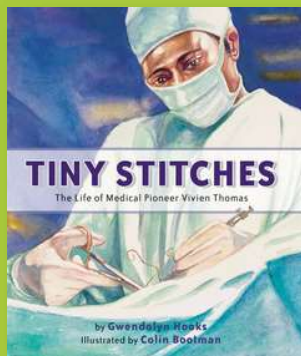


TEACHER'S GUIDE



LEE & LOW BOOKS

Tiny Stitches: The Life of Medical Pioneer Vivien Thomas

written by Gwendolyn Hooks

illustrated by Colin Bootman

About the Book

Genre: Nonfiction (biography)

***Reading Level:** Grades 4–5

Interest Level: Grades 2–8

Guided Reading Level: S

Accelerated Reader® Level/Points: 5.9/0.5

Lexile™ Measure: 920L

*Reading level based on the Spache Readability Formula

Themes: Creativity/Innovation, Inventor, Science (Medicine), Overcoming Obstacles, Working Toward a Dream, Careers (Doctor), Persistence and Grit, Discrimination and Racism, Dreams and Aspirations, United States History, Biography, African/African American Interest

SYNOPSIS

From the time he was a teenager, Vivien Thomas dreamed of going to medical school and becoming a doctor. But after the stock market crashed in 1929, Vivien lost all his savings and had to put his dream on hold. Then he heard about a job opening in a research lab at Vanderbilt University medical school under the supervision of Dr. Alfred Blalock. Vivien knew that the all-white school would never admit him as a student, but he hoped working there meant he was getting closer to his dream.

As Dr. Blalock's research assistant, Vivien Thomas learned surgical techniques and conducted experiments. When Dr. Blalock was invited to become Chief of Surgery at Johns Hopkins Hospital, he accepted with one condition: his research technician, Vivien Thomas, must be invited too.

In 1943, Vivien Thomas was asked to help Dr. Helen Taussig find a cure for children with a specific heart defect. After months of experimenting, Vivien developed a procedure that was used for the first successful open-heart surgery on a child. At Johns Hopkins this surgery was performed on a baby in 1944. The procedure and tiny needles used had been developed by Vivien Thomas, but he was not allowed to perform the operation. Instead he was asked to stand on a stool behind Dr. Blalock and give him step-by-step instructions during the operation.

Afterward, Dr. Blalock and Dr. Taussig announced their innovative new surgical technique, the Blalock-Taussig shunt. Vivien Thomas's name did not appear in the report. It took more than twenty-six years for the medical community to recognize Vivien for his groundbreaking work.

Overcoming racism and resistance from his colleagues, Vivien Thomas ultimately changed the lives of thousands of patients, and ushered in a new era of medicine—children's heart surgery.



BACKGROUND

Surgical technician: Surgical technologists, also known as surgical techs, operating room technicians, and scrubs, are members of the operating room team (http://explorehealthcareers.org/en/Career/35/Surgical_Technologist). They assist in surgical operations by preparing the operating room and setting up sterile instruments, equipment, and supplies.

The Great Depression (1929–1939) and African Americans: As the Library of Congress describes, “The problems of the Great Depression affected virtually every group of Americans (<http://www.loc.gov/teachers/classroommaterials/presentationsandactivities/presentations/timeline/depwwii/race/>). No group was harder hit than African Americans. By 1932, approximately half of black Americans were out of work.” According to the Amistad Digital Resource from Columbia University, the economic crisis of the Great Depression began with an agricultural crisis in the South and led many African Americans to migrate to the North and West (http://www.amistadresource.org/plantation_to_ghetto/the_great_depression.html). As unemployment rose in northern and western cities, African Americans were often the first to be fired to save or give jobs to whites.

From the Afterword:

Tetralogy of Fallot: “Blue babies” was once a popular term, but the scientific name for the condition is “tetralogy of Fallot.” Babies born with this condition have four heart defects. One defect is a hole in the wall that separates the right and left ventricles of the heart. This hole allows blood to flow back and forth between the left and right ventricles in an inefficient manner, and dilutes the supply of oxygen-rich blood to the body. Another defect involves the right ventricle. In blue babies’ hearts it is much larger and thicker than in normal hearts. This overworks the heart and causes the ventricle to stiffen over time. In a third defect, the aorta, the main artery leading out of the heart, is in the wrong position. This allows the aorta to receive blood from both the right and left ventricles and mixes oxygen-poor blood with oxygen-rich blood.

Vivien Thomas decided to focus on the fourth defect: the narrowing of the flap (the pulmonary valve) that separates the right ventricle of the heart from the main blood vessel leading to the lungs. This defect limits the

amount of blood that reaches the lungs. Vivien Thomas and Dr. Blalock created a shunt by joining an artery leaving the heart to an artery leading to the lungs, which allowed more blood to circulate to the lungs and then oxygenate the rest of the body.

Additional titles to teach about following your dreams:

Little Melba and Her Big Trombone written by Katheryn Russell-Brown, illustrated by Frank Morrison
<https://www.leeandlow.com/books/2854>

Shining Star: The Anna May Wong Story written by Paula Yoo, illustrated by Lin Wang
<https://www.leeandlow.com/books/2706>

Ira’s Shakespeare Dream written by Glenda Armand, illustrated by Floyd Cooper
<https://www.leeandlow.com/books/2885>

Baby Flo: Florence Mills Lights Up the Stage written by Alan Schroeder, illustrated by Cornelius Van Wright, Ying-Hwa Hu
<https://www.leeandlow.com/books/2767>

Knockin’ On Wood: Starring Peg Leg Bates by Lynne Barasch
<https://www.leeandlow.com/books/2419>

Catching the Moon: The Story of a Young Girl’s Baseball Dream written by Crystal Hubbard, illustrated by Randy DuBurke
<https://www.leeandlow.com/books/2372>

In Her Hands: The Story of Sculptor Augusta Savage written by Alan Schroeder, illustrated by JaeMe Bereal
<https://www.leeandlow.com/books/2712>

Jim Thorpe’s Bright Path written by Joseph Bruchac, illustrated by S.D. Nelson
<https://www.leeandlow.com/books/2411>

Sixteen Years in Sixteen Seconds: The Sammy Lee Story written by Paula Yoo, illustrated by Dom Lee
<https://www.leeandlow.com/books/2451>



VOCABULARY

(Language Standards, Vocabulary Acquisition & Use, Strands 4–6)

The story contains several content-specific and academic words and phrases that may be unfamiliar to students. Based on students' prior knowledge, review some or all of the vocabulary below. Encourage a variety of strategies to support students' vocabulary acquisition: look up and record word definitions from a dictionary, write the meaning of the word or phrase in their own words, draw a picture of the meaning of the word, create a specific action for each word, list synonyms and antonyms, and write a meaningful sentence that demonstrates the definition of the word.

Content Specific

operating table, sterilized, operation, carpenter, medical school, stock market, Great Depression, lab, spirometer, blood-gas manometer, chemical, shock, blood pressure, organs, heart, lungs, shock treatment, lab reports, suture, blood vessels, research technician, surgical technician, segregated, "colored," prejudice, pediatric cardiologist, heart defect, oxygen, open-heart surgery, blue babies, blue blood, red blood, defects, circulate, shunt, arteries, sutured, stitch, procedure, incision, Blalock-Taussig shunt, scientific paper, honorary doctorate degree, Instructor of Surgery

Academic

delicate, razor sharp, seamlessly, panic, heartache, scarce, tickled, fascinating, captured, dangerously, supervision, conduct, insulted, independently, interfere, bluish, investigate, pumps, blocked, determined, solution, perfected, directly, snapped, perform, grumbled, thudded, cautioned, glorious, healthy, innovative, graciously, acknowledged, honorary, appointed, pioneered

BEFORE READING

Prereading Focus Questions

(Reading Standards, Craft & Structure, Strands 4 and 5 and Integration of Knowledge & Ideas, Strand 7)

Before introducing this book to students, you may wish to develop background knowledge and promote anticipation by posing questions such as the following:

1. What is *persistence*? Share a time you demonstrated persistence and worked hard to achieve a goal. What was your goal? Who helped you achieve your goal? What challenges did you face? What advice would you give someone who has a goal he or she wants to achieve?
2. What do you know about prejudice, racism, and segregation? How do these issues affect and isolate groups of people? How do they rely on assumptions and preconceptions? Do you think racism is an issue today? Why or why not?
3. What do you know about the Great Depression (1929–1939)? How did it affect people in the United States? How did it affect African Americans?
4. What do you know about the human heart? What is its main function? Why does your heart beat? How can we take care of our hearts?

Exploring the Book

(Reading Standards, Key Ideas & Details, Strand 1, Craft & Structure, Strand 5, and Integration of Knowledge & Ideas, Strand 7)

Read and talk about the title of the book. Ask students what they think the title, *Tiny Stitches: The Life of Medical Pioneer Vivien Thomas*, means. Then ask them what and whom they think this book will most likely be about. What places or situations might be talked about in the text? What do you think might happen? What information do you think you might learn? What makes you think that?

Take students on a book walk and draw attention to the following parts of the book: front and back covers, title page, illustrations, afterword, glossary, author's sources, dedications, acknowledgments, and author and illustrator bios (on jacket back flap).



Setting a Purpose for Reading

(Reading Standards, Key Ideas & Details, Strands 1–3)

Have students read to find out:

- how Vivien Thomas became a medical pioneer and affected children’s medical treatment
- how Vivien Thomas pursued his dream to study medicine in spite of discrimination
- how Vivien Thomas and Dr. Blalock overcame their differences and worked as a team
- what Vivien Thomas taught people about persistence and determination

Encourage students to consider why the author, Gwendolyn Hooks, would want to share this story with young people.

AFTER READING

Discussion Questions

After students have read the book, use these or similar questions to generate discussion, enhance comprehension, and develop appreciation for the content. Encourage students to refer to passages and/or illustrations in the book to support their responses.

To build skills in close reading of a text, students should cite evidence with their answers.

Literal Comprehension

(Reading Standards, Key Ideas & Details, Strands 1–3 and Craft & Structure, Strand 4)

(Language Standards, Vocabulary Acquisition & Use, Strand 4)

- How does the story begin? How does the story introduce Vivien Thomas?
- What “brand-new” operation is referred to in the beginning of the story?
- How does Vivien learn carpentry? What does he do with the money he earns?
- What is Vivien’s dream?
- Why is Nashville, Tennessee, the perfect city for Vivien’s dreams to come true?
- How does Vivien lose all his money?
- What happens when the stock market crashes in 1929? What follows? How does it affect Vivien and other people in the United States?
- Why do Vivien and his father struggle to find work as carpenters?
- What is segregation?
- Why is Vivien hopeful about the job opening at Vanderbilt University?
- What does Vivien Thomas see while exploring Dr. Blalock’s lab for the first time?
- Why does Dr. Blalock offer Vivien the job?
- What types of tasks is Vivien Thomas responsible for as a research technician under Dr. Blalock’s supervision? What skills does he learn? With what is Dr. Blalock impressed?
- What is Vivien’s official job title at Vanderbilt University? Why? Why does Vivien get paid less than other research technicians?
- How does Vivien advocate for himself while working as a researcher?
- What is Dr. Blalock’s one condition before accepting the job at John Hopkins Hospital in Baltimore, Maryland, as Chief of Surgery?
- Why doesn’t Vivien Thomas want to leave Nashville? Why does he have to leave? What would probably happen to Vivien as soon as Dr. Blalock left?
- Why does it take months for Vivien and his family to find a home in Baltimore?
- Is John Hopkins more segregated than Vanderbilt? Why or why not? How does discrimination take different forms?
- Who is Dr. Helen Taussig? Why does she visit Dr. Blalock?
- What are “blue babies”? What does this term refer to? What medical condition or heart defect do blue babies have? What is the scientific name for the condition? What does Vivien discover during his research of blue babies’ hearts?



★“Beyond the crucial message of perseverance and spotlight on prejudiced attitudes that still resonate today, this middle-grade picture book illuminates the life of a little-known man...”

–*Booklist, starred review*

“Told candidly with a touch of gravitas, Vivien’s story deftly presents complex social and medical issues along with the gently insistent message of perseverance.”

–*Kirkus Reviews*

“Expressive watercolor illustrations depict [Vivien] Thomas’s dedication. . .
VERDICT An important addition for STEM or biography collections for its exceptional coverage.”

–*School Library Journal*

22. How does a healthy heart function? How does it deliver oxygenated blood to different parts of the body? What is the difference between blue blood and red blood?
23. What solution does Vivien propose for helping blue babies? What challenge does this procedure present? How does Vivien overcome this challenge?
24. What is a shunt?
25. How does Vivien’s new procedure work? How does it help oxygenated blood circulate throughout the body?
26. Why does Dr. Blalock ask Vivien Thomas to stand on a stool behind him during Eileen’s operation?
27. Why is Vivien nervous about Eileen’s operation? How is Eileen’s operation significant and groundbreaking?
28. After it is first performed, what is the innovative surgical procedure named? For what are Dr. Blalock and Dr. Taussig nominated as a result of performing this operation?
29. Who are the Old Hands Club? When does Vivien Thomas finally receive public recognition for his research and surgical talents? How does John Hopkins University honor him?

Extension/Higher Level Thinking

(Reading Standards, Key Ideas & Details, Strands 1–3, Craft & Structure, Strands 4–6, and Integration of Knowledge & Ideas, Strand 7)

1. Why does the author, Gwendolyn Hooks, begin the story with the rising action? How does this technique hook the reader?
2. How is the stock market crash of 1929 a turning point in Vivien’s life?
3. Why do banks, such as Vivien’s in Nashville, Tennessee, fail after the stock market crash of 1929? How does the stock market crash cause panic?
4. Why would schools, such as Vanderbilt University and John Hopkins University, not admit Vivien as a student? What was life like for African Americans during this time period?
5. What can you infer about Vivien’s character from his reaction to preparing an animal for shock treatment?
6. How does Dr. Blalock treat Vivien Thomas? Does Dr. Blalock respect Vivien? Why or why not?
7. Describe Dr. Blalock and Vivien Thomas’s relationship. How do they support and learn from each other? How does their mentor-mentee relationship change throughout the story?
8. How does being a person of color affect Vivien’s career? What obstacles does Vivien face because of the color of his skin?



9. What message does Vivien's job title as "janitor" send about Vanderbilt University's view of African Americans in academic roles?
10. How do other doctors at Vanderbilt feel about Vivien's research technician job? Why do they not want Vivien working independently?
11. Compare and contrast segregation in Nashville, Tennessee, to Baltimore, Maryland, during the 1930s and 1940s. How are people of color treated? What is similar? What is different?
12. How does Vivien use his surgical skills to break racial barriers? How does the hospital and operating room serve as an equalizer between Vivien and his white colleagues?
13. How does Vivien overcome the barriers and challenges he experiences? How does his perseverance and skill help him combat prejudice and segregation?
14. How is Vivien's carpentry experience beneficial to his job as a research technician? What parallels can be drawn between these two jobs?
15. How does Vivien use his ingenuity to develop the surgical procedure for the blue babies?
16. Why does Eileen's skin color turn from blue to pink? Of what is this an indication?
17. Do you think Dr. Blalock is confident in his ability to perform the new surgical procedure? Do you think Dr. Blalock could have successfully completed the surgery without Vivien Thomas's guidance? Why or why not?
18. How do you think racial discrimination affected the blue babies eligible for the Blalock-Taussig shunt procedure during the time period of the story?
19. How do you think Vivien Thomas feels when Dr. Blalock and Dr. Taussig name the surgical procedure the Blalock-Taussig shunt? Why?
20. Why doesn't Vivien Thomas receive recognition in any of the national magazines? Do you think this is fair? Why or why not? Do you think Vivien would have received recognition and praise if he were white or college educated? Why or why not?
21. How do you think Vivien feels when he is finally publicly acknowledged for his research and surgical talents? Does he feel validated? Why or why not?
22. Although Vivien never attended medical school, do you think he feels like he achieved his dream? Why or why not?
23. What message does the placement of Vivien Thomas's portrait across from Dr. Blalock's at Johns Hopkins Hospital send to viewers? Why is this significant? How does Johns Hopkins Hospital view Vivien's accomplishments?
24. Do you think Dr. Blalock would approve of the recognition Vivien Thomas receives, including the honorary doctorate degree and faculty appointment from Johns Hopkins University? Why or why not?
25. Do you think Dr. Blalock is a good person? Why or why not?
26. Read the afterword about Vivien Thomas and examine the photograph included in the back of the book. How is Vivien Thomas a medical pioneer and a trailblazer for African Americans and people of color in medicine, health, and other science careers? How might Vivien have influenced and inspired others to achieve their potential?
27. How has the Blalock-Taussig shunt helped make significant medical advances in the world today?
28. What message does this story send about the power of persistence to pursue your dreams?

Reader's Response

(Writing Standards, Text Types & Purposes, Strands 1 and 2 and Production & Distribution of Writing, Strands 4–6)
(Speaking & Listening Standards, Comprehension & Collaboration, Strand 1 and Presentation of Knowledge & Ideas, Strands 4 and 6)

Use the following questions and writing activities to help students practice active reading and personalize their responses to the book. **Suggest that students respond in reader's response journals, essays, or oral discussion.** You may also want to set aside time for students to share and discuss their written work.

1. Vivien Thomas dreams of going to medical school and becoming a doctor. What dream do you have?



What will you need to do to achieve your dream? Why is it helpful to learn about people who have worked hard to achieve their dreams? How can these stories teach or inspire us?

2. Studying and learning medicine requires hard work and dedication. Have you ever been challenged or experienced difficulty when learning something new? Describe this time and how you felt. Did you want to give up? Why or why not? What helped you stay motivated? How did you feel after you learned the new skill? What advice do you have for someone who faces challenges in achieving a goal?
3. Vivien is anxious while guiding Dr. Blalock through Eileen's operation. Have you ever been nervous or had anxiety before a performance or test of your skills or knowledge? How did you feel? How did you overcome your worries or fears? What advice do you have for someone who is anxious or nervous about an upcoming test or performance?
4. Even though he had only a high school education, Vivien develops excellent surgical skills and knowledge with Dr. Blalock's guidance and hands-on learning experiences. Do you think anyone can learn a new skill? Why or why not? What factors (internal or external) might a person need to do so? What do you think discourages people from trying or learning something new? How might we change this?
5. Racial discrimination results in the mistreatment and isolation of people based on their race and the color of their skin. Have you or someone you know ever been treated differently based on race or the color of one's skin? How did you feel experiencing this or witnessing it? How did you react? What can we do to confront this kind of discrimination?
6. Dr. Blalock and Vivien Thomas serve as mentors to each other at different points in the story. What does the word mentor mean to you? Think of someone in your life who you look to for guidance and support. How does this person support and help you? How has this person helped you overcome obstacles and challenges? What makes this person a good mentor?
7. Vivien Thomas does not receive any public recognition or acknowledgment for his work in

developing the Blalock-Taussig shunt until twenty-six years after the first blue baby operation. Have you or someone you know ever not received credit for your work? How did it make you feel? How did you react? Why is it important to acknowledge other people's work or contributions? Do you think it is sufficient to know you've done the work but still not receive credit for it? Why or why not?

ELL/ESL Teaching Activities

*(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3 and Presentation of Knowledge & Ideas, Strands 4–6)
(Language Standards, Vocabulary Acquisition & Use, Strands 4–6)*

These strategies might be helpful to use with students who are English Language Learners.

1. Assign ELL students to partner-read the story with strong English readers/speakers. Students can alternate reading between pages, repeat passages after one another, or listen to the more fluent reader.
2. Have each student write three questions about the story. Then let students pair up and discuss the answers to the questions.
3. Depending on students' level of English proficiency, after the first reading:
 - Review the illustrations in order and have students summarize what is happening on each page, first orally, then in writing.
 - Have students work in pairs to retell either the plot of the story or key details. Then ask students to write a short summary, synopsis, or opinion about what they have read.
4. Have students give a short talk about what they admire about Vivien Thomas in the story, what the author's message in the book is, or what goal or dream they have of their own.
5. The book contains several content-specific and academic words that may be unfamiliar to students. Based on students' prior knowledge, review some or all of the vocabulary. Expose English Language Learners to multiple vocabulary strategies. Have students make predictions about word meanings, look up and record word definitions from a



dictionary, write the meaning of the word or phrase in their own words, draw a picture of the meaning of the word, list synonyms and antonyms, create an action for each word, and write a meaningful sentence that demonstrates the definition of the word.

INTERDISCIPLINARY ACTIVITIES

(Introduction to the Standards, page 7: Students who are college and career ready must be able to build strong content knowledge, value evidence, and use technology and digital media strategically and capably)

Use some of the following activities to help students integrate their reading experiences with other curriculum areas. These can also be used for extension activities, for advanced readers, and for building a home-school connection

English Language Arts

(Writing Standards, Text Types & Purposes, Strands 1–3, Production & Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7–9, Range of Writing, Strand 10)

(Reading Standards, Key Ideas and Details, Strands 1–3, Craft and Structure, Strand 6, Integration of Knowledge & Ideas, Strands 7–9, Range of Reading of Text Complexity, Strand 10)

(Speaking and Listening Standards, Comprehension and Collaboration, Strands 1–2, Presentation of Knowledge and Ideas, Strands 4–6)

1. Ask students to use the Bio Cube tool (<http://www.readwritethink.org/parent-afterschool-resources/games-tools/cube-a-30180.html>) and planning sheet from [ReadWriteThink.org](http://www.readwritethink.org) to write a biography based on *Tiny Stitches: The Life of Medical Pioneer Vivien Thomas* (<https://www.leeandlow.com/books/2927>) and additional resources.
2. Have students use a chart graphic organizer to show information after they have researched different types of careers in STEM (science, technology, engineering, and math) fields. What career paths or jobs are available in each field? How are these fields related or how do they overlap? How much education or hands-on experience is needed? What types of skills are needed? How do these jobs affect or make a difference in people's lives?
3. Have students examine the lack of diversity in STEM careers and what can be done to change this with the STEM by the Numbers (<http://www.tolerance.org/lesson/stem-numbers>) and the STEM for All (<http://www.tolerance.org/lesson/stem-all>) lesson plans from Teaching Tolerance. Then have students write and present a proposal for increasing diversity representation in STEM careers. What could teachers, colleges, schools, employers, companies, the government, and/or the general public do to increase representation of diverse leaders and positions in the STEM field?
4. Encourage students to write a diary from the perspective of Vivien Thomas. Students should include multiple dates and passages as Vivien chronicles his feelings about working for Dr. Blalock as a surgical technician, moving from Vanderbilt University to John Hopkins, segregation and discrimination, and his dream of studying medicine. How does Vivien feel about his job title and salary? His research and role in developing the Blalock-Taussig shunt? The lack of recognition he receives?
5. Ask students to write a letter to Vivien Thomas from the perspective of Dr. Blalock. If Dr. Blalock were still alive today, what would he say to Vivien? How does he feel about their work and research? How does he feel about Vivien Thomas's surgical skills? Does Dr. Blalock have any regrets? Why or why not? If possible, what would he have changed and why?
6. Have students read *Little Melba and Her Big Trombone* (<https://www.leeandlow.com/books/2854>) and *Shining Star: The Anna May Wong Story* (<https://www.leeandlow.com/books/2706>). Ask students to compare and contrast each book to *Tiny Stitches: The Life of Medical Pioneer Vivien Thomas* (<https://www.leeandlow.com/books/2927>). What is the central idea of each book? How are the books connected? What themes or ideas do they share?
7. Ask students to imagine that they are going to interview the author and illustrator of *Tiny Stitches: The Life of Medical Pioneer Vivien Thomas*. Students should write a list of interview questions they would ask the author and illustrator if they were on a talk show, news show, or radio show. What



do students want to learn more about in terms of the writing process, the illustration process, inspiration or research for the story, Vivien Thomas, segregation, discrimination, careers in STEM, and so on?

Social Studies/Geography

(Reading Standards, Integration of Knowledge & Ideas, Strands 7 and 9)

(Writing Standards, Text Types & Purposes, Strands 1 and 2, Production & Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7–9)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1 and 3 and Presentation of Knowledge & Ideas, Strands 4–6)

1. Encourage students to research the Great Depression (1929–1939) and its effects on people of the United States. What caused the Great Depression? What motivated people to move to new states and cities? How did the Great Depression affect African American communities? In a graphic organizer, have students list the cause and effects of the Great Depression on Americans overall and African Americans specifically.
2. In a chart, have students list and define the following terms: *stocks, bonds, stockbroker, stock market, profit, loss, shareholder, investor, and interest*. Then have students explore the economics of the stock market with the “Wall Street for Beginners and Virtual Investing” activities from The Crash of 1929 Teacher’s Guide from PBS.org (<http://www.pbs.org/wgbh/americanexperience/features/teachers-resources/crash-teacher-resource/>).
3. Ask students to investigate other African American scientists or researchers and their contributions in health, math, and the sciences. How do these advances affect or influence people today? Explore the “Partners of the Heart-African American Medial Pioneers” resource from PBS.org for more information (http://www.pbs.org/wgbh/amex/partners/early/e_pioneers_txt.html).
4. Have students research and create an informational poster about another African American pioneer who overcame obstacles to pave the way for positive change in science, technology, engineering, or math. What did he or she do that influenced others? Why was his or her work or efforts important? What challenges or obstacles

did he or she face? What should people know about him or her? Then have students present their posters to the class.

5. In small groups, have students create a timeline illustrating major medical advances during the 19th and 20th centuries. Ask students to discuss and present their findings to the class. Why are these medical advances significant? How did earlier breakthroughs influence later advances? How does technology play a role? What surprises you about your research? How do these medical milestones affect the world today?
6. Have students learn more about African American life during the early 20th century. Make a chart with the following topics: Housing, School, Jobs, Public Accommodations. Encourage students to explore “The Segregation Era (1900–1939)” from the Library of Congress for more information (<https://www.loc.gov/exhibits/civil-rights-act/segregation-era.html>).

Science/STEM

(Reading Standards, Integration of Knowledge & Ideas, Strands 7–9 and Range of Reading & Level of Text Complexity, Strand 10)

(Writing Standards, Text Types & Purposes, Strands 1–2, Production and Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7–9)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3 and Presentation of Knowledge & Ideas, Strands 4–6)

(Language Standards, Vocabulary Acquisition and Use, Strands 4 & 6)

1. Ask students to research the heart defect, Tetralogy of Fallot (TOF). What is it? How does it develop and who is at risk? How does it affect the human heart? What are the symptoms? Provide students with a diagram of a healthy heart and another of a heart with TOF. Have students use a Venn diagram to compare and contrast a healthy, typically functioning human heart to a heart with TOF. What is similar? What is different?
2. Introduce students to the circulatory system with the “Bill Nye Blood and Circulation” video from SchoolTube (<https://www.schooltube.com/video/885d625e420247489aa3/Bill+Nye+Blood+and+Circulation>) and the “Heart and Circulatory System” video from Mayo Clinic (<http://www.mayoclinic.org/diseases-conditions/heart-disease/multimedia/circulatory-system/vid-20084745>). What



structures make up the circulatory system? What is the function of the heart? What parts make up the heart? How does the heart pump blood throughout the human body? What does blood carry to different parts of the body? What is oxygen and why is it important?

3. Have students follow the path as blood flows into and out of the heart with the illustrated Map of the Human Heart feature from NOVA (<http://ny.pbslearningmedia.org/resource/tdco2.sci.life.stru.heartmap/map-of-the-human-heart/>). What path does oxygen-poor blood follow? Where does blood pick up oxygen? What path does oxygen-rich blood follow? How is oxygen-rich blood circulated throughout the body? Then ask students to write a detailed summary explaining the path blood flows in the circulatory system.
4. Have students identify and label the different parts of the human heart using the Label the Heart's Parts worksheet from the American Heart Association (http://www.heart.org/idc/groups/heart-public/@wcm/@global/documents/downloadable/ucm_312367.pdf). Then ask students to define and represent the function of each part of the heart in a separate chart or graphic organizer. What does each part of the heart do? Why is it important?
5. Investigate how the heart pumps blood by having students watch the How Does the Heart Pump Blood video from TED-Ed (<http://ed.ted.com/lessons/how-the-heart-actually-pumps-blood-edmond-hui>). Then have students build a model with the Heart as a Pump activity from the Science Museum of Minnesota (<https://www.smm.org/heart/lessons/lesson5a.htm>).
6. Have students calculate their maximum heart rate and observe the relationship between heart rate and physical activity with the Heart Zone Math Lesson Plan from the American Heart Association (https://www.heart.org/idc/groups/heart-public/@wcm/@fc/documents/downloadable/ucm_451993.pdf). How does heart rate, or beats per minute, change with different levels of physical activity? Why does the heart rate increase? Why does it decrease? Of what does the body need more or less?

Art/Media

(Reading Standards, Integration of Knowledge & Ideas, Strands 7 and 9)

(Writing Standards, Text Types and Purposes, Strands 1 & 2, Research to Build and Present Knowledge, Strands 7–9)

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1–3, Presentation of Knowledge and Ideas, Strands 4–6)

1. In small groups, have students examine and discuss The Diversity Gap in Silicon Valley Infographic (<http://blog.leeandlow.com/2015/03/12/the-diversity-gap-in-silicon-valley/>). Where are the gaps in diversity in the tech industry? What is surprising about the data? What is not surprising? Then ask each group to research more information about racial and gender diversity in the tech industry and find a recent article to bring to their group for further discussion. What is currently being done and what can be done better to improve these numbers and increase diversity representation?
2. Have students watch the film *Partners of the Heart* from PBS (<http://www.pbs.org/wgbh/amex/partners/filmmore/index.html>) and *Something the Lord Made* (<http://www.imdb.com/title/tt0386792/>) by director Joseph Sargent. Ask students to take notes and prepare a comparative analysis of each film using a Venn diagram. What is the storyline? How does each film depict Dr. Blalock and Vivien Thomas? How are they characterized? How is the information presented? What functions do the commentaries (if any) play? How accurate is the information? Is the information based on fact or fiction? What is the overall message or theme? What in these films is similar to and different from *Tiny Stitches*?
3. In small groups, have students view photographs documenting the Great Depression and racial segregation during the 1930s and 1940s from the Race Relations in the 1930s and 1940s (<http://www.loc.gov/teachers/classroommaterials/presentationsandactivities/presentations/timeline/depwwii/race/evidence.html>) and Photographs of Signs Enforcing Racial Discrimination collections at the Library of Congress (https://www.loc.gov/rr/print/list/o85_disc.html). What powerful words and ideas are expressed? What messages do the text and images in these pictures give? What was life like? What do these photographs say about the



treatment of African American civil rights? How has life for African Americans changed? How has it stayed the same? How do you feel looking at these pictures? What questions do you have?

4. Provide students with paper, colored pencils, and additional art supplies and ask students to create a self-portrait of themselves in their future careers. What are their dreams? What do they want to be or what do they imagine themselves doing when they grow up? Why? Have each student write a brief summary of her or his self-portrait, explaining why she or he wants to pursue a specific dream and how she or he will reach the goal.

What is challenging and rewarding about the job? What was the person's major in college? How many years of college or graduate school did the person attend? What types of jobs or careers can be pursued with the degree and experience? What advice or recommendations does the person have for anyone looking to pursue a career in the field?

School-Home Connection

(Speaking & Listening Standards, Comprehension & Collaboration, Strands 1-3, Presentation of Knowledge and Ideas, Strand 4)

(Writing Standards, Text Types & Purposes, Strand 2, Production & Distribution of Writing, Strand 4, and Research to Build & Present Knowledge, Strands 7-8)

1. Have students interview a parent or guardian about what they were passionate about when they were growing up. How was this passion important, meaningful, or enjoyable? Did the person pursue a career in her or his passion? Why or why not? What advice would the person give to someone turning a passion into a career? Students should write down their interviewee's responses and be prepared to share them in class.
2. Ask students to interview a parent or guardian about someone in her or his life who was a mentor. What did the person help with? What guidance or support did the person provide? What did the parent or guardian admire about the person? What makes someone a good mentor?
3. Encourage students to ask a parent or guardian to describe a time he or she experienced discrimination or witnessed discrimination toward someone else in the workplace. How did the experience make the person feel? What did the person do, if anything? What positive changes has the person seen throughout the years or hopes to see in the future?
4. If possible, have students interview someone in a STEM job or career. What is the person's job or position? What are his or her main responsibilities?

Awards and honors for *Tiny Stitches*:

Eureka! Honor Award (Silver), California Reading Association

Top Ten Science and Health Books for Youth, Booklist

Lasting Connection Title, Book Links

NAACP Image Award Nominee, NAACP



ABOUT THE AUTHOR

Gwendolyn Hooks was born in Savannah, Georgia. Thanks to her Air Force dad, she also lived in Texas and Washington in the United States, and Italy. Her first stop in every new city was the local library where she got her new library card. After teaching middle school math, Hooks decided to follow her passion to write books for children. Since then she has written several popular early readers for Stone Arch Books (Capstone), Just for You! (Scholastic), and Bebop Books (Lee & Low Books). Hooks lives in Oklahoma City, Oklahoma, with her husband. Visit her online at gwendolynhooks.com.

ABOUT THE ILLUSTRATOR

Colin Bootman has illustrated numerous award-winning books for children, including *Almost to Freedom*, a Coretta Scott King Illustrator Award Honor Book, and Lee & Low's New Voices Award-winner *Love Twelve Miles Long*. Born in the Caribbean, Bootman grew up in Trinidad and the United States. His artwork realistically and engagingly captures the rich nuances in historical and contemporary stories, with a special focus on portraying the African American experience. In addition to creating illustrations for children's books, textbooks, and periodicals, Bootman enjoys teaching students and young artists. He lives with his family in Trinidad. Visit him online at colinbootman.net.

ABOUT LEE & LOW BOOKS

LEE & LOW BOOKS is the largest children's book publisher specializing in diversity and multiculturalism. Our motto, "about everyone, for everyone," is as urgent today as it was when we started in 1991. It is the company's goal to meet the need for stories that children of color can identify with and that all children can enjoy. The right book can foster empathy, dispel stereotypes, prompt discussion about race and ethnicity, and inspire children to imagine not only a world that includes them, but also a world where they are the heroes of their own stories. Discover more at leeandlow.com.

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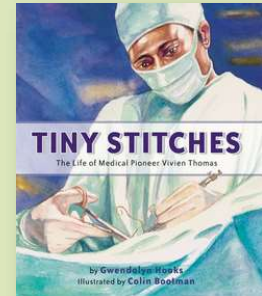
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*Reading level based on the Spache Readability Formula

Interest Level: Grades 2–8

Guided Reading Level: S

Accelerated Reader® Level/Points: 5.9/0.5

Lexile™ Measure: 920L

THEMES: Creativity/Innovation, Inventor, Science (Medicine), Overcoming Obstacles, Working Toward a Dream, Careers (Doctor), Persistence and Grit, Discrimination and Racism, Dreams and Aspirations, United States History, Biography, African/African American Interest

RESOURCES ON THE WEB:

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All guided reading level placements may vary and are subject to revision. Teachers may adjust the assigned levels in accordance with their own evaluations.