



Katherine Johnson
By C4A Academy



KATHERINE JOHNSON was an American MATHEMATICIAN who made significant contributions to the fields of space and AERONAUTICS. Born in 1918 in White SULPHUR Springs, West Virginia, Johnson showed a strong APTITUDE for mathematics at a young age. She graduated from high school at the age of 14 and went on to attend West Virginia State College, where she earned a degree in mathematics and French. After college, Johnson began her career as a school teacher. However, her love of mathematics led her to apply for a job at the National Advisory Committee for Aeronautics (NACA), which later became NASA.

Spell: MATHEMATICIAN APTITUDE AERONAUTICS
Who are we talking about? (full name) KATHERINE JOHNSON
Where did Katherine go to college? WEST VIRGINIA STATE COLLEGE
What was Katherine's first career after college? SCHOOL TEACHER
I said that NACA later became what? NASA
In what field did Katherine make significant contributions? SPACE,
AERONAUTICS

Where was Katherine born? WHITE SULPHUR SPRINGS, WEST VIRGINIA

Name a subject that Katherine earned a degree in. MATHEMATICS, FRENCH

In what year was Katherine born? 1918

What year did Katherine graduate from high school? (Show the equation)

$1918 + 14 = 1932$

What is the name of the satellite the Soviet Union launched in 1957?

SPUTNIK

Why do you think Johnson started her career as a school teacher?

In 1953, she was hired as a "COMPUTER" at the Langley Research Center, where she worked on calculations for the TRAJECTORIES of various aircraft and SPACECRAFT. Johnson was part of the West Area Computing Unit. This group was made up of African American women who were responsible for performing calculations and data analysis for the aerospace engineers at Langley. Johnson's exceptional mathematical abilities quickly earned her the respect of her COLLEAGUES and supervisors and a reputation as one of the most skilled mathematicians at the organization.

Spell: TRAJECTORIES COLLEAGUES QUICKLY

Johnson was hired as a what? COMPUTER

Johnson was part of what unit? WEST AREA COMPUTING UNIT

In her job at the Langley Research Center, Katherine worked on calculations for the trajectories of what? AIRCRAFT, SPACECRAFT

Johnson's exceptional mathematical abilities earned her the respect of whom? COLLEAGUES, SUPERVISORS

Johnson's exceptional mathematical abilities earned her what? RESPECT FROM HER COLLEAGUES, REPUTATION OF BEING A SKILLED MATHEMATICIAN

Name the year that Katherine was hired to work at the Langley Research Center. 1953

How old was Katherine when she began working at the Langley Research Center? (Show the equation) $1953 - 1918 = 35$

Who is often called the father of geometry? EUCLID

Why do you think some people were called "computers"?

In 1961, NASA sent a spacecraft named "Mercury-Redstone 3" into orbit around the Earth. The mission was a success, and it was a turning point for Johnson's career. The CALCULATIONS for the mission were performed by electronic computers, which were new technology at the time. However, the ENGINEERS found that the computers' calculations were not as accurate as they had hoped. They turned to Johnson to verify the computer's calculations by hand. This was the first time in history that a woman was responsible for the trajectory of a space flight. Johnson's work at NASA was critical to the success of many space missions, including the first manned orbit of the Earth by John GLENN in 1962. Johnson's calculations were used to plot the flight path for Glenn's spacecraft, and he famously requested that she personally verify the calculations before the launch.

Spell: SPACECRAFT ENGINEERS CALCULATIONS

What was the name of the spacecraft that NASA sent into orbit around the Earth in 1961? MERCURY-REDSTONE 3

Mercury-Redstone 3 was a turning point for Johnson's _____. CAREER

What type of missions was Johnson's work critical to? SPACE

Who conducted the first manned orbit of the Earth? (full name) JOHN GLENN

What did the engineers use to check the calculations for space missions? COMPUTERS, KATHERINE JOHNSON

What was significant about the Mercury-Redstone 3 mission?

SPACECRAFT ORBITED THE EARTH, TURNING POINT IN JOHNSONS CAREER, FIRST TIME A WOMAN WAS RESPONSIBLE FOR THE TRAJECTORY OF A SPACE FLIGHT

In what year was the first manned orbit of the Earth? 1962

VAKTivity: NASA Trailblazer: Katherine Johnson | National Geographic (5.20 min) https://www.youtube.com/watch?v=E4j_LpKzcZQ

Why is it so important that Glenn wanted Katherine Johnson to personally verify the calculations?

Throughout her career at NASA, Johnson continued to make SIGNIFICANT contributions to the field of mathematics and space science. She played a critical role in the success of the Mercury and Apollo programs, and her calculations were essential to the launch and recovery of the Friendship 7 and Apollo 11 missions. Johnson's work on the Apollo Lunar Landing program was CONSEQUENTIAL, as she calculated the trajectories for the Apollo 11 mission, which successfully landed astronauts

Neil Armstrong and Edwin "Buzz" Aldrin on the moon.

Spell: SIGNIFICANT CRITICAL LUNAR

What was Edwin Aldrin's nickname? BUZZ

Buzz Aldrin and who landed on the moon? (full name) NEIL ARMSTRONG

The ___ program sent the first humans to the moon? APOLLO

Johnson's work on the Apollo Lunar Landing program was ___.

CONSEQUENTIAL

Name one of the astronauts Johnson helped successfully land on the moon. NEIL ARMSTRONG, EDWIN "BUZZ" ALDRIN

Name one mission where Katherine's calculations were essential to the launch and recovery. FRIENDSHIP 7, APOLLO 11

Who was the unnamed third member of the Apollo 11 crew? MICHAEL COLLINS

What do you think was Johnson's biggest contribution to the Space Program?

In addition to her work on space projects, Johnson also made important contributions to the field of aeronautics or the science of air travel. She worked on the development of the first SUPERSONIC aircraft, the X-15, and her calculations were used in the design of the Space Shuttle. Johnson's work on the Space Shuttle program was significant, as her calculations helped ensure the safety of the crew and the success of the mission. Johnson's contributions to the field of space exploration were not limited to her work on SPECIFIC missions. She also developed new methods for calculating trajectories, including the use of the "shooting method," which is still used today. Additionally, she co-authored 26 SCIENTIFIC papers throughout her career.

Spell: DEVELOPMENT SPECIFIC SCIENTIFIC

Aeronautics is the science of what? AIR TRAVEL

Katherine worked on the development of the first ___ aircraft.

SUPERSONIC

What is the name of the first supersonic aircraft? X-15

What was the name of the method that Johnson developed for calculating trajectories? SHOOTING METHOD

Katherine's calculations on the Space Shuttle program ensured was what? SAFETY OF THE CREW, SUCCESS OF THE MISSION

How many scientific papers did Johnson co-author throughout her career?

26

What space telescope was launched into low Earth orbit in 1990? HUBBLE

What was Johnson's contribution to the Space Shuttle Program?

VAKTivity: 5.4 Katherine Johnson and Euler's Method (9min.)

<https://www.youtube.com/watch?v=gdxYsVniOYo>

Johnson's work at NASA was also notable for her role as a TRAILBLAZER for African American and female scientists. Despite facing discrimination and PREJUDICE throughout her career, Johnson persevered and made significant contributions to the field of aeronautics and space science. She received numerous awards and ACCOLADES throughout her career, including being inducted into the National Black College ALUMNI Hall of Fame and the National Women's Hall of Fame. In 2015, President Barack Obama awarded her the Presidential Medal of Freedom, the highest civilian honor in the United States, in recognition of her achievements. In 2016, Johnson was included on the BBC's "100 Women," a list of 100 influential women worldwide.

Spell: TRAILBLAZER

PREJUDICE

ACCOLADES

Johnson received numerous awards and what throughout her career.

ACCOLADES

In what year was Johnson named to the BBC's "100 Women" list? 2016

Name the year that Johnson was awarded the Presidential Medal of Freedom. 2015

How old was Katherine when she was awarded the Medal of Freedom?

(Show the equation) $2015 - 1918 = 97$

For whom was Johnson a trailblazer? AFRICAN AMERICANS, FEMALE SCIENTISTS

Name a field to which Johnson made significant contributions.

AERONAUTICS, SPACE SCIENCE

What was Johnson inducted into? NATIONAL BLACK COLLEGE ALUMNI HALL OF FAME, NATIONAL WOMEN'S HALL OF FAME

What do you think was the hardest challenge Johnson faced during her career at NASA?

Johnson's legacy extends beyond her scientific contributions, as she also served as a role model and inspiration for future GENERATIONS of scientists and mathematicians, particularly for women and people of color. Her story was featured in the book "Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race" by MARGOT LEE SHETTERLY, which was later adapted into the film Hidden Figures. Johnson's story, and that of the other "hidden figures" at NASA, has brought attention to the important contributions of underrepresented groups in the field of science and technology and has helped to break down barriers for future generations. Her work and DETERMINATION serve as an inspiration to all those who wish to pursue a career in STEM (Science, Technology, Engineering and Math).

Spell: PURSUE LEGACY DETERMINATION

What is the name of the movie that features Johnson's story? HIDDEN FIGURES

Who is the author of the book Hidden Figures? (full name) MARGOT LEE SHETTERLY

Johnson's story brought attention to the important contributions of what groups? UNDERREPRESENTED

Johnson helped to break down barriers for future _____. GENERATIONS

The book was later adapted into a what? FILM, MOVIE

For whom does Johnson serve as a role model? FUTURE SCIENTISTS, FUTURE MATHEMATICIANS, WOMEN, PEOPLE OF COLOR

From the text what field has Johnson's story helped bring attention to? SCIENCE, TECHNOLOGY

How has Johnson's work helped break down barriers for future generations?

Tell me about someone who has broken down barriers that you admire and what you admire about them.

Write a short story about a day in the life of Johnson when she was working for NASA.

What would you make a film about? Describe the film you would create.

This lesson was adapted from text generated by ChatGPT.

References:

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