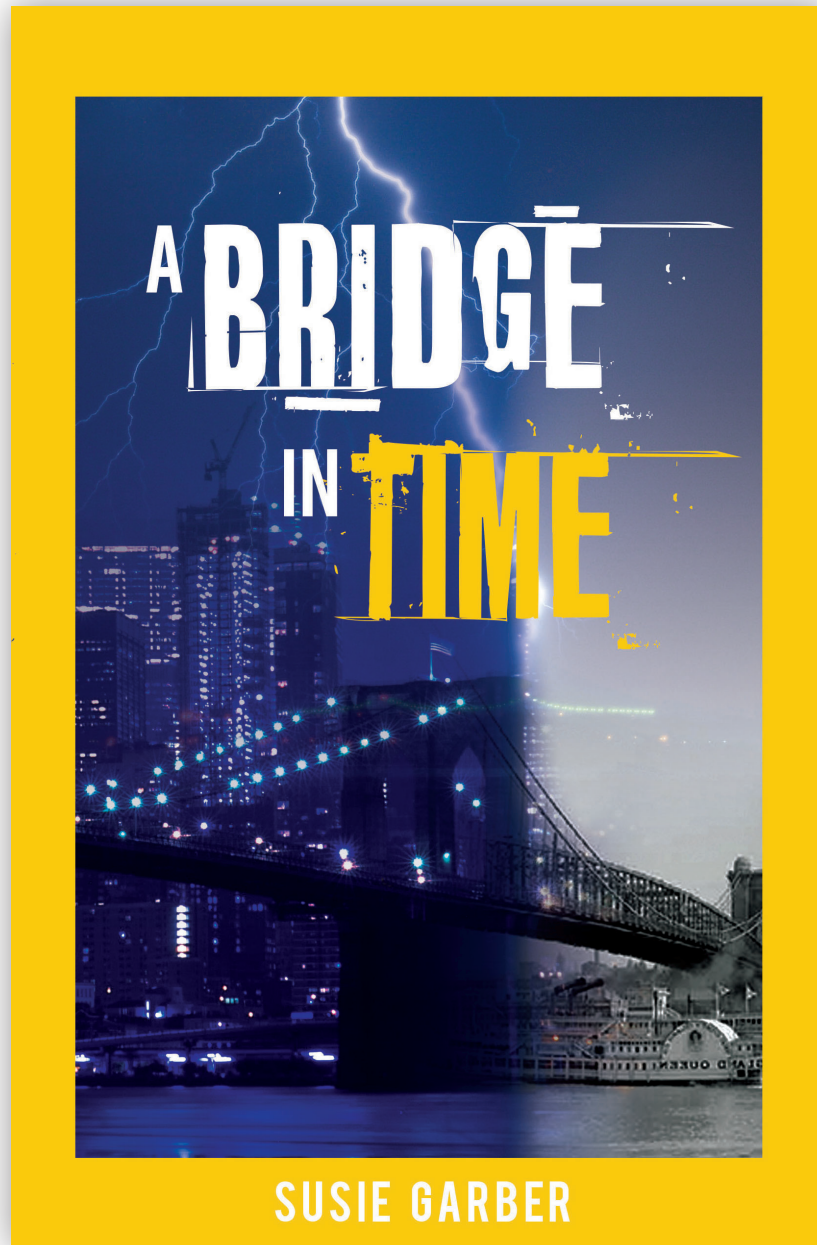


# Educator's Guide



1235 38<sup>th</sup> Street, Brooklyn, NY 11218 • 718-232-0856 • [www.menuchaclassrooms.com](http://www.menuchaclassrooms.com)



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## FOR THE TEACHER

As teachers, we want to instill a lifelong love of reading and writing in our students. The goal of this guide is to help our students' reading comprehension and language arts skills while enhancing their experience with the novel. It is written in a chapter-by-chapter format and includes a synopsis, pre-reading activities, a list of characters, vocabulary words for each chapter, questions for oral and written literary responses, and supplementary activities.

To promote active reading, students should read with Post-it notes handy. You can use the book as a shared novel with the whole class, where you read aloud some chapters and then they read silently, or you can group students by ability, and they can read with reading partners or in a small group or literature circle. Accompanying questions can be answered in pairs or in small groups or in whole-class literary discussions. Read-aloud time is a good opportunity to demonstrate a strategy you want them to practice in their reading. For example, you might say, "Let's look for foreshadowing in chapter one." Then you do a think-aloud demonstration and show how you label an example of foreshadowing with a Post-it.

Students should keep a reading notebook with their written responses, which you can use for monitoring and assessment.

The main reading strategies used in this guide are those taught in Stephanie Harvey's seminal work *Strategies That Work* — retelling, summarizing, making connections, finding the main idea, visualizing, questioning, inferring, and synthesizing. The questions and activities in this guide will help students with these strategies. Students will also learn about literary elements and literary devices like foreshadowing, similes, metaphors, personification, and onomatopoeia.

## **SYNOPSIS**

Few people know that the most important engineering work of the nineteenth century, the Brooklyn Bridge, was completed by a woman, Emily Roebling. The fascinating story of the building of the Brooklyn Bridge is woven into this historical fiction novel.

Twins Tali and Tuvie Tanz, who live in California, are sent one summer to stay with their Tante Chava, who lives near the Brooklyn Bridge. They've never met her before, and Tali is especially wary. She imagines a witchy aunt.

Tante Chava warns them not to go out on the bridge during a rainstorm, but alas, the first night they do go out on the bridge, and it starts raining. A loose plank from construction on the bridge is struck by lightning and falls on Tali. The next thing she knows, Tali finds herself in the same neighborhood, only she and Tuvie are now in the home of the Roeblings.

They meet Chana Marks, who is their great-great-great-grandmother and a good friend of Emily Roebling. She lives down the block and brings them kosher food and invites them to her house for Shabbos. The twins become close with the Roeblings — and also become part of the story of the building of the Brooklyn Bridge.

## PRE-READING ACTIVITIES

Use one or more of the following activities to introduce the novel.

1. **Predictions:** Have students preview the book by reading the title, the author, and looking at the cover image. Have they read any other books by this author? Based on the title and cover illustration, what do they think *A Bridge in Time* will be about?
2. **Building Background:** Have students read the accompanying nonfiction article about the Brooklyn Bridge. The Brooklyn Bridge was completed in 1883 by Emily Roebling, who acted as a messenger on behalf of her husband, Washington Roebling, the chief engineer. It took many years and there were many obstacles before it was completed. Have students read the accompanying nonfiction article about the Brooklyn Bridge to gain further knowledge.
3. **Genre Focus:** This book is historical fiction. Explain what that means and how the setting (time and place) is so central to a story in this genre. Historical fiction includes historical facts, events, and real people who lived during that time period. It also includes fictional characters. As students read the book, have them create a chart of characters and determine if the character is fictional or real and what role s/he plays in the story.
4. **Geography:** Have students study a map of Manhattan and see where the Brooklyn Bridge is located and how it connects Manhattan and Brooklyn.
5. **Social Studies:** Have students study the time period when the Brooklyn Bridge was being built, soon after the Civil War. In a KWL Chart, have them list what they know about that time period and what they want to learn. After reading the book, they can fill in what they learned about this time period.
6. **Predictions:** Have students create an Anticipation Guide (from *Literature-Based Reading Activities* by Hallie Kay Yopp and Ruth Helen Yopp).

**Agree    Disagree**

- |       |       |  |
|-------|-------|--|
| _____ | _____ | <b>A woman could work as an engineer on a bridge in the 1800s.</b> |
| _____ | _____ | <b>Respect for adults has changed over the years.</b>              |

7. **Opinionnaire:** Have students create an opinionnaire (from *Literature-Based Reading Activities* by Hallie Kay Yopp and Ruth Helen Yopp).

- Have you ever visited the Brooklyn Bridge? What did you notice?
- Would you want to meet a famous person from the past and learn their story firsthand? Who would that be?
- Do you think a woman should be allowed to work as an engineer on a bridge project? Do you think it was difficult for a woman to do so in the 1800s? Why?
- If you were sent to a distant relative to stay for the summer, how would you feel? What would you do to make the best of it?

## CHARACTERS

**Tali Tanz:** protagonist and narrator (*fictional*)

**Tuvie Tanz:** protagonist and twin to Tali (*fictional*)

**Fraidy:** the twins' baby sister (*fictional*)

**Ima:** Mrs. Tanz (*fictional*)

**Abba:** Mr. Tanz (*fictional*)

**Tante Chava:** the aunt who lives near the Brooklyn Bridge (*fictional*)

**Licorice:** Tante Chava's black dog (*fictional*)

**Chana Marks:** the great-great-great-grandmother of the Tanz twins (*fictional*)

**Devorah Marks:** Chana Marks's daughter and the great-great-grandmother of the Tanz twins (*fictional*)

**Emily Roebling:** wife of Washington Roebling; finished the building of the Brooklyn Bridge.

**Washington Roebling:** chief engineer of the Brooklyn Bridge

**John Roebling:** father of Washington Roebling and the person who conceived the idea of the Brooklyn Bridge

**Charles:** the Roeblings' butler (*fictional*)

**Ronnie:** young nephew of the Roeblings (*fictional*)

**Daniel Clemons:** investor in the Brooklyn Bridge (*fictional*)

**Cecily Clemons:** wife of Daniel Clemons (*fictional*)

**Lottie Clemons:** daughter of Daniel and Cecily Clemons (*fictional*)

**Evelyn:** friend of Lottie Clemons (*fictional*)

## CHARACTERS (continued)

**Blima:** friend of Lottie Clemons (*fictional*)

**Seth Low:** mayor of Brooklyn from 1881 to 1885, and mayor of New York City from 1902 to 1903

**Henry C. Murphy:** president of trustees of the Brooklyn Bridge

**General Gouverneur K. Warren:** brother of Emily Roebling

**E. F. Farrington:** chief mechanic of the Brooklyn Bridge

**Ferdinand de Lesseps:** famous for building the Suez Canal; climbed the tower of the Brooklyn Bridge at age 76

**Lloyd Haigh:** sold wire for the Brooklyn Bridge

**General Henry Slocum:** member of the board of directors of the Brooklyn Bridge

**Lloyd Aspinwall:** member of the board of directors of the Brooklyn Bridge

**Jake Halsen:** a bully and an investor in the bridge (*fictional*)

**Dun Halsen:** Jake's brother and an investor in the bridge (*fictional*)

**Miss Laurel:** schoolteacher (*fictional*)

**Francis Collingwood:** assistant engineer for the Brooklyn Bridge

**Mara:** young girl living in Mrs. Roebling's childhood home in Cold Spring, New York (*fictional*)



 **CHAPTERS 1–4**

**SYNOPSIS** The twins travel to Brooklyn for the summer to stay with Tante Chava, who lives near the Brooklyn Bridge. Despite Tante Chava’s warning not to go on the bridge when it’s raining, Tuvie and Tali take a walk on the bridge at night, and it starts raining. All of a sudden, a plank from some construction on the bridge strikes Tali. The next thing she knows, she opens her eyes and finds herself lying on a couch in a strange house. A lady wearing an old-fashioned dress is hovering over her. She finds out the lady is Emily Roebling. Tuvie tells Tali that he went a few houses down the block to Tante Chava’s house, but Tante Chava wasn’t living there. Instead he saw the lady who was in the photograph in Tante Chava’s house, Chana Marks.

### Vocabulary

**amethyst** (p. 5): A silver chain with a small **amethyst** dangled from her neck.

**abhorred** (p. 9): Ima had warned us that Tante Chava **abhorred** electronics.

**adjacent** (p. 10): Our rooms were **adjacent**.

**abacus** (p. 10): Tuvie’s room was the same as mine, but instead of a clock on his dresser, there was an **abacus**.

**illuminated** (p. 13): A flash of lightning **illuminated** the room.

**promenade** (p. 17): We walked closer and closer, until we reached the **promenade**.

### Questions

1. List two examples of foreshadowing (hints of what will happen later) the author uses in the first few chapters.
2. Find sentences that show Tali’s feelings.
3. What do you think happened to Tali and Tuvie on the bridge? Show evidence from the text.
4. Where are Tali and Tuvie at the end of chapter 3?
5. What are you wondering at this point in the story?



6. **Literary device:** The author uses a simile to compare the bridge to something. Write the words from the text and draw how you imagine it.

 **CHAPTERS 5–9**

**SYNOPSIS** Tuvie looks for a scientific explanation for what happened to him and Tali, and a way to go back to their own time.

Tuvie tells the Roeblings that he and Tali are on their own for the summer while their parents are away. Mrs. Roebling feels the kids are too young to be left on their own, and invites them to stay with her. The Marksese will bring them kosher food and be their hosts for Shabbos. Tali meets Devorah Marks, and they become friends. The frightening fact dawns on Tali that she may never see her family again.

Devorah invites Tali to her birthday party, and at the party Tali meets some of the girls in Devorah's class. Lottie is very bossy and mean. When the party ends, Devorah is not feeling well.

The twins meet Washington Roebling, and he tells them how the idea of the East River Bridge (what we now call the Brooklyn Bridge) was conceived.

### Vocabulary

**almanac** (p. 24): "I looked in the **almanac**. I found one in the library upstairs."

**engrossed** (p. 29): I found Tuvie **engrossed** in an engineering book in the Roebling Library.

**grimaced** (p. 44): He shifted in his seat and **grimaced**. "Sorry, some pain..."

**caisson** (p. 45): "Well, when I was a young man, my father sent me with my bride to Europe to study **caisson** design."

### Questions

1. How would you feel meeting your great-great-grandmother when she was a child your age? What would you want to ask her?
2. Who are the real historical people in these chapters?
3. Find a description of a character's feelings, and write the words from the text.
4. List objects and other descriptions that indicate this story takes place in the 1800s.

 **CHAPTERS 10–13**

**SYNOPSIS** Devorah is in quarantine with scarlet fever. Tuvie needs access to the almanacs in her father’s study to try to figure out when the planets will be lined up so he and Tali can try to get back to their time. They will also need a storm, and the bridge to be completed in order to attempt to go back.

Tuvie is not feeling well. Devorah recovers from scarlet fever, and Tali reveals to Devorah that she and Tuvie are from the twenty-first century.

### Vocabulary

**suspension bridge** (p. 47): “Not one of those consultants ever built a **suspension** bridge, but they all have an opinion about how it should be done.”

**the bends** (p. 48): “I pray this isn’t **the bends**. I’ve seen so many suffer from that disease!”

**decompress** (p. 52): “It sounds something like what scuba divers get if they don’t **decompress** properly.”

**leeches** (p. 59): “No, they’ll send that doctor, and he’ll use **leeches**.”

**askew** (p. 61): I pointed out my blue stitch that was slightly **askew**.

### Questions

1. Find four historical facts in these chapters.
2. Who is becoming sick with the bends, and why?
3. Why is Tali grateful that Mrs. Marks doesn’t ask her to read?
4. Did you ever have an experience where you had to read aloud and you didn’t feel comfortable? Write about it. Alternatively, did you have an experience when you enjoyed reading aloud? Explain.
5. How does Tali convince Devorah that she’s from another time period?
6. What is Devorah’s reaction to Tali’s disclosure about where and when she and Tuvie are from? Show evidence from the text.
7. Find two examples that show the respect Devorah demonstrates for her parents.
8. Find an example of an onomatopoeia (words that sound like what they mean), and explain how it helps the reader imagine the scene.

 **CHAPTERS 14–20**
**SYNOPSIS** Tuvie recovers from scarlet fever.

Tali and Tuvie have to go to the schoolteacher, Miss Laurel, to register for school. Tali is flustered when Miss Laurel asks her to read aloud, but then she is saved by a distraction. On the way home, Mrs. Roebing asks Tali why she didn't want to read aloud, but Tali doesn't feel comfortable enough to confide the reason.

Mr. Roebing is brought home from the bridge site on a stretcher. He is diagnosed with caisson disease (the bends), and he can't go back to the bridge site. Now, Emily has to decide if she can become his messenger so the bridge will get completed. Tali and Tuvie need Emily to agree. Tuvie has determined that they definitely need the bridge to be completed so they can find a way back home.

When Tali and Tuvie are in the apothecary, Tali sees Lottie accidentally break a bottle of perfume. Mrs. Clemons is about to hit Lottie, but Tali interrupts and claims she broke the bottle.

**Vocabulary**

**slates** (p. 72): "You'll need some **slates** and chalk."

**dyslexia** (p. 73): *Because I have **dyslexia** and the words won't sound right.*


**ricocheted** (p. 83): A bolt of lightning **ricocheted** off the bridge.

**anchor bars** (p. 85): "Now, Chief, in terms of the **anchor bars**—"

**apothecary** (p. 99): One day, Tuvie and I were sent on an errand to the **apothecary**.

**Questions**

1. Find a sentence in chapter 16 that demonstrates Devorah's *emunah*.
2. Find four historical facts in this chapter.

-  3. **Literary device:** Explain the simile in this sentence: "Mrs. Roebing's words floated like fragile bubbles." What does this mean?
4. Explain why Mrs. Roebing must become the messenger for her husband. Why do you think this may be particularly challenging?
5. What do you predict will happen next?

 **CHAPTERS 21–24**

**SYNOPSIS** The newspapers reflect public worry about the safety of the bridge with the chief engineer absent from the bridge site. Tuvie suggests that Mrs. Roebling present a program to reassure the public, so she plans a presentation. Jake Halsen meets them at the magic lantern show and trips Mrs. Roebling. Dun Halsen gets upset at his brother for tripping a lady, and ends up coming to watch the program. Lottie witnesses Jake Halsen’s mean action. She confides in Tali that her father does business with the Halsens, and she doesn’t like them.

Devorah enters Tali’s drawing into an annual art contest. Tali ends up telling Mrs. Roebling about her reading problem. Mrs. Roebling refers her to Chana Marks, who knows strategies to help her with this reading issue. Mrs. Clemons threatens Mrs. Roebling that she will blacken her name if Mrs. Roebling doesn’t force Mr. Roebling to resign from the bridge.

### Vocabulary

**word blindness** (p. 111): “She told me about an article she read...about **word blindness**.”


**adequate** (p. 112): Every arch must fall if its thrust is not met by **adequate** lateral support.

**lateral** (p. 112): Every arch must fall if its thrust is not met by adequate **lateral** support.

**peering** (p. 113): I saw Mrs. Roebling **peering** through the front window curtain.

**facade** (p. 116): They both knew he was feeling poorly, but they kept up this **facade**, pretending all was well.

### Questions

1. Name an antagonist (someone who opposes the main character) of the Roeblings. Give proof from the text that this person is an antagonist.
-  2. **Inference:** Why do you think Mrs. Clemons wants Mr. Roebling to resign?
3. What surprising event happens at the magic lantern show? Why do you think this happened?
4. Find a description you can imagine, and sketch it.
5. What are people worried about regarding the bridge?

 **CHAPTERS 25–27**

**SYNOPSIS** The board votes to use Haigh’s wire in the bridge even though Mr. Roebling opposes the plan. The mayor pays a visit to the Roebling home and tells Mrs. Roebling that her husband should resign from the bridge because he is not well enough to come to the bridge site. He believes it is unacceptable for a woman to be at the bridge site doing a man’s work.

Mr. Collingwood shows Mrs. Roebling that the pile of rejected wire never gets bigger. It’s possible the bad wire is being put back into the bridge.

Tali finds she can actually read a *pasuk* in *Tehillim*.

Mr. Clemons announces that there will be a vote to decide if they should keep Mr. Roebling as chief engineer. The twins are worried because they need the Roeblings to remain in charge so the bridge can be completed soon and properly.

### Vocabulary

**aesthetically** (p. 126): “Our bridge will be **aesthetically** beautiful, with a promenade for walking.”

**furtively** (p. 127): He glanced **furtively** behind him as he climbed the steps to the Clemonses’ home.

**incapacitated** (p. 129): “I have heard your husband has become **incapacitated** and that you have been going in his place.”

### Questions

1. What crime is being committed against the bridge?
2. What is the mayor’s opinion of Mrs. Roebling going to the bridge site to work? Show evidence from the text. How is this different from what a mayor would say today? Why?
3. Bring an example that shows Devorah and Tali are good friends.
4. Tali thinks about what her father always says: “Never give up hope. Hashem is always with you.” What does this saying mean to you?

 5. **Literary device:** Explain the metaphor the author uses: *The bridge is like a gift waiting to be unwrapped.*

## CHAPTERS 28–30

**SYNOPSIS** In an almanac, Tuvie discovers the time when the planets will be lined up correctly for them to try to get home, but they need the bridge to be complete by that date. Mrs. Roebeling pays a visit to Daniel Clemons, as she believes he is connected to Lloyd Haigh. She confronts him and asks him to be honest with her.

He pulls out a paper from his drawer as if he is going to hand it to her, but then he changes his mind and doesn't show it to her.

### Vocabulary

**egregious** (p. 141): "There has been an **egregious** crime committed against our bridge committee."

**vanish** (p. 142): It meant so much to the Roebblings to complete the bridge, but I saw my own dream of leaving **vanish** like a morning mist.


**disheveled** (p. 147): His pale hair was **disheveled**, and there were dark circles under his eyes.

**thwarting** (p. 147): "Why are you **thwarting** my husband?"

**russet** (p. 148): She perched on the imported European couch with its **russet** fabric design.

**exonerate** (p. 149): "I seek information to **exonerate** my husband."

### Questions

-  1. **Inference:** What do you think the connection is between Haigh and Mr. Clemons? Can you find proof for your thoughts in the text?
2. What is Mr. Clemons's dilemma?
3. Find an onomatopoeia in chapter 29. How does it add to the description?
4. Why does Tuvie say they need the bridge to be done very soon? What is the urgency here?

 **CHAPTERS 31–34**

**SYNOPSIS** Tali goes back to the Clemonses', hoping to convince Lottie to help her get the paper that proves Mr. Clemons is in cahoots with Mr. Haigh and that Mr. Roebling is totally innocent of the bad wire going into the bridge. Lottie gives Tali the keys to her father's desk. Tali sneaks into the office and finds the paper, but then she has second thoughts and doesn't take it.

Later, Lottie brings the paper to the Roeblings' house, as her father had a change of heart.

Mrs. Roebling needs time to think, as she realizes that if she reveals this paper, it will disgrace the Clemons family. She decides to take a trip to her hometown of Cold Spring to give herself time to think through what to do.

### Vocabulary

**taunting** (p. 153): All the drawers were **taunting** me.

**debilitating** (p. 163): "Due to his **debilitating** illness, I move to replace our chief engineer."

**reconvene** (p. 172): "We will take a short recess and **reconvene** after lunch."

### Questions

1. Why does Tali change her mind about taking the paper? Find the proof for your answer in the text.
2. What do you think was the right thing to do in that situation? Why?
3. How does the paper Lottie brought prove Mr. Roebling is not responsible for the faulty wire?
4. Find references to time in these chapters. How does this add to the story?
5. Why is it so important to Tali and Tuvie that the board votes to keep Mr. Roebling as chief engineer?
6. What is the result of the vote?



## CHAPTERS 35–40

**SYNOPSIS** Work on the bridge continues. Mrs. Roebing is planning the bridge opening event. The date for the planets to be lined up finally arrives, and because a storm is brewing, Tuvie tells Tali to get ready to go to the bridge that night. They stop at the Marksés' house to say goodbye to Devorah. Then they go to the bridge, and Tuvie finds the right spot. They stand there, and he pushes Tali toward an opening. She wakes up in Tante Chava's house. Tali notices her aunt has the same dimple as Devorah. It turns out her aunt's middle name is Devorah, after Devorah Marks, their ancestor. Tali's feelings toward her aunt have shifted, and she feels a connection to her. The Tanz parents come back, and when they take a stroll on the Brooklyn Bridge, to everyone's amazement, Tali is able to read the words on the plaque dedicated to Emily Roebing.

### Vocabulary


**crescendo** (p. 176): The roar of applause came to a **crescendo**, and then it melted into a quiet knock on my bedroom door.

**electrocuted** (p. 178): In this case, I supposed it was good thing, but I was worried we might both get **electrocuted** in the process.

**lingered** (p. 185): Tuvie **lingered** near Emily's plaque.

**stricken** (p. 185): "Dedicated to the memory of Emily Warren Roebing (1843–1903) whose faith and courage helped her **stricken** husband Col. Washington A. Roebing, C.E. (1837–1926) complete the construction of this bridge..."

### Questions

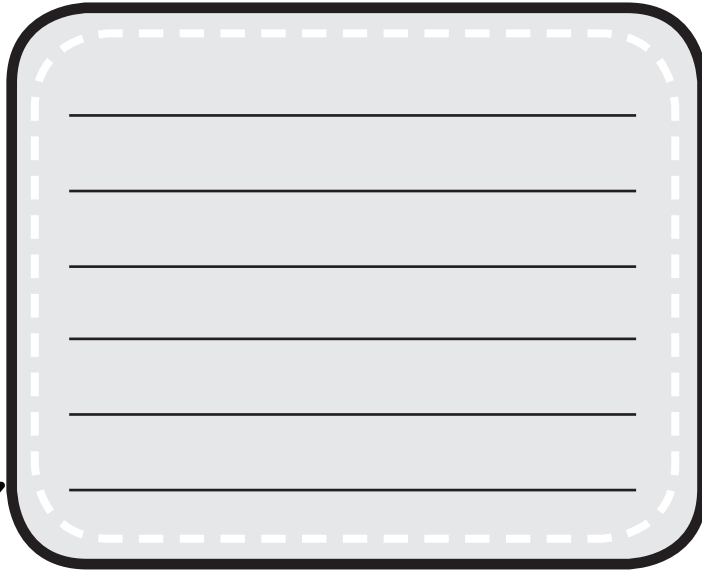
1. How has Tali changed since her visit to the past? Give some examples that prove this.
2. Do you think they really went back in time? What do you think happened? Give two proofs to back up the idea that they did go back in time or that they didn't go back in time.
-  3. **Inference:** Why do you think Tali's feelings changed toward Tante Chava?
4. Draw a scene you can imagine from these last chapters.
5. Why do you think the author included the epilogue? How does it add to the story?

## **SUPPLEMENTARY ACTIVITIES**

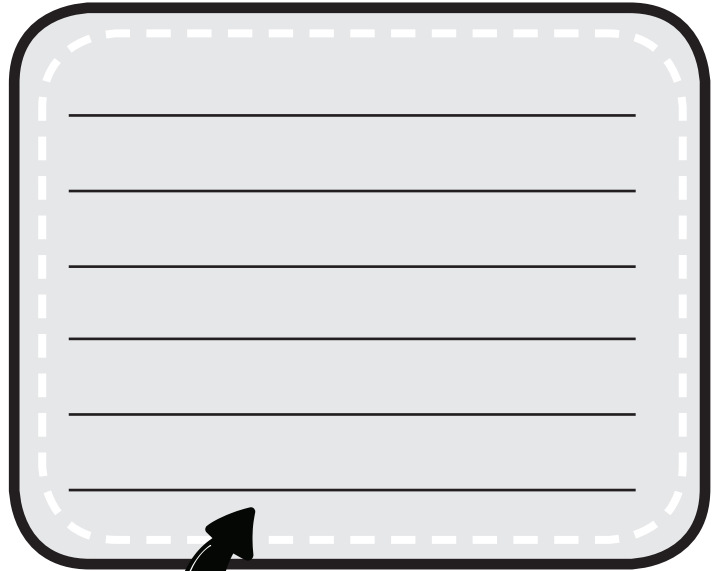
1. Write about other suspension bridges in the world, and research different designs of bridges. Create a feature article, research report, or picture book about bridges.
2. Write a poem about this book or the Brooklyn Bridge.
3. Write a letter to the author and tell her what you liked and what you're wondering.
4. Who do you admire in this book? Write that character a letter and tell him/her why you admire him/her.
5. Design a poster advertising the book. See what you can include to entice readers to read the book.
6. Write a different ending to the book.
7. Create your own book cover and a blurb about this book.
8. Write a song about the Brooklyn Bridge.

# Character Web

List a character's personality traits in the boxes around his or her name. Include evidence from the text to back up your claim.

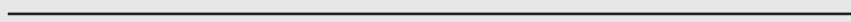


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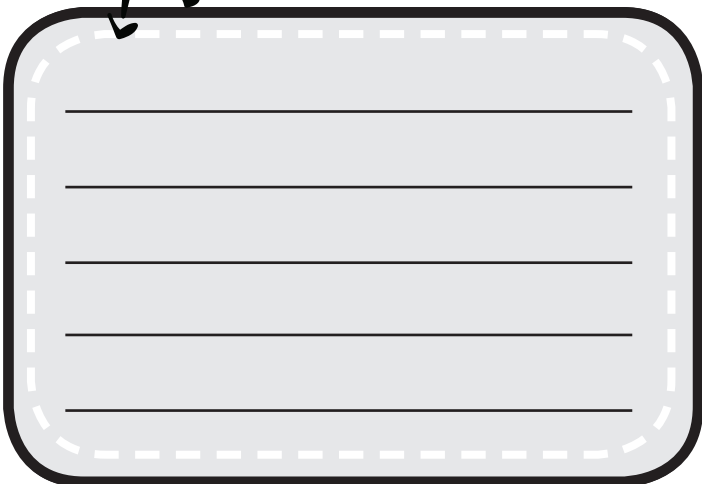
**Character's Name**



A single horizontal line for writing the character's name.



A second horizontal line for writing the character's name.



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A large, rounded rectangular box with a dashed border and five horizontal lines for writing.

# Literary Elements for the Twins' Story

Complete in full sentences.

## **Characters (Antagonists)**

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## **Setting (Time and Place)**

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## **Problem**

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## **Solution**

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## **Theme (Lessons)**

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# Literary Elements for the Roebblings' Story

Complete in full sentences.

## **Characters (Antagonists)**

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## **Setting (Time and Place)**

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## **Problem**

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## **Solution**

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## **Theme (Lessons)**

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## **NONFICTION TWIN TEXT ABOUT THE HISTORY OF THE BROOKLYN BRIDGE**

### **The Story of the Brooklyn Bridge**

Few people know that the greatest engineering feat of the nineteenth century was completed by a woman, Mrs. Emily Roebling. The story of the Brooklyn Bridge is one that must be shared. Amazingly, the Brooklyn Bridge, which elegantly connects Brooklyn to Manhattan and adorns one of the most picturesque views of the Manhattan skyline, could not have been completed without Emily Roebling.

How the Brooklyn Bridge was built is a story of vision, resilience, and raw courage. It all began one freezing-cold day in 1852, when John Roebling and his fifteen-year-old son Washington were traveling on the Fulton Ferry from Brooklyn to Manhattan. It was so cold that the ferry kept hitting huge chunks of ice. At that time, the only way to journey from Brooklyn to Manhattan was to cross the East River by ferryboat. If the river froze, people were stranded and unable to go to work. John Roebling, an engineer and bridge designer, told his son that day that he planned to build a great bridge that would cross the river from Brooklyn to Manhattan to link the two boroughs.

Over the years, people talked about building a bridge over the East River to connect Manhattan and Brooklyn. Many ideas for bridges were proposed, such as chain bridges, wire bridges, and a bridge a hundred feet wide. “New York and Brooklyn must be united,” Horace Greeley wrote in the *Tribune* in 1849.

It remained just an idea mainly because the East River is a turbulent tidal strait. It wasn’t until the winter of 1867, when it was so cold that the East River froze solid and ferryboats were stuck, that people began earnestly requesting a bridge.

In April 1867, a charter authorizing a private company to build and operate an East River bridge was passed in Albany. The charter only specified that it would be a toll bridge with a “substantial railing,” and it had to be kept well-lit all hours of the night. The projected date of completion was January 1870.

A month later, John Roebling was appointed the chief engineer. The bridge was called by various names then, including Empire Bridge, East River Bridge, Roebling Bridge, the Great Bridge, and the Brooklyn Bridge.

At that time there were many opponents to the bridge. *Scientific American* said a tunnel would be better and would cost less. Warehouse owners and others in the shipping business called it an obstruction

to navigation and a public nuisance. The New York Polytechnic Society put on a series of lectures at Cooper Union about the fallacies of the Roebling plan. Engineers expressed “grave apprehension.” The bridge was “a monumental extravagance. A wild experiment.” Nothing like this had ever been attempted. It would be the longest suspension bridge in the world at that time. It seemed like an impossible dream.

On a lovely June morning in 1869, after John Roebling finished the design plans for the bridge and his son had returned from studying about the foundation for the bridge in Europe, John Roebling and his son Washington set out to complete the preliminary measurements for the bridge. That’s when tragedy struck. John Roebling was so engrossed in studying the area that he didn’t hear a ferry approaching. Washington tried to warn his father, but it was too late. The ferry slammed into the pier and crushed John Roebling’s toes. They were badly injured, and the doctor had to amputate them. Mr. Roebling was so brave that he requested no anesthetic during the operation. Then he insisted on treating his wounds his own way, with water treatments. Sadly, John Roebling developed tetanus due to his wounds, and after a few weeks of severe suffering and seizures, he died. This left Washington Roebling, only thirty-two years old, in charge of the bridge.

Equipped with his father’s meticulous design, Washington Roebling toiled tirelessly on the bridge. His wife, Emily, encouraged him every step of the way. He worked inside the bridge foundations underwater alongside the men. One night a fire broke out. Washington Roebling worked all night to stop the blaze. At the end of the night he had successfully stopped the fire, but he collapsed and had to be carried home. This was his first attack of “the bends,” or caisson disease, a mysterious dreaded disease that befell men who worked deep underwater. Symptoms included severe joint pain, nausea, dizziness, fever, and paralysis. Men described that they felt like they’d been hit by a bullet. Everyone feared the bends.

After the foundations were completed and filled with concrete, they were lowered into the river. As the work moved deeper in the river, more men sickened. There were more cases of the bends, and two men died. At this point, Mr. Roebling had to make a decision. If he went further down, it could cost more lives and another half million dollars. Emily Roebling remarked later that her husband said it could take another year to get to bedrock. He decided that because the sand and gravel was extremely compact, he didn’t need to go lower down. “The period of time at the end of the sinking of the New York caisson was,” his wife would say, “one of intense anxiety for Colonel Roebling” (McCullough, 1982).

In late spring, Washington Roebling was struck again with an attack of the bends. He collapsed just like he had the night of the fire. Emily Roebling later wrote that on the night of the attack the doctors told her he would die before the next day.

Amazingly, he recovered, and a few days later he went back to work. The rest of the summer he suffered from attacks of the bends. By September he was too ill to go to the bridge site every day, and he stayed home two or three days a week. This was kept private. Public records said he was on

the job full-time. Emily shielded her husband from visitors and reporters.

In December, Washington Roebling was so ill that he could no longer go to the bridge site at all. Instead, he met with his assistants in his home. Only a few loyal men running the bridge knew the extent of his condition.

His symptoms increased. His vision was affected, and he worried that he was going blind. At one point, Mr. Roebling told his assistants to leave. He couldn't bear to meet with them anymore. He couldn't stand being with anyone but his wife. He dictated all of his correspondence to her. Emily remained by his side, acting as his nurse and private secretary. She drafted his dictation and read it back to him. He told her his corrections, and then she would rewrite a final draft in longhand. In this way she learned about engineering.

Doctors warned Emily to expect the worst and that there was little hope for her husband's recovery. Mr. Roebling himself feared he would die before the bridge was finished. He spent the winter writing everything that had to be done to complete it. This included detailed instructions for the cables and for assembling the components of the superstructure, all in meticulous freehand drawings and diagrams.

At this time, Emily met with Henry Murphy, president of the New York Bridge Company, to plead the case for her husband to remain at the helm of the bridge project. Mr. Murphy agreed to allow her husband to continue as chief engineer — on condition that nothing went wrong at the bridge.

The building continued under Roebling's direction because the plans were clear, and his written instructions were comprehensive. Also, his loyal assistants were dedicated to the project. Emily wrote later, "...Probably no great work was every conducted by a man who had to work under so many disadvantages" (McCullough, 1982).

On August 14, Mr. Roebling received long-awaited news by telegram. The first wire had been raised over the bridge, the first rope was in position, and another had gone across, stretching from anchorage to anchorage. This was the moment Roebling had anticipated for such a long time. Sadly, he was not able to be there in person to witness it.

The Herald described the great endless rope draped over the river as "only the engagement ring in the marriage preparations of the two cities." Everyone was talking about it. The next step was to send a man across on the rope. This would show everyone that one could cross from one city to the other.

Over one hundred people, including a twelve-year-old boy, volunteered to make the trip. Assistant engineer C. C. Martin told reporters that over a dozen of his own men were willing to forfeit a month's pay to be the first to cross the river.



In the end, E. F. Farrington, the sixty-year-old master mechanic, was chosen. Crowds gathered to see him cross. He started at the Brooklyn tower, seated in a contraption that resembled a swing, with four ropes drawn through and tied to the wire rope. People waved hats and handkerchiefs. He stood up in the swing and lifted his hat to the crowd. Then he sat down again. As he appeared to fly over the river waving his hat, a steam tug blew its whistle. Soon there was a cacophony of boat whistles as every boat on the river blew its whistle. When he reached the New York tower, he was surrounded and congratulated by a crowd of friends. Harper's Magazine called his crossing a "public triumph." Nobody who saw it would ever forget it.

As work continued, Emily grew more knowledgeable about the engineering involved in building the bridge. She composed all written communication to the bridge office from her home in Columbia Heights. Her intelligence and natural gift for mathematics enabled her to learn quickly. Trustees complained about her influence on the project. Some stated that Roebling was out of his mind. Their proof was that his wife was so involved in the engineering of the bridge.

At around this time, Farrington presented a magic lantern slide lecture series about the bridge at the Brooklyn Music Hall and at Cooper Union. The purpose was to allay people's concerns about the safety of the bridge and to report on its progress. The New York Star reported, "It is whispered among the knowing ones over the river that Mr. F.'s manuscript is in the handwriting of a clever lady, whose style and calligraphy are already familiar in the office of the Brooklyn Bridge."

Many were convinced that Emily knew as much about the technical aspects of the bridge as any of the assistant engineers. In fact, bridge officials or representatives for contractors came to the Roebling's house in Brooklyn, and Emily conducted interviews on behalf of her husband. She posed questions and answered their questions with poise and confidence that reflected her knowledge of the facts. Some were so impressed that they left convinced they had met with the chief engineer himself, and their future correspondence was addressed to Mrs. Emily Roebling.

Mr. Roebling stated that her services as his penman were vital. She kept all his records and answered much of his mail, delivered various messages or requests to the bridge offices, went on the bridge itself to check on things for him, and was his representative at occasional social functions. She was his eyes and legs.

"...Apparently just about everyone involved with the work liked her enormously and held her in great respect, regardless of his politics, profession, age, or particular feelings about her husband. That she was welcome among them, her opinions regarded seriously, was considerable testimony in itself, in a day and age when a woman's presence in or about a construction job except as a spectator on special occasions was absolutely unheard of" (McCullough, 1982).

Tragically, during a gale in December 1879, the Tay Bridge in Scotland collapsed into the sea, and seventy-five people aboard a train on the bridge were killed. Newspaper headlines read: "Will the Tay Disaster Be Repeated between New York and Brooklyn in the New Year 1880?"

This terrible disaster, plus the fact that thirteen years had passed and some new trustees were frustrated by delays on the bridge, meant trouble for the Roeblings. A new young Republican mayor, Seth Low, became an adversary to the Roeblings. He asked the chief engineer to submit a regular monthly report on work accomplished. He also demanded that Mr. Roebling project when the bridge would be completed. A motion requested that the chief engineer appear in person before the trustees at a special meeting.

Mr. Roebling did not come, and this upset the trustees. Rumors circulated that Roebling was no longer functioning and his wife had been deciding everything and directing the entire work for months. Another rumor spread that Mr. Roebling was paralyzed.

The trustees again requested he come to a meeting. This time Mr. Roebling sent a letter explaining he was too ill to attend. He said a day did not go by that he didn't work on the bridge. His assistants could refer to him at any time.

Seth Low was not satisfied. He proposed making Mr. Roebling a consulting engineer. The New York Star said it was time to get a new chief engineer. Mr. Roebling said that under no circumstances would he take any other position than chief engineer: "...Continuing to work has been with me a matter of pride and honor! You must however trust me in so far that the moment I am unable to do full justice to my duties as chief engineer, I shall give you ample warning..." (McCullough, 1982).

The following is an excerpt from a letter that Emily Roebling wrote to one of Mr. Roebling's supporters during this difficult time.

*I take the liberty of writing to express to you my heartfelt gratitude for your generous defense of Mr. Roebling at the last meeting of the Board of Trustees. Your words were a most agreeable surprise to us as we had understood you were working in full sympathy with the Mayors of the two cities and the Comptroller of New York. Mr. Roebling is very anxious for me to go to Brooklyn to convey to you... a few messages from him. Can you see me at your office some morning...? I will go to Brooklyn any day you can give me a little of your time and see you at your own house or your office just as you may prefer...*

*As you are a stranger to Mr. Roebling all that you said was doubly appreciated. There are some few old friends in the Board of Trustees who know him well and who have always stood by him in the many attacks that have been made on him in the past ten years, but we never expect such consideration and kindness from those who have never seen him (McCullough, 1982).*

The controversy came to a head when Mayor Seth Low pushed for a vote to remove Mr. Roebling as chief engineer. After a heated meeting, the vote results were 10-7 in favor of retaining Roebling.

After this, work progressed at a steady pace. Finally, on May 24, 1883, the bridge officially opened.

Below is a copy of the invitation Emily sent.

***THE EAST RIVER BRIDGE***  
*will be opened to the public*  
***Thursday, May twenty-fourth, at 2 o'clock.***  
***Col. & Mrs. Washington A. Roebling***  
***request the honor of your company***  
***after the opening ceremony until seven o'clock.***  
***110 Columbia Heights, Brooklyn***  
***r.s.v.p.***

In later years, Mr. Roebling's health improved. Emily Roebling went on to study law and become a lawyer. This was also quite unusual for a woman in the nineteenth century. She actually predeceased her husband (Weingold, 1984).

Today, when you take a stroll across the Brooklyn Bridge promenade or gaze at the graceful cables draped across this exquisitely designed bridge, stop a moment and think about Emily Roebling and the story of this magnificent engineering feat. One person, no matter whom he or she is, can make such a tremendous difference in the world!

## **What Is Caisson Disease?**

Caisson disease, a condition also known as the bends or decompression sickness, is caused by the formation of gas bubbles in the body. Human body tissues contain small amounts of the gases present in the air. At great depths underwater, because of the increased air pressure, larger amounts of gas can be held in solution in the body. However, when a diver or underwater construction worker rises to the surface of the water, the pressure decreases and the gases come out of solution. Oxygen doesn't cause a problem, because it's used up by the cells of the body. Carbon dioxide is simply exhaled. Nitrogen, on the other hand, accumulates. When the pressure decreases, the dissolved nitrogen comes out of solution, forming tiny bubbles in the blood and tissues of the body.

Nitrogen bubbles in the respiratory system can cause excessive coughing and difficulty breathing. Other symptoms include chest pain, dizziness, paralysis, unconsciousness, or blindness. In extreme cases, caisson disease can cause death. (<https://www.britannica.com/science/decompression-sickness>)

## References

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Cold Spring Historical Society

Rutgers University Roebling Collection

Brooklyn Collection - Brooklyn Public Library

**Author's note:** *This guide reflects decades of training at Columbia University Teachers College Reading and Writing Project to help bestow the gift of a love of reading on your students.*