"I found what I was looking for at Langley," she says. "This was what a research mathematician did. I went to work every day for 33 years happy. Never did I get up and say I don't want to go to work." Katherine Johnson

Many people of the present generation take for granted the rights they have; however, many people in the past had to fight for their rights. Katherine Johnson was one of many people who had to fight for her rights. She worked as a mathematician for NASA from the year 1953 to the year of 1986 (See Appendix A), and during her time there, she was credited with many significant calculations for important space missions for our country. Born on August 26, 1918, in White Sulphur, West Virginia, and is currently still alive. Katherine had a gift for math starting at a very young age, and lasting throughout her whole life. When she was a young child, she used to count everything, such as the dishes that she washed or the steps to her church. Katherine learned many skills from her father even though her father only went to school until the sixth grade. Her father, Joshua Coleman, was not allowed to move on with his education because he was African-American. “She always seemed to be ahead of her time. She always seemed to have answers for problems nobody else could solve,” said Katherine Moore, Johnson’s daughter (Davis, 4). Johnson started high school at the age of ten and finished at the age of 14. She then started college at 15, and graduated college at 18. Katherine was able to use her skills to help others if they were struggling in school. “If you lose your curiosity, then you stop learning,” she believed (What Matters). Breaking boundaries, Katherine Johnson and her work for NASA was a triumph for women and African-Americans all over the country, as well as NASA.

The Civil Rights movement started in the southern states in the 1950’s to try to show that African-Americans were deserving of equal rights. They were not allowed to go to the same
places as white people, drink from the same water fountains, or use the same bathrooms.

African-Americans and many others were extremely angered at these laws, and they would protest businesses that discriminated against them. Katherine Johnson would have only been allowed to go to school through the sixth grade if she had stayed in her hometown because of her race. If African-Americans would break the rules that were set in place, they would often be arrested. Rosa Parks was one African-American who broke the rules when it came to segregation in her town because she stood up for her rights, which was a triumph in itself to African-Americans in the southern United States. On a public bus, whites were allowed to kick African-Americans out of their seats, and they would have to stand, which is not as safe as sitting in a seat. Parks refused to get out of her seat; therefore, she was arrested. There were many other people in the south that tried to gain equal rights. Martin Luther King Jr. was another person who tried to help others gain equal rights. He gave a very famous speech called I Have A Dream. This speech told about how he wanted everyone in our country to get along with each other, no matter the color of their skin, or any other differences. Many of these people are currently seen as the ones who helped end segregation in the United States. In 1948, President Harry Truman issued an executive order as the Cold War was beginning, to end discrimination in the military (Civil Rights Movement, 2). This helped African-Americans to start being seen more as equals.

Our country has had many groups of people who had not had the same rights as others. Women also did not have equal rights in the past. They did not have the same rights as men. Because they did not have the same rights, the Women’s Rights Movement started. The Women's Rights movement is also known as feminism, and this movement is still occurring today. The very beginning of the Women’s Rights Movement occurred at a convention for
Women’s Rights in Seneca Falls, New York in 1848. It was the first convention for Women’s Rights. The convention was advertised as a convention to bring equal rights for women. More than 100 people showed up to the convention, which was a large triumph for women in the world because the word would spread about what they were fighting for. At the convention, Lucretia Mott, and Elizabeth Cady Stanton demanded, “equal rights, including the right to vote, and an end to the double standard.” (Women’s Rights, 3). The UN founded the Development Fund for Women in 1976. Over time, women have gained their rights, such as the right to vote in the United States.

Women could not always have the same jobs that men had. This even occurred at NASA. During the early 1950’s NASA (National Aeronautics and Space Administration) was previously known as NACA (National Advisory Committee for Aeronautics), which focused more on aviation than space exploration. When the organization changed to NASA, the group desegregated. The organization needed everyone possible to help work on space missions, and this meant they needed to allow women to do so. NASA has made many breakthroughs in space exploration, and NASA is credited with sending the first manned mission to the moon, which is a large triumph that the U.S.’ space program is credited with. Since NASA was established, the organization has had the Apollo program, which allowed 12 astronauts to walk on the moon, and the Space Shuttle program. The first United States satellite, Explorer 1, reached its orbit on January 31, 1958. This was a large triumph for NASA because it was the very first launch of a satellite. However, in the same year, Russia launched a satellite of their own, Sputnik, creating the Space Race which intensified the Cold War between the U.S and Russia. Many people in the U.S. believed that the satellite was a tool used by Russia to spy on our
government, or possibly to drop nuclear bombs. America did not want the satellite to worry people, but NASA wanted to win against Russia. The next step was to develop the math to get to the moon before the Soviets could. NASA relied on their human computers while the whole country was relying on them. NASA also has established multiple research facilities since it was created. Some of these facilities include the NASA headquarters, Goddard Space Flight Center, and Langley Research Center, which is where Katherine Johnson worked. Each facility has been of major significance for the United States space missions.

Katherine Johnson always had a gift for math, and school. She started high school at age 10, and finished high school at age 14. Katherine was then selected at age 15 to attend West Virginia University, and she was the first African-American women to attend the school. She finished college by age 18 with highest regards in French and math. “But sometimes I could see that others in the class did not understand what he was teaching. So I would ask questions to help them. He’d tell me that I should know the answer, and I finally had to tell him that I did know the answer, but the other students did not. I could tell.” (Katherine Johnson: A Lifetime of STEM, 2). Katherine often helped other people that she knew with homework, and she was a tutor. She was the first black woman to attend West Virginia University’s newly-integrated school program with two African-American men. Her college professor, W. W. Schieffelin Claytor, told her that she would make a great research mathematician. This professor was the third African-American man to earn a PhD in math in the United States. Johnson’s teachers even created extra classes just for her to help her become a research mathematician. Katherine became a teacher in Virginia before she started at NASA. This was her job at the time she heard about openings at NASA. After Katherine had heard about the job opportunity, she and her family
moved to Newport News, Virginia, which is near Hampton Virginia, which is where Langley is located. Katherine heard about job openings at NASA from a family member. NASA was specifically looking for African-Americans to work as human computers in their Guidance and Navigation department. She was very excited about her new job once she was accepted because it paid three times the amount she got for teaching, and she had just enough money to support her family. The first area of NASA that she worked in was the West Area Computing facility, which was run by Dorothy Vaughan. Dorothy would sometimes assign workers to go work with the engineers at the NASA facilities. Katherine was given an assignment which was supposed to be a temporary job. Later the job became permanent, and she began work at the Flight Research Division. Dorothy had talked to Katherine’s boss, and said they needed to give her a raise, or send her back to work for Vaughan (Shetterly, 102). At work, she was the first woman to attend meetings with the engineers of the missions. Katherine also worked in the space task group, who were credited with winning the space race. Katherine was known by many that worked with her as “the girl.” Engineers admit themselves that the girl computers do the work more rapidly and accurately than they could (Rissman, 9). John Glenn trusted her with the calculations for his flight more than the computer, so he wanted her to check all of the math before he went into space. He said once she said everything was correct, he would fly. “It took me a day and a half to compute what the computer gave him.” (Katherine Johnson Did The Math For NASA When It Counted Most, 2) She was the first female worker at NASA to have her name as the author, or co author of a paper. Her children had not known at the time what she did at work, and how important her job was. Katherine had three kids; Constance, Joylette, and Katherine. She has also been married twice. Her first husband died of inoperable brain cancer in 1956.“I knew my
mother worked at NASA. Growing up we knew she was smart. But she was Mom.” (Daughter of NASA mathematician, 1). This was said by Johnson’s daughter, Katherine Moore. They just knew that she did math. “I felt most proud on the success of the Apollo mission. I computed the path that would get you there. You determine where you were on the Earth when you started out. We told them how fast you would be going and the moon would be there by the time you got there.” (Katherine Johnson Did The Math For NASA When It Counted Most, 2). She also worked at the Langley Research Center. In 2015, Katherine received the Presidential Medal of Freedom, the highest civilian honor, for her work in the STEM (Science, Technology, Engineering, and Math) field.

Johnson’s work at NASA was a large triumph for equal rights, and NASA. Because of her work at NASA, more parts of the country had the same opportunities for women, and African-Americans. Her work was also part of a major triumph for NASA. Part of the organization’s triumph was sending the first men to the moon, and Katherine did the math to get the astronauts there and back safely. She also calculated the mission of Alan Shepard, the first American to go to space as well as Freedom 7, and the orbital mission of John Glenn. Katherine also worked in the Space Task group, who are credited with the triumphant win if the Space Race. Johnson was also a leader of the Alpha Kappa Alpha sisters. This was a group of people around the country who met to talk about ways to improve the communities they lived in.

All of Johnson’s work left a large impact for the future of NASA. Katherine was the one who had the vital information for many space missions during the time she was working at NASA, which was also part of the triumph for NASA. During her time at NASA, the organization desegregated which was a triumph for many people in the country; furthermore,
everyone at NASA got the same opportunities now. The calculations that Johnson did left a big impact on the world of space exploration. “Everything was so new - the whole idea of going into space was new and daring. There were no textbooks, so we had to write them.” (NASA Mathematician Katherine Johnson, 20). Katherine has left a large imprint of her work on NASA because she created new, and efficient equations for space missions. Orbiting the planet and going to the moon were turned into reality. She was the one who worked through the entire time of the space shuttle program.

Katherine Johnson’s legacy will be known for all in the future. A museum in Hampton, Virginia has created an exhibit showcasing Katherine Johnson, and the other women in Hidden Figures (See Appendix D). Many people at West Virginia University still remember her as the first African-American women to go to school there. She will always be the one who calculated how the first humans would land on the moon when she worked at Langley Research Center. “No place has played a larger role on the history of American flight technology or flight technology in general than Langley Research center.” (Allen, 1) Her work was showcased in the movie Hidden Figures (See Appendix C). NASA also had a new facility built that was named after Katherine. She also won the Presidential Medal of Freedom in 2015 (See Appendix B).

Katherine Johnson lived in the shadows of famous astronauts for many years. Even though she was responsible for many successful space missions, she was still treated poorly at her job. Katherine Johnson was one of the many people who fought for their rights. She never let her rights get in the way of her work. To understand the impact of Katherine Johnson, one must first understand the Women’s Rights Movement, the Civil Rights Movement, and NASA history, then the accomplishments she achieved. The impact that Katherine Johnson had on equal rights
and the success of NASA has allowed our country to have more opportunities for everyone, as well as Americans making astounding breakthroughs in astronomy and space exploration. NASA has had many breakthroughs in space exploration, and many missions have been calculated by Katherine Johnson. Katherine was the brain behind the fame of astronauts who made history by walking on the moon. She was the smart but humble mother, daughter, wife, and human computer.
This is a picture of Katherine Johnson when she worked at NASA as a mathematician. She started work in 1953, and retired in 1986.

(Katherine Johnson Biography, 1)
This photo shows Katherine Johnson in 2015 when she won the Presidential Medal of Freedom for her outstanding work in the STEM field.

(9 fascinating facts about Katherine Johnson, 6)
Appendix C

This photo shows Katherine Johnson, and the actresses that were in *Hidden Figures*. Taraji P. Henson played Katherine in the movie. Octavia Spencer played Dorothy Vaughan, with whom Katherine worked with at the very beginning of her days at NASA.

(9 fascinating facts about Katherine Johnson, 4)
This picture is of the exhibit at the Hampton History Museum in Hampton, Virginia showcases the women computers at NASA who were a significant factor to the success of NASA missions, and the Space Race.

(Museum Exhibit Reveals the NASA Langley Human Computers from 'Hidden Figures, 1)
Annotated Bibliography

Primary Sources:


Steve Anderson works in the Astronomy department at UW Madison. I emailed, and had phone calls with him so he could help me as much as possible with my project. I thought he would have been a good source because of his job, and he helped direct me toward other people that might be able to help with my topic.


This website helped me understand how Johnson’s family was affected by her working at NASA. I also learned how her family didn’t know what she did during her time at NASA. In this source I also learned about how humble Katherine is about her work at NASA.

Davis, Julie. E-mail interview. Dec. 2018.

Julie Davis is a professor at UW Madison. I emailed her to see if she could help me find more information about my topic, or if she knew of someone that could help me. She directed me to someone who worked at NASA that I was not able to contact.
Research Facility, Langley. E-mail interview. 2018.

I found this source at the very beginning of my research because this is the location that Katherine Johnson worked at. I emailed the Langley Research Facility. This source helped direct me to other places where I could find information, which many of the sources it led me to were on NASA’s website.


This source helped me to understand what Katherine Johnson did at her job, and why it was such a huge deal for a women to work at NASA. It also helped me understand how advanced she was when it came to space exploration, and math. This was a primary source because it was something that Katherine helped write, and it is from the time period that she was working at NASA.


This source helped me to understand what Katherine Johnson did at her job, and why it was such a huge deal for a women to work at NASA. It also helped me understand how advanced she was when it came to space exploration, and math. This was a primary source because it was something that Katherine helped write, and it is from the time period that she was working at NASA.

This video helped me know more about her life, and what she did when she was a child. It helped me understand how her rights were different from many other people’s rights in the past. This is a primary source because Katherine Johnson was in the video.

Secondary Source:
"5 Facts About Katherine Johnson the Groundbreaking “Human Computer”." Theportalist.com, theportalist.com/5-extraordinary-facts-about-katherine-johnson. Accessed 26 Nov. 2018. This source helped me find some information that was very important to Katherine Johnson’s life. The source also gave me some more detailed facts about her, and what she did at NASA. This source also showed events in her life in a sequence.

This source helped me find more detailed events that occurred in her life. It also helped me know which facts were more important in her life because they were reoccurring on other sites. This source gave me more facts about her work for NASA rather than facts in her early life.

This source helped me learn more about the facility that Katherine Johnson worked in during her time at NASA. I learned that the Langley Research Center was used for
aviation purposes, and the basics of aeronautics. I learned how the research facility had changed over time due to the space race.


This source helped me learn more about what Katherine did when she was in school, and how she helped other students even though she did not have to. It also taught me what Katherine did as work before she applied at NASA. This source also showed Katherine’s life like a timeline which was very helpful.


This source told about how Katherine Johnson had celebrated her 100th birthday in 2018, and how she was celebrated by many people, including her family, and workers at NASA. This source showcased many of the outstanding achievements made by Katherine in her life. It also tells a small amount about how she is a great role model for others, and how she was a very important person when it came to planning space missions.


This source helped me see what actually happened when Katherine worked at NASA. It was a very good source because it was different than reading a book, or looking at a website. It also had good information about my broad topics, like NASA history.

In this source I found that this was more of a conversation with Katherine. She explained more about how she decided to be a research mathematician. Katherine also explained more about how much she loved her job, and what she did while she was working at NASA.

"Katherine Johnson." *NASA.gov*, 2 Mar. 2016,


This source led me to other possible sources. It gave me examples of papers that Katherine Johnson had worked on with other people who worked at NASA with her at the time. It also gave me some basic information about her, such as when and where she was born.


This source told me about how people in her hometown are still honoring her today. It tells about why she won the Presidential Medal of Freedom. It also explains her schooling, and how she was able to learn even though she didn’t have as many opportunities.


This source gave me the basic information about Katherine, and her life. It gave me more detail of when each of the events happened, as in what year each event happened. It had more information of her later life, but not much about her early life.


This source gave me an idea of the importance of some of the items in the display at the museum. The mechanical calculator was what Katherine would have used at work on a daily basis. There is also a written memo that showed that segregation was ending in the West Area Computing Facility, which is where Katherine started her work for NASA.


This source helped me to know how Katherine was being celebrated and awarded for her work. NASA built a research facility, and she was awarded the Silver Snoopy Award, for her contribution to space exploration. It also tells about how Katherine won the Presidential Medal of Freedom, and had a movie based off of her.

*Meet the Women Who Really Took Man to the Moon. Video. 2018*

This source tells about Katherine and her work at NASA. It explains her job, and why she got to work there. It also tells what she did while she was working.
Mink, Micheal. "Katherine Johnson Did the Math For NASA When It Counted Most."
This source helped me understand slightly how important she was in order to get astronauts to space, but no one knew that she was one who calculated how to get them there. It told how everyone at NASA appreciates the work that she did. The source tells about what others think of her, and some facts about her life.

www-groups.dcs.st-and.ac.uk, 2016,
https://www-groups.dcs.st-and.ac.uk/history/Biographies/Johnson_Katherine.html.
This source helped me find more basic information about her early life, and her family. It also had more information about her time at NASA, and how she felt about the people there. It also had many quotes from Katherine that gave me information.

Redd, Nola Taylor. "60 Years of Space Exploration." Space.com, 7 Nov. 2017,
This source gave me some background information about space missions that were launched by NASA. It helped me find out the missions that Katherine could have possibly worked on during her time at NASA. The source tells what has gone into space, and when.

This book gave me some information about Katherine Johnson, and the missions she worked on at NASA. I also found out some other people who had to deal with the same issues as Katherine. It also gave me some background and important information about NASA, as well as changed that occurred there.


This source gave more details about when Katherine was in college, and how her professors wanted her to be a research mathematician. It also gave more detail about the astronauts and missions that she calculated. It had some information that was repeated on many sources.


This source helped me understand more about what Katherine Johnson did at NASA, and how she was treated there. I also found out why she was such an important person when it came to planning space missions. I also figured out who she worked with, and other people who experienced the same things she did.

Tertiary Sources:

This source helped me find more information about the Civil Rights Movement in the southern United States. I found more information about people who played important roles during that time period, and how they helped fight for equal rights. This source told how people in the south felt about African-Americans during this time.


This source helped understand more about the Civil rights Movement, and what actions were taken during the movement. I learned about who was affected during the time period, who was fighting who, and what actions civilians took. I was also able to get background knowledge about why this was happening.


This source gave me information about each part of Katherine’s life. The source told about when she worked for NASA, and allow the missions that she helped plan for the country. It also tells a large amount of her schooling, which is when she was the first in her African-American to go to attend college at West Virginia University.


This source gave me more information about the history of NASA, and events that have happened because of them. It explained more about the times of events, and each thing that happened there. It also tells about the areas of NASA, and where they are located.
"Women’s Rights." *Women’s Rights*, Discoveryeducation.com, 2005,
app.discoveryeducation.com/learn/player/3d444897-332e-4076-971a-7429131e5d3c?#.
This source gave me background information about how women fought to have equal
rights. It shows different time periods and places when women fought to have better
rights. It was very easy to find the right information using this source because of the way
that the text was sorted.