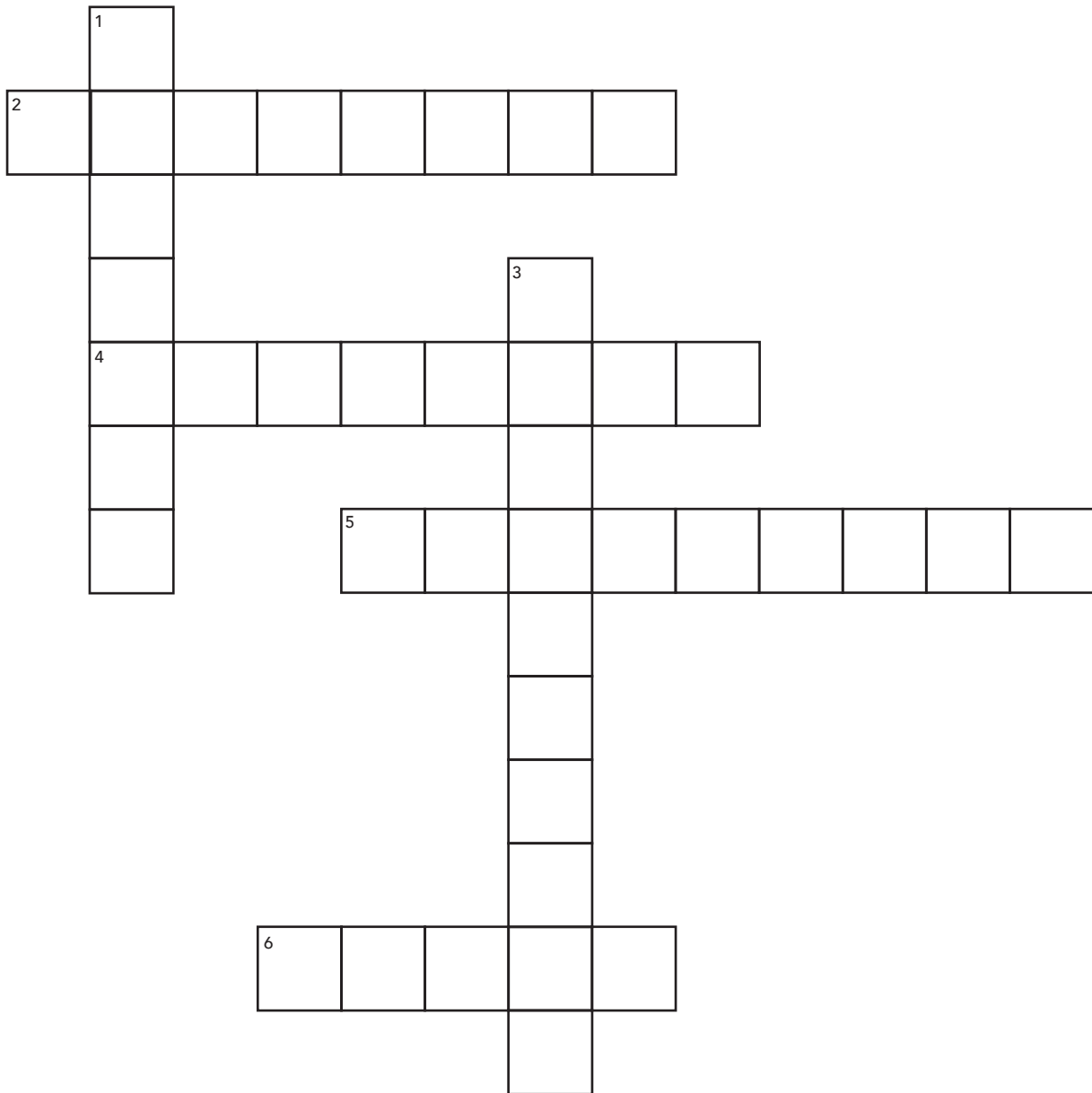
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Crossword

Name: _____

Date: _____



DOWN

1. A long, chain-like molecule
3. Rubber that has been heated with sulfur
6. A liquid harvested from the rubber tree to create rubber

ACROSS

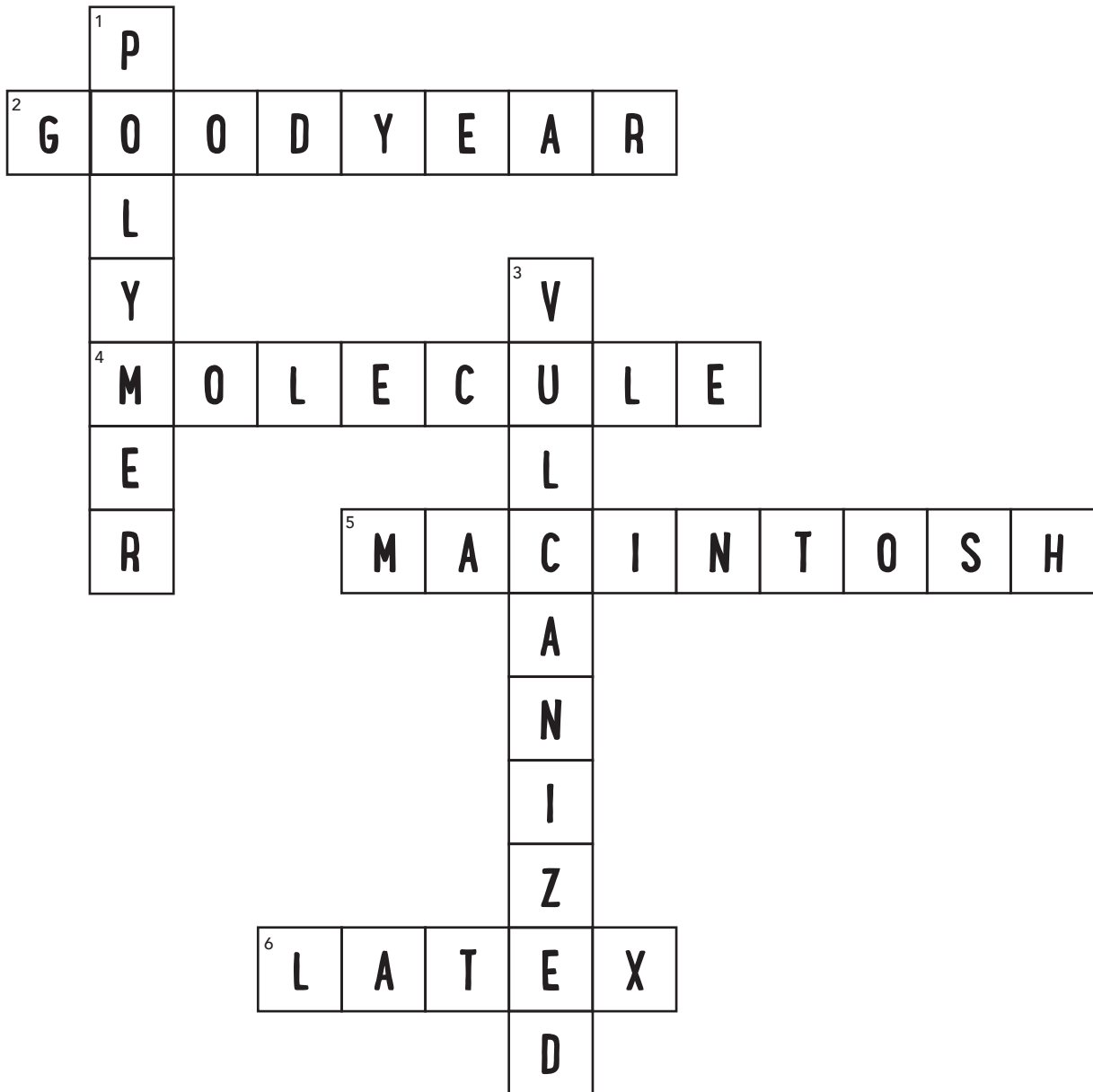
2. The last name of an American inventor who added sulfur to rubber
4. A group of bonded atoms
5. The last name of a man who invented the European waterproof raincoat

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Crossword Answer Key



DOWN

1. A long, chain-like molecule
3. Rubber that has been heated with sulfur
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ACROSS

2. The last name of an American inventor who added sulfur to rubber
4. A group of bonded atoms
5. The last name of a man who invented the European waterproof raincoat

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PE Connection: Play Ulama

Connect with Indigenous history and enjoy one of the oldest uses of rubber with a simplified modern version of an original Mesoamerican ball game.

You will need:

- 10 to 24 students
- A scoreboard
- A large flat area that can be marked, like a grass field, blacktop, or gym floor
- Chalk, tape, or field marking paint
- One rubber ball (ulama is traditionally played with a seven-pound rubber ball; this variant uses a lighter rubber handball for safety)
- Optional: one or two adult volunteers to help referee and supervise the game

Procedure:

1. **Preview the game** of ulama with students by reading *Bounce!* and pointing out that the Indigenous communities who invented the first game to use a rubber ball still exist in what is now Central America. Watch one of the following short documentary videos about modern ulama players and their connection to the original Mesoamerican ball game: ["Reviving a 3,000-year-old Ancient Ballgame"](#) , ["The ancient Mayan sport making a comeback - BBC Reel"](#) , ["Group of athletes look to bring back Ulama, one of the world's oldest sports"](#) (Note that while some of the players in these videos wear various kinds of regalia and face paint, it is appropriate to wear ordinary sports clothing for this activity and refrain from painting students' faces in imitation of Maya people.)
2. **Set up an ulama court** by marking a 112-foot-long, 13-foot-wide rectangle with chalk, tape, or field marking paint and dividing it in half widthwise.
3. **Review the rules** with the students. Explain that this is a simplified version, and the rules for grown-ups playing formal games are very complex, especially when it comes to keeping score. For more information about the game, you can read the article ["Ulama: The Pre-Columbian Ballgame Survives Today"](#) by Dr. Manuel Aguilar-Moreno in the *Magazine of the Smithsonian National Museum of the American Indian*.
 - Players must only touch the ball with their hips, not their hands or feet.
 - Players may not touch other players.
 - Players must stay on their team's side of the court and may not cross the center line.
 - The goal of the game is to keep the ball from going out of bounds on your team's side of the court.
 - Teams take turns serving the ball at the start of the game and whenever it goes out of bounds.
 - If a team hits the ball across the line behind the other team, they score a point.
 - The first team to get eight points is the winner.
4. **Divide the students into equal teams** of 5–12 players and invite them to play ulama. Keep track of the score on the scoreboard.
5. **After the game**, celebrate everyone's hard work with a snack. Invite students to reflect on the experience in their journals or by conversing in small groups about what they learned. Would ulama work without a rubber ball? How did the ball's bounciness influence the game?