

**Can you imagine a time when computers were new?  
Or when people didn't trust computers to do things like perform  
mathematical calculations?**

This was the case at the National Aeronautics and Space Administration (NASA) in the 1950s and 1960s. Instead of relying on the combination of humans and computers like it does today, **NASA had a group of women referred to as human computers.** These women spent their time analyzing data, performing calculations, looking for patterns, and coming to conclusions that could mean life or death for astronauts in space.



## Katherine Johnson

### Physics, Mathematics, Space Sciences

Meet Katherine Johnson. Johnson was an instrumental person in the group of "human computers" at NASA. As a child, Johnson loved numbers. She excelled so much at school that she was in high school by age 10! Following her love of math, she graduated from college by 18 and went to work.

Johnson applied for a job as a human computer at the National Advisory Committee for Aeronautics (NACA), which came before NASA. Johnson was always asking questions.

She wanted to know *how* and *why* things worked. Her curiosity also led her to attend meetings that most other women were not allowed to attend.

Johnson was part of a team who had to determine how to get a human being into space and back again. She calculated the space flight of Alan Shepard, the first American in space. She also helped with the successful orbit of John Glenn in 1962. By the end of the 1960s, NASA began relying heavily on electronic computers. But Katherine Johnson's value did not decrease. She helped perform the calculations for Apollo 11's trip to the moon in 1969.



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In the time since, technologies—such as computers—have expanded our capabilities for measurement, exploration, modeling, and computation. Advances in technology have influenced the progress of science, and science has influenced advances in technology.

You might be thinking about how to combine some of your interests into a career. When you study physics, you study principles of gravity and Newton’s laws. You do investigations and figure out that potential energy is the stored energy of position, and when position changes, the amount of energy in a system changes. You learn that energy is always conserved, so when the amount seems to change, it is because the energy is transferred to another object. You can predict how an object will move based on what you know about the forces acting upon it. You learn how mass, force, speed, and velocity are related. You do calculations. And you learn that to communicate with others, you need to define the system, and share information with them about the frame of reference and the units of size that are important to your model, your data, or your explanation. If you think about each of these ideas, one by one, you can see how they all contributed to Katherine Johnson’s success in her work. Physics, math, and space were her main interests. What are yours? And how could you combine them into a career someday?

Katherine Johnson graduated from West Virginia State University with a BS in Mathematics and French. She was one of the first three African Americans to enroll in a graduate program at West Virginia University. Johnson remains a respected figure in the field of space sciences. Without her work, Americans may have never explored space at that time and with such success.

## Works Cited

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