

Name: \_\_\_\_\_ Class: \_\_\_\_\_

## Who Is Katherine Johnson?

By NASA  
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*Katherine Johnson (1918- ) is an African American physicist and mathematician who worked at NASA during the early years of the space program. In this biography, the NASA Science Team describes Johnson's early life and her time working on their space missions. As you read, take notes on the challenges Johnson faced along her career path.*

- [1] Katherine Johnson is an African-American mathematician who worked for NASA from 1953 until 1986. She was a human computer. In a time when minorities held very few jobs in mathematics and science, Johnson was a trailblazer. Her work in calculating the paths for spaceships to travel was monumental<sup>1</sup> in helping NASA successfully put an American in orbit around Earth. Then her work helped to land astronauts on the moon.

### What Was Katherine Johnson's Early Life Like?

Katherine Johnson was born in 1918 in White Sulphur Springs, West Virginia. As a very young girl, she loved to count things. She counted everything, from the number of steps she took to get to the road to the number of forks and plates she washed when doing the dishes.

Johnson was born with a love for mathematics. At a young age, she was very eager to go to school. Now in her 90s, Johnson can vividly<sup>2</sup> remember watching her older siblings go to school, wishing so much that she could go with them. When Johnson finally did start school, she so excelled that by age 10, she was in high school. By age 15, she'd started college!



*"NASA research mathematician Katherine Johnson is photographed at her desk at Langley Research Center in 1966" by NASA is in the public domain.*

1. **Monumental (adjective):** great in importance, extent, or size  
2. **Vivid (adjective):** producing strong or intense mental images

## What Did She Study in College?

At West Virginia State College, Johnson became immersed<sup>3</sup> in the math program. She loved being surrounded by smart people, she said, and knew all of the professors and students on campus. One of her math professors, the renowned Dr. William W. Schiefflin Claytor, recognized Johnson's bright and inquisitive<sup>4</sup> mind. "You'd make a great research mathematician," he told her. (A research mathematician does many things, one of which is solving large math problems.) Then Claytor helped her become one.

- [5] Johnson said, "Many professors tell you that you'd be good at this or that, but they don't always help you with that career path. Professor Claytor made sure I was prepared to be a research mathematician." Claytor made sure that Johnson took all of the math classes she needed to pursue her life's passion. He even created a class about the geometry of outer space — just for her. Geometry is the study of lines, angles and shapes.

At age 18, Johnson graduated with very high grades and degrees in mathematics and French.

## What Did She Do After College?

When Johnson graduated from college, the United States was still segregated. During this time, "segregation" meant that different races were separated from each other in many places and activities. African-Americans were rarely able to have jobs in mathematics and science. It was also very unusual for women of any race to have degrees in mathematics. At that time, the only professional job available to Johnson after graduation was teaching. She taught school for a number of years but stopped when she married and had children. In 1952, she started teaching again to support her family after her husband became ill.

## How Did She Get to NASA?

When Johnson was 34 years old, she applied for a job at the National Advisory Committee for Aeronautics, or NACA. NACA was the name of the government agency that later became NASA. In the early to mid-1950s, NACA was just beginning its work on studying space. NACA was hiring women — including African-Americans — to be "computers." These female computers calculated the mathematics for the engineers who were working on the space program. The first time Johnson applied, all of the jobs were already filled. She was disappointed, but she didn't give up. Johnson applied the following year, and that time the agency offered her a job. She took it and worked with a large group of women who were all computers like her.

## What Did She Do for NASA?

As Johnson worked on math problems with the other female computers, she would ask questions. She didn't want to just do the work — she wanted to know the "hows" and the "whys," and then the "why nots." By asking questions, Johnson began to stand out.

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3. **Immerse** (*verb*): to involve oneself deeply in a particular activity or interest

4. **Inquisitive** (*adjective*): curious

- [10] Women were not allowed to attend meetings with the male engineers and scientists. Johnson wanted to go to these meetings to learn more about the projects, so she went. She became known for her training in geometry and began to work with teams made up of men. Eventually, she was recognized as a leader, and the men increasingly relied on her to have the answers they needed.

In 1958, NACA officially became NASA. Shortly thereafter, Johnson became part of the space team. She began calculating the flight path, or trajectory path, for the rocket to put the first American in space in 1961. That American was astronaut Alan Shepard. The engineers knew when and where they wanted Shepard's space capsule to land, but the tricky part was to calculate when and where the rocket would have to launch. Johnson figured it out! And in February 1962, her calculations helped put the first American into orbit around Earth. His name was John Glenn.

In September 1962, President John F. Kennedy charged the country to send a man to the moon. The math calculations for sending a man to the moon were similar to those for putting a man into orbit. But this time, a lot more calculations were involved. This mission would include a crew of three astronauts launching from Earth to the moon; two astronauts landing on the moon; and then all three returning successfully back to Earth.

Johnson worked with the NASA team to figure out where and when the rocket needed to be launched to put it on the right path to land on the moon. Once again, Johnson's calculations were instrumental in NASA's success. With the information she provided, astronauts walked on the moon for the first time on July 20, 1969. They returned safely to Earth on July 24, 1969. All of this happened, in part, because of Johnson and her love of mathematics.

## What Did She Do After NASA?

Katherine Johnson retired from NASA in 1986. In 2016, she received honorary doctorates in science from West Virginia University and West Virginia State University.

- [15] Since retiring, she has enjoyed traveling, playing bridge (a card game), and spending time with her family and friends. She also likes to talk to students about school. She tells students to keep studying and to work hard. She encourages students to learn more about mathematics and science — and to never give up on their dreams.

And in case you're wondering, Katherine Johnson still loves to count.

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## Text-Dependent Questions

**Directions:** For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following statements best describes the central idea of the text?
  - A. Katherine Johnson overcame racial and gender discrimination and became one of the top mathematicians at NASA.
  - B. Katherine Johnson wanted to work for NASA, but her status as an African American woman prevented her from doing so.
  - C. Katherine Johnson was responsible for designing the first space probe sent to the Moon.
  - D. Katherine Johnson had a difficult childhood, but after beginning work at NASA, she faced less discrimination.
  
2. PART B: Which section from the text best supports the answer to Part A?
  - A. "In a time when minorities held very few jobs in mathematics and science, Johnson was a trailblazer." (Paragraph 1)
  - B. "Johnson can vividly remember watching her older siblings go to school, wishing so much that she could go with them." (Paragraph 3)
  - C. "As Johnson worked on math problems with the other female computers, she would ask questions." (Paragraph 9)
  - D. "She encourages students to learn more about mathematics and science — and to never give up on their dreams." (Paragraph 15)
  
3. Which statement best describes the effect of the words "immersed" and "inquisitive" on the meaning of paragraph 4?
  - A. They suggest that Katherine Johnson would ask questions of other students to study more effectively.
  - B. They suggest that Katherine Johnson was exceeding the expectations her family had set for her.
  - C. They show that Katherine Johnson's professors were committed to helping her succeed in her career.
  - D. They show that Katherine Johnson approached the study of mathematics with energy and enthusiasm.
  
4. PART A: How do the details about Johnson's early life in paragraphs 2-3 help us understand her later success?
  - A. Her struggles in school show how much she developed during her early life before working for NASA.
  - B. By describing her love of counting, the text shows that Johnson was always passionate about math.
  - C. Johnson's enrollment in college at just 15 years old emphasizes how different she was from her peers.
  - D. Johnson's early academic success made her later accomplishments seem less impressive in comparison.

5. PART B: Which detail from paragraphs 2-3 best supports the answer to Part A?
- A. "She counted everything, from the number of steps she took to get to the road to the number of forks and plates she washed when doing the dishes." (Paragraph 2)
  - B. "At a young age, she was very eager to go to school." (Paragraph 3)
  - C. "Johnson can vividly remember watching her older siblings go to school, wishing so much that she could go with them." (Paragraph 3)
  - D. "she so excelled that by age 10, she was in high school. By age 15, she'd started college!" (Paragraph 3)

6. How do paragraphs 6-8 contribute to the development of ideas about Johnson's life?

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## Discussion Questions

**Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.**

1. From an early age, Johnson loved math and science. In the context of the text, what is the goal of education? Is it more important for education to help people achieve their career goals or to inspire a love of learning? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
2. For the majority of Johnson's early life, many places in the U.S. were still strictly segregated. In the context of the text, what are the effects of prejudice? How did prejudice impact Johnson's pursuit of her career? What lessons can be learned from Johnson's response to prejudice?
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
3. In your experience, how do we define the roles of men and women? How has Katherine Johnson helped expand the role of women — particularly African American women — in math and science? How does the larger society benefit when men and women have equal opportunities? Cite evidence from this text, your own experience, and other literature, art, or history in your answer.