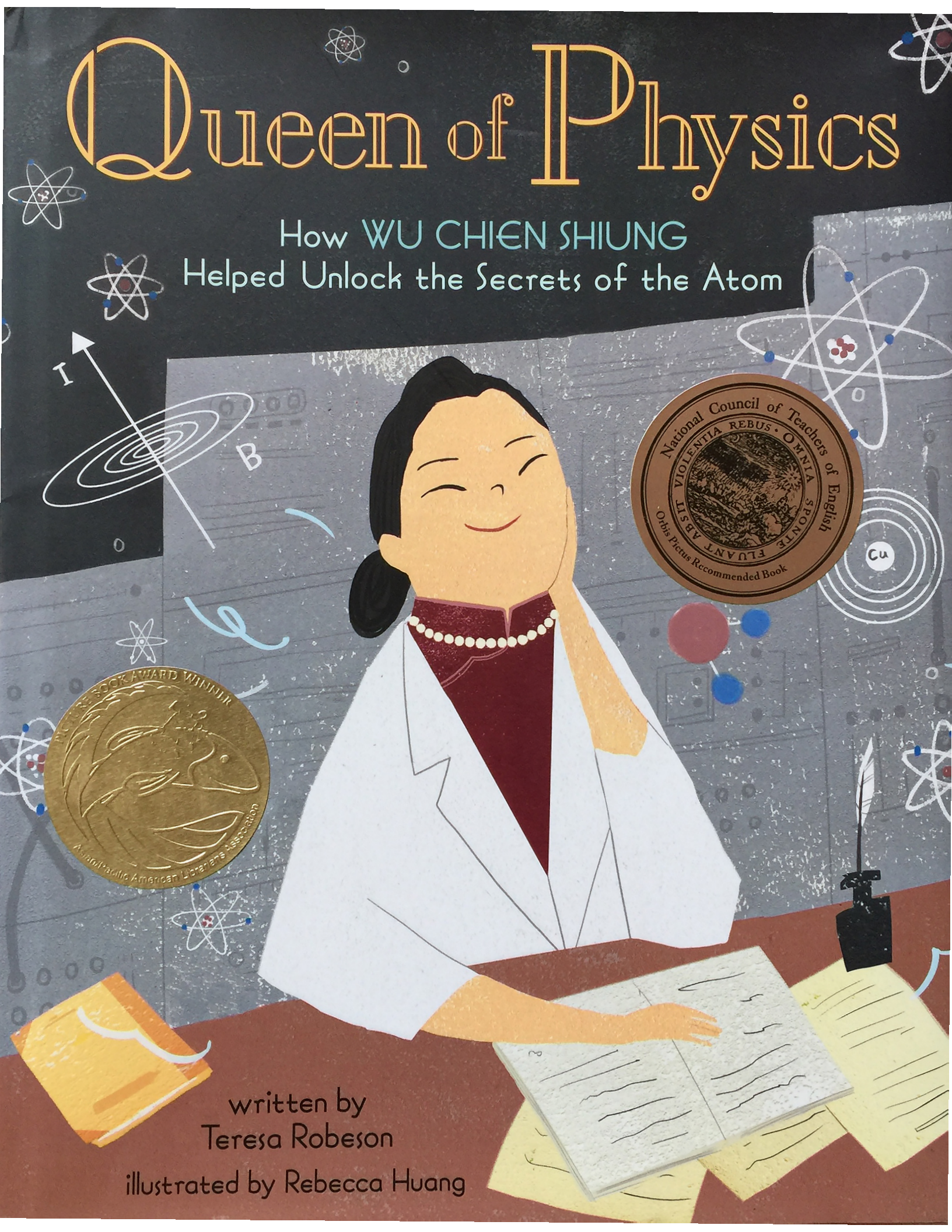
Queen of Physics

How WU CHIEN SHIUNG Helped Unlock the Secrets of the Atom



written by
Teresa Robeson

illustrated by Rebecca Huang

Teresa Robeson is the APALA Picture Book Award-winning author of QUEEN OF PHYSICS (also ILA Nonfiction PB Honor and NCTE Orbis Pictus Nonfiction Recommended Book). Other publications include TWO BICYCLES IN BEIJING and an essay in NONFICTION WRITERS DIG DEEP, edited by Melissa Stewart. Her upcoming works include a nonfiction poem in NO WORLD TOO BIG, edited by Dawson, Metcalf, and Bradley; two biographical graphic novels with Penguin Workshop, one on the Dalai Lama (2023) and the other on Bruce Lee (2024); as well as two picture books, the informational fiction CLOUDS IN SPACE: THE NEBULA STORY with MIT Kids/Candlewick (2024) and an own-culture picture book with Astra Young Readers (2024). Teresa and her family try to live a self-sufficient lifestyle on 27-acres where they've been raising chickens for twenty years and growing and processing much of their own vegetables. When not writing or washing veggies for hours on end, Teresa enjoys knitting, soap-making, sewing and doing art.

Rebecca Huang is an illustrator from Taiwan and now currently living in Bay area. She likes to play with color and shapes with mixed media. She employs printmaking and color pencil in her work, too. Rebecca's debut picture book, Bobo and the New Baby, was published by Houghton Mifflin Harcourt. She is also the illustrator of Teresa Robeson's Queen of Physics: How Wu Chien Shiung Helped Unlock the Secrets of the Atom.

ABOUT THE BOOK

When Wu Chien Shiung was born in China 100 years ago, most girls did not attend school; no one considered them as smart as boys. But her parents felt differently. Giving her a name meaning "Courageous Hero," they encouraged her love of learning and science. This engaging biography follows Wu Chien Shiung as she battles sexism and racism to become what *Newsweek* magazine called the "Queen of Physics" for her work on beta decay. Along the way, she earned the admiration of famous scientists like Enrico Fermi and Robert Oppenheimer and became the first woman hired as an instructor by Princeton University, the first woman elected President of the American Physical Society, the first scientist to have an asteroid named after her when she was still alive, and many other honors.

REVIEWS AND AWARDS

"*Wu Chien Shiung's story is remarkable—and so is the way this book does it justice.*" —Booklist *(Starred review)*

Winner - 2020 Asian/Pacific American Awards for Literature Picture Book!
An NCTE Orbis Pictus Recommended book!

OTHER RESOURCES

Visit Teresa Robeson's website to hear pronunciations of the Mandarin words in the text and to find other resources and activities. https://www.teresarobeson.com/educator-resources.html

ABOUT THE GUIDE

This guide has activities for students in grades Kindergarten through 5th. Activities and questions can and should be modified by educators to best fit the needs of their students. Common Core Standard connections are listed at the end of the guide for reference and support.
The guide was written and created by Kari Allen. Kari is an educator and author with over twenty years of classroom experience. Visit her website www.kariallenwrites.com for more information.

Discussion Questions

- Discuss the title. What do you know about physics? If she is considered the Queen of Physics, what predictions can we make about the story?
- Examine the endpapers. What do you see? What do you notice? What do you think that symbol means?
- Discuss the following quote from the second page: "In those days, girls were not sent to school, not considered as smart as boys, and certainly not encouraged to be scientists." What are you wondering? How does this make you feel? What connections or history do you know about that connects to this quotation?
- How were Chien Shiung's parents different from other parents of the time? What did they do to support their daughter? Who supports you? How do people in your life support you?
- How would you describe Chien Shiung? What kind of person do you think she was?
- How do you think Chien Shiung felt leaving home to go to a new school? How do you think she felt when she left China?
- Why did other scientists go to Chien Shiung for help?
- Chien Shiung never won a Nobel Prize. What do you think about that? What questions do you have?
- Chien Shiung's name meant "courageous hero"? Do you think that was a good name for her? How so?
- Why do you think the author wanted to tell Wu Chien Shiung's story?

WRITING PROMPTS

- Write and/or draw about something you like to learn about. (See printable.)

- Write and/or draw about a time you showed courage. (See printable.)

- Write and/or draw about what you would queen (or king or royalty) of. (See printable.)

ACTIVITIES

- *Queen of Physics* talks a lot about different kinds of sciences. Make an infographic or poster that tells about each one and how they differ and connect to mathematics. Biology, chemistry, and physics are all mentioned.

- Using found or recycled materials, make a model of an atom. Label its parts.

  Extension: Use this TED video to explore atmos even more.
  https://ed.ted.com/lessons/just-how-small-is-an-atom

- The illustrator used printmaking to make the illustrations. Experiment with printmaking. What can you create?

- Use a map to find all the places mentioned in the book:
  - Liuthe, China
  - Suzhou, China
  - Nanjing, China
  - Berkley, California
  - New York City, New York

ACTIVITIES CONTINUED

- Wu Chien Shiung was on the cover of Time magazine and on a postage stamp. What will you do to be on a magazine or postage stamp? Design your cover or stamp. (See printables.)

- Chien Shiung's name means "courageous hero". What does your name mean? Learn about the meaning behind your name and make an art piece to highlight the meaning.

- Learn about the steps of the scientific method: ask a question, make a prediction/hypothesis, test/gather data, and make a conclusion. Where in the book do you see Chien Shiung applying those steps?

Extension: Develop your own testable research question. Then use the printable Science Journal to make a hypothesis, test your question and draw a conclusion.

VOCABULARY

The following words appear in *The Queen of Physics*. The words can be used to explore etymology, and spelling patterns and to grow content knowledge.

- precise
- decay
- conducted
- distinguish
- investigate
- hypothesis
- obstacles
- exceptional

CRAFT MOVES

- How did the author tell Chien Shiung's story?
- What details did the author repeat? Why do you think she did that?
- On Teresa Robeson's website, she talks about how *The Queen of Physics* has a fairy tale structure. How did the author make Chien Shiung's story into a fairy tale?
- Examine and compare other picture book biographies with *The Queen of Physics*. What do you notice about how picture book biographies are structured?

PICTURE BOOK TEXT SET FOR THE QUEEN OF PHYSICS

Use the following books to connect to similar topics and themes. You could compare the subjects using T-charts or Venn Diagrams. You could make a list of qualities and strengths the subjects have.

- *Shark Lady: The True Story of How Eugenie Clark Became the Ocean's Most Fearless Scientist* by Jess Keating, illustrated by Marta Alvarez Miguens

- *Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* by Margot Lee Shetterly, illustrated by Laura Freeman

- *Classified: The Secret Career of Mary Golda Ross* by Traci Sorell, illustrated by Natasha Donovan

- *Grace Hopper Queen of Computer Code* written by Laurie Wallmark, illustrated by Katy Wu.

A SAMPLING OF COMMON CORE AND NEXT-GENERATION SCIENCE STANDARDS CONNECTIONS

2-PS1-3 Matter and Its Interactions
Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
5-PS1-1 Matter and Its Interactions
Develop a model to describe that matter is made of particles too small to be seen.

LANGUAGE ARTS STANDARDS

Kindergarten:

- With prompting and support, ask and answer questions about key details in a text.
- With prompting and support, identify characters, settings, and major events in a story.
- Actively engage in group reading activities with purpose and understanding.
- With prompting and support, ask and answer questions about unknown words in a text.

Second Grade:

- Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
- Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
- Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
- Write narratives in which they recount a well elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
- Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).

Fifth Grade:

- Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
- Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

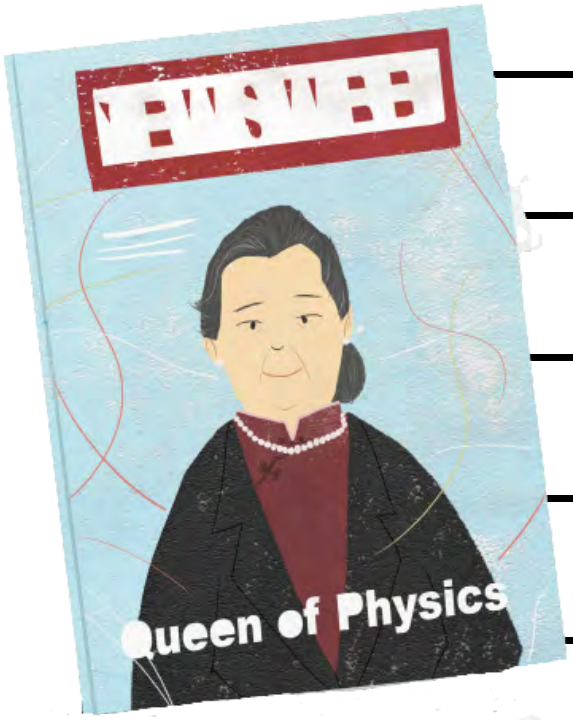
I like to learn about...

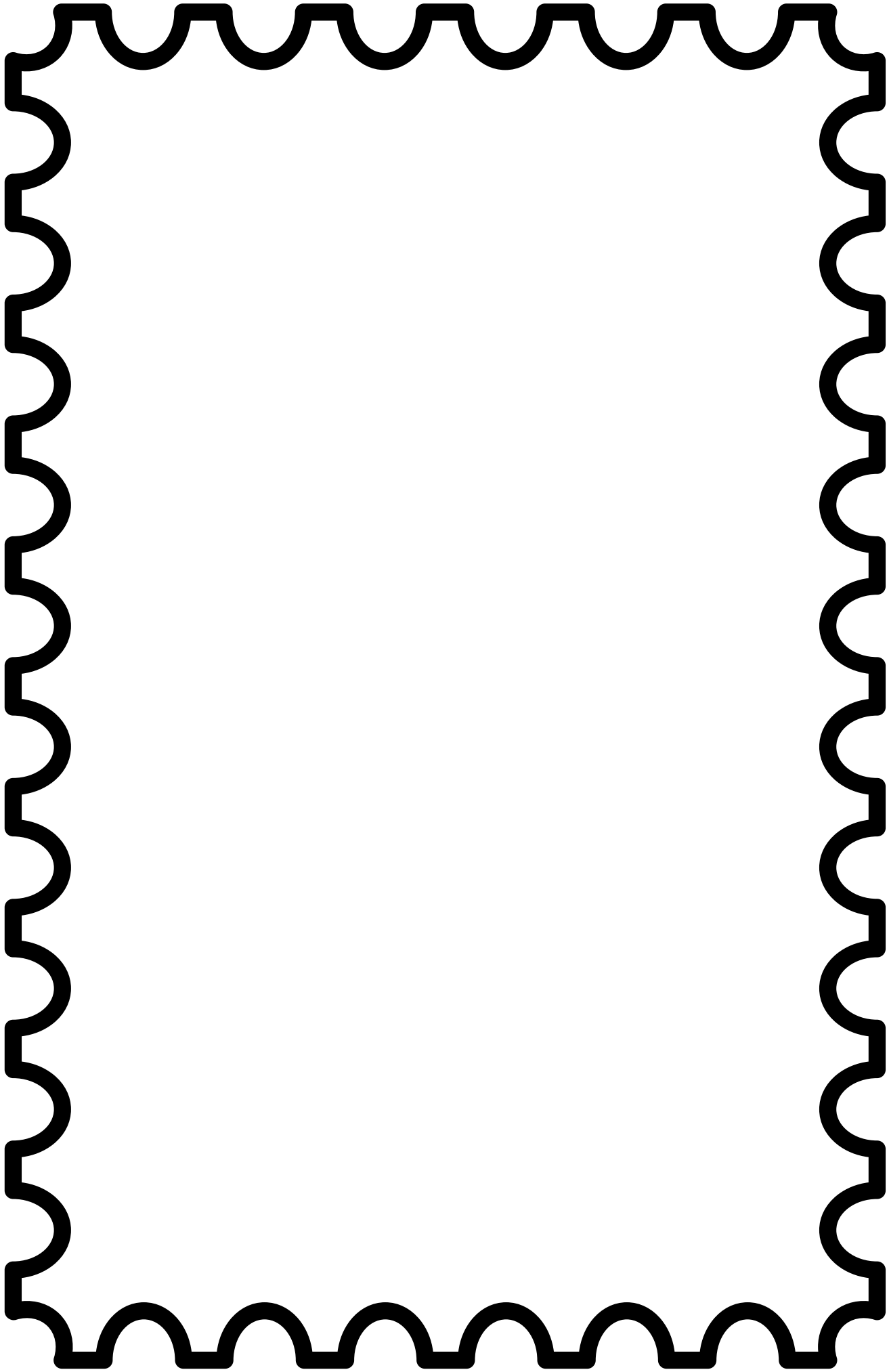
because...

I was courageous when I...

Someday I will be _____ of _____

because...





Science Journal:

My question:

My hypothesis:

My pocedure:

My Data::

My Conclusion: