

**“It also made the case for why a space program - and its enormous price tag - was in the interest of every American, offering four arguments... national defense and global prestige, of course, ... an unprecedented opportunity to expand the body of human knowledge about the universe, ... and their longing to know what lay beyond the confines of their own small world.”**

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

*Before John Glenn orbited Earth or Neil Armstrong walked on the Moon, a group of dedicated female mathematicians known as “human computers” used pencils, slide rules, and adding machines to calculate the numbers that would launch rockets, and astronauts, into space.*

*Among these problem-solvers were a group of exceptionally talented African American women, some of the brightest minds of their generation.*

*Starting in World War II and moving through to the Cold War, the Civil Rights Movement, and the Space Race, Hidden Figures follows the interwoven accounts of Dorothy Vaughan, Mary Jackson, Katherine Johnson, and Christine Darden, four African American women who participated in some of NASA’s greatest successes. It chronicles their careers over nearly three decades as they faced challenges, forged alliances, and used their intellect to change their own lives and their country’s future.*

**While this novel’s historical perspective is captivating, both elevated vocabulary and attention to detail can prove challenging for readers. Below, you will find both the summer reading assignment as well as support materials to aid in comprehension and discussion.**

## **Summer Assignment for Incoming 6th Grade**

**The book and all assignments must be brought in, or sent to Mrs. Jordan [marisa.jordan@sfxphx.org](mailto:marisa.jordan@sfxphx.org) by the first day of school.**

Hidden Figures by Margot Lee Shetterly - Read the book in full and watch the film. (Please note: You may read the young reader's version of the book. The questions for this version are below, after the non-young reader's edition questions.)

**Before reading** - look up and be familiar with the following terms and ideas:

1. Segregation: What is it? What did it look like in the United States in the 1950s?
  2. Space Race: What is it? Why was it important to the United States?
  3. Social Mobility: In your own words, what does this mean?
  4. Civil Rights Movement: What is this and who are key figures?
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**\*\* See rubrics for each assignment at the end of the packet.**

### **1.) Guided Reading Chapter Questions:**

After reading each chapter, answer the guided reading questions below in complete sentences to help you summarize the important points in that chapter. You should also include one sentence giving your personal response to the details in that chapter. It's best to answer the questions after you read each chapter while the plot details are fresh in your mind. **Complete all responses on one document (Google Docs or hand written) titled: Guided Reading Chapter Summaries.**

### **2. Important Quotes:**

A) Find and write down five quotes (with page numbers) that you find important or interesting as you read. Explain why you chose them in complete sentences.

B) Write down a list of all major characters, and include two direct quotes (with page numbers) that shows who each character really is. Describe in writing what inferences you can make about the character based on the quotes given.

**Complete all responses on one document (Google Docs or hand written) titled: Important Quotes.**

### **3. Vocabulary:**

As you read, mark new vocabulary. Try to determine the meaning of unknown words from the context; otherwise, look them up. **For each chapter, write 3 vocabulary words and their definitions on a sticky note. Use each word in a sentence. Place the sticky note at the**

**beginning of each chapter. Bring book to school.**

**Guided Reading Chapter Questions:**

**(Below are all the questions for the “adult”, non-young reader’s version of the book that some may be choosing to read.)**

Chapter 1: A Door Opens

1. What are some reasons for wanting more mathematicians at Langley? 2. Who is A. Philip Randolph? How does he help build the workforce at Langley?

Chapter 2: Mobilization

1. Describe Dorothy Vaughan: What is she like? What do you learn of her background? 2. What kinds of employment were available to African American women at this time? 3. Why is the opportunity for a job at Langley so unique to Dorothy? 4. In her application, Dorothy said she could be ready to accept employment at Langley within 48 hours. Why do you think she makes that claim?

Chapter 3: Past is Prologue

1. How did Dorothy handle the balance between her family life and work aspirations? 2. What does this job mean for Dorothy in terms of social mobility? 3. From what we know so far, in what ways do Dorothy and Katherine’s experiences mirror each other? In what ways are they different?

Chapter 4: The Double V

1. What is life in Newport News like for Dorothy? 2. How does the civil rights movement take shape during this time period? 3. To what does the chapter title, the double V, refer to?

Chapter 5: Manifest Destiny

1. Are the women who become “girl computers” held to a higher standard? Or do they hold themselves to one? Why or why not? 2. Why does Miriam Mann remove the cafeteria sign? What does her act of defiance represent? 3. How were Malcolm MacLean and Henry Reid supportive of their new colleagues?

Chapter 6: War Birds

1. To whom does the phrase “tank Yanks” refer? 2. Why did locals think of Langley employees as “more than a little peculiar”? 3. What is the Reynolds number? How was Dorothy able to learn about it? How does the Reynolds number help work at Langley?

Chapter 7: The Duration

1. What makes Newsome Park an attractive place for Dorothy to live? How does it differ from Newport News? 2. How did the end of the war and V-J Day change working conditions in the U.S.? What did it mean for women, in particular?

Chapter 8: Those Who Move Forward

1. Describe Katherine Goble: What is she like? How are she and Katherine similar? 2. What are the circumstances leading to Katherine’s enrollment at West Virginia University? What was her time at West

Virginia like?

#### Chapter 9: Breaking Barriers

1. Is it surprising to learn that on the east side of Langley's campus white laboratory staff didn't know an all-black computing group existed? Why or why not? 2. Who is Blanche Sponsler? Why does she leave Langley? How does Blanche's story highlight the pressure these women are under?

#### Chapter 10: Home by the Sea

1. Describe Mary Jackson: What do we learn about her background? How is she similar to Dorothy Vaughan and Katherine Goble? 2. How does Mary embody and enact her family's motto of "sharing and caring"?

#### Chapter 11: The Area Rule

1. What event prompted Mary to accept an offer to work with Kaz Czarnecki? 2. What kind of disagreement did Mary and John Becker have? Do you think it is a moment that Mary will use as motivation in the future? 3. What is the Area Rule? How did it impact everyday aviation?

#### Chapter 12: Serendipity

1. How did Katherine Goble get her job at Langley? 2. What happened when Katherine sits down to wait to meet her new boss? 3. How does integration happen at Langley?

#### Chapter 13: Turbulence

1. What kind of research does the Maneuver Loads Branch do? 2. Katherine's first assignment was to investigate the crash of a small Piper propeller plane. What is learned as a result of her contribution? 3. What tragedy reshapes Katherine's family? How does it change it?

#### Chapter 14: Angle of Attack

1. How did the machines affect female mathematicians? 2. How was the fight for equality affecting education? 3. In what ways is Mary's transition to engineer significant?

#### Chapter 15: Young, Gifted, and Black

1. Who is Christine Mann? How are events of the civil rights movement impacting her?

#### Chapter 16: What a Difference a Day Makes

1. How does Sputnik create interest in U.S. participation in the space race? 2. How does NACA become NASA? Why is it necessary and what is the result for employees? 3. What kind of technological advancements occur as this space race begins to heat up?

#### Chapter 17: Outer Space

1. How does the nature of Katherine's work change as her department shifts to space? 2. Why does Katherine want to go to the editorial meetings?

#### Chapter 18: With All Deliberate Speed

1. What was the selection criteria for picking astronauts for missions? Who were selected? 2. What kind of work did Katherine do, and how did it fit in the space race? 3. What is the name of Katherine's report

for NASA? Why is it so significant for both her and the department?

#### Chapter 19: Model Behavior

1. What did Mary Jackson and her son, Levi, build together? Why is this important? 2. How does Mary make female participation in engineering and the sciences visible to school-age young women? Why is her work as a role model important? 3. After winning the derby, what does Levi tell reporters? Why is his comment significant?

#### Chapter 20: Degrees of Freedom

1. How does Hampton Institute get involved in the civil rights movement? 2. What challenge did President Kennedy give to the space program? How do they receive this challenge?

#### Chapter 21: Out of the Past, the Future

1. Who is the astronaut chosen by NASA for manned space flight? 2. How is the Soviet Union still pulling ahead in the space race? 3. Who were the other West Computers that played a part in Glenn's flight? How did they play a part in it? 4. What was Glenn's experience in Friendship 7? Do you consider the mission successful?

#### Chapter 22: America is for Everybody

1. In what ways was the March on Washington for Jobs and Freedom significant? 2. How did Christine Darden get to NASA? 3. How do the astronauts feel about the risks they're taking?

#### Chapter 23: To Boldly Go

1. Where did Katherine watch the moon landing from? Why is the location and people she was with significant? Were you surprised to learn that's where she was? 2. Why did some people think the space program was a waste of money? Do you agree with their argument? 3. How is the actress Nichelle Nichols talked into staying in her role on Star Trek? Why is that role significant to African Americans at this time?

### Hidden Figures Young Reader's Edition Questions

#### Chapter 1: Setting the Scene

1. What was the purpose of NACA?
2. Describe the accomplishments of the four women.
3. What prevented African Americans from being treated equally and being able to vote?
4. What were some of the effects of African Americans not being able to vote?

#### Chapter 2: A Door Opens

1. Why was NACA looking for women?
2. Why did the president challenge the nation to increase the production of airplanes?
3. In what ways were the women hired as mathematicians treated differently than the men?
4. How has the use of the word "computers" changed?

### Chapter 3: Mobilization

1. Describe Dorothy Vaughan's childhood and educational career.
2. What assumption did Dorothy make about the bulletin looking for women to fill mathematical jobs?
3. Why did she make that assumption?
4. Describe the different types of jobs African Americans could have.
5. Which jobs were typical for African Americans to have?

### Chapter 4: A New Beginning

1. What was Dorothy's teaching job like?
2. What sacrifice did Dorothy have to make when she accepted the job offer?
3. How did Dorothy feel as she left her home?

### Chapter 5: The Double V

1. How did the war change the role of women?
2. What problem was caused by the amount of newcomers in the area?
3. How was it solved?
4. What were the bus laws?
5. What were the consequences for breaking the laws?
6. Do you think these laws were fair? Why?
7. How did many African Americans feel about the US trying to help people in other countries gain freedom?
8. Do you think African Americans were justified in feeling this way?
9. What does Double VV stand for?

### Chapter 6: The "Colored" Computers

1. Describe the room the West Computers worked in and the kind of work they did.
2. In your opinion, was taking the sign down worth the risk of losing the job?
3. How did Malcolm MacLean's ideas differ from other whites?
4. How did the women support each other?

### Chapter 7: War Birds

1. Why was the Langley employees work a secret?
2. Was it hard for them to keep the secret? Why?

3. Testing the airplanes was dangerous. What did they do to prevent them from being in danger when they wanted to test the planes?
5. Why was the collection of data important?
6. Explain what the quote in the column from Air Scoop means.

#### Chapter 8: The Duration

1. What were the effects of the war ending?
2. Why was Dorothy's decision to commit to the lease on her apartment a risk?
3. What helped Dorothy and her children adjust to life in Newport News?

#### Chapter 9: Breaking Barriers

1. What details show that the end of the war did not destroy the economy of the Hampton Roads area?
2. What barriers did the female computers that worked with the experiment at Mojave Desert break?
3. What barriers did Dorothy Hoover and Dorothy Vaughn break?

#### Chapter 10: No Limits

1. Describe Mary Jackson's childhood and educational background.
2. Who was the United States in competition with as it relates to "ruling the skies"?
2. What actions by NACA resulted from this competition?
3. In what ways did the African American women at Langley fight discrimination?

#### Chapter 11: The Area Rule

1. How was Mary treated when she was sent to the East Side?
2. Why did it seem that Mary's calculations were wrong?
3. How did Mary react after she was told that her calculations were wrong?
4. What does this say about her ability and character?

#### Chapter 12: An Exceptional Mind

1. Describe Katherine Goble's childhood and educational background.
2. What important task was Katherine asked to be apart of?
2. Why did her principal give her books?
3. Why did black mathematicians make a special effort to be well-dressed, well-spoken, patriotic, and upright?

### Chapter 13: Turbulence

1. What detail shows that Katherine was competent and good at her job?
2. What important discovery did Katherine help make? Why is it so important?
3. What changes occurred in Katherine's personal life?
4. How did it affect her and her children?

### Chapter 14: Progress

1. How did the new machines change the production of research?
2. Why did Dorothy Vaughan encourage the women in her group to take the classes in computer programming?
3. What obstacles did Mary Jackson face as she tried to enroll in engineering courses?
4. Compare the challenges African Americans faced at Langley with the challenges African Americans faced in the country.

### Chapter 15: Young, Gifted, and Black

1. What is meant by the term "space race"?
2. In what ways were the Russians winning?
3. What argument did the Chicago Defender have about Russian education vs US education?
4. What was the ruling in the Brown vs Board of Education case?
5. What other incidents influenced the ruling?
6. Describe Christine Mann's educational background.

### Chapter 16: What A Difference A Day Makes

1. What changes were made when NACA became NASA?
2. Why did the West Computing office close?

### Chapter 17: Writing the Textbook on Space

1. Describe the literature review process. What does a place at the table refer to in this section?
3. How did Katherine's persistence pay off?

### Chapter 18: With All Deliberate Speed

1. How did the Supreme Court's Decision affect Virginia schools?
2. What was the goal of the Project Mercury?
3. What role did Katherine play in the Project Mercury?

4. What did she accomplish?

#### Chapter 19: Model Behavior

1. In what other way did Mary use her skills and talents?

2. Why do you think most African American boys disqualified themselves from competing?

3. From whom did Levi Jackson receive support?

4. In what ways was he supported?

5. What does cracking a hole in the wall symbolize?

#### Chapter 20: Degrees of Freedom

1. What event caused the spread of peaceful protests?

2. Did going to prison stop the protesters? Why?

2. How had computing changed since Dorothy first started at Langley?

3. What was another challenge they engineers faced besides building the spacecraft?

4. Why was this important?

5. What was President Kennedy's new goal for the country?

#### Chapter 21: Out of the Past, The Future

1. How did John Glenn prepare for the first orbital flight?

2. Why did John Glenn choose Katherine to check the numbers? What can you infer from his request?

4. How was the successful flight celebrated?

#### Chapter 22: America is for Everybody

1. What's one of the reasons few African Americans applied for science and engineering positions at Langley?

2. What evidence shows that Katherine, Dorothy, and Mary inspired other women?

3. Explain what happened to Apollo 1.

#### Chapter 23

1. Why did some people oppose the Apollo 11 Mission? What's your opinion?

2. Explain Neil Armstrong's statement, "That's one small step for man, one giant leap for mankind."

3. Why is this book titled Hidden Figures? 4. Why is it important that people know the legacy of these women?

**Hidden Figures Summer Reading Rubric**

**1.Guided Reading Chapter Questions**

| CATEGORY  | 3   | 2   | 1   |
|-----------|---|---|---|
| Responses | Student completed all chapter responses in complete sentences with <u>full detail</u> reflecting a <b>strong</b> effort in writing and comprehension of text. | Student completed all chapter responses in complete sentences with <u>sufficient detail</u> reflecting a <b>good</b> effort in writing and comprehension of text. | Student completed all chapter responses in complete sentences with <u>partial detail</u> reflecting <b>below average</b> effort in writing and comprehension of text. |
| Grammar   | Zero to few punctuation or grammar errors.  | Several punctuation or grammar errors.  | Many punctuation or grammar errors.   |
| Spelling  | Zero to few spelling errors.  | Several spelling errors.  | Many spelling errors.   |

**2.Important Quotes**

| CATEGORY  | 3   | 2   | 1   |
|-----------|---|---|---|
| Responses | Student completed both sections of the Important Quotes section with <u>full detail</u> showing a <b>strong</b> effort in writing and selection of quotes/reflection of characters. | Student completed both sections of the Important Quotes section with <u>sufficient detail</u> showing a <b>good</b> effort in writing and selection of quotes/reflection of characters. | Student completed both sections of the Important Quotes section with <u>partial detail</u> showing a <b>below average</b> effort in writing and selection of quotes/reflection of characters. |
| Grammar   | Zero to few punctuation or grammar errors.  | Several punctuation or grammar errors.  | Many punctuation or grammar errors.   |
| Spelling  | Zero to few spelling errors.  | Several spelling errors.  | Many spelling errors.   |

**3. Vocabulary**

| CATEGORY  | 3  | 2  | 1  |
|-----------|--|--|--|
| Responses | Student completed all Vocabulary assignment criteria with <u>full detail</u> reflecting a <b>strong</b> effort in writing and comprehension of chosen words. | Student completed all Vocabulary assignment criteria with <u>sufficient detail</u> reflecting a <b>good</b> effort in writing and comprehension of chosen words. | Student completed all Vocabulary assignment criteria with <u>partial detail</u> reflecting a <b>below average</b> effort in writing and comprehension of chosen words. |
| Grammar   | Zero to few punctuation or grammar errors.   | Several punctuation or grammar errors.   | Many punctuation or grammar errors.  |
| Spelling  | Zero to few spelling errors.   | Several spelling errors.   | Many spelling errors.  |

Extensions and Additional Resources:

➤ *Women of Hidden Figures:*

<http://www.biography.com/news/hidden-figures-movie-real-women>

➤ Space Travel Timeline:

<http://www.nationalgeographic.com/125/timelines/space-exploration/>

➤ Audiobook via Audible (Audible provides a 30-day free trial or the audiobook can be purchased . Students can use this in conjunction with reading the physical text for auditory support.)

<https://www.audible.com/pd/History/Hidden-Figures-The-Untold-Story-of-the-African-American-Women-Who-Helped-Win-the-Space-Race-Audiobook/B01IRFZ6KS>