

COMMANDING SPACE



VALVE POWER
PANELBOARD LAMPS



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The filming of *Commanding Space* generously made possible by:

The Broward Center for the Performing Arts

Des Moines Performing Arts

Playhouse Square

The Smith Center for the Performing Arts - Education and Outreach

Seattle Theatre Group

Cincinnati Arts Association

Commanding Space

By
Stephanie Leary

Directed by
Joann Maria Yarrow

Annie Easley
Erin Lockett

Stage Manager
Erin C. Brett

Lighting Design
David Bowman

Costume and Prop Design
Kate Laissle

Sound Design
Luther Masanto

Robert Hupp
Artistic Director

Melissa Crespo
Associate Artistic Director

Jill A. Anderson
Managing Director



ABOUT THE PLAYWRIGHT Stephanie Leary

“Be honest! Don’t hide from who you are don’t hide from the topic that you’re writing about. Don’t be afraid to put yourself in the play, what you’re about, your true essence. But the most important thing is to be honest, always be honest.”

Stephanie Leary’s plays include *An Apple a Day*, *A Polished Slavery*, *Unleavened*, *Relay*, and *Spinach: The Often Overlooked and Usually Under-appreciated Nutritional Value of Like at First Sight*. Stephanie’s work has been produced and/or developed by Syracuse Stage, the Sankofa Theatre Festival, and the International Performing Arts for Youth. Her play, *Commanding Space*, was recently awarded a grant from the Alfred P. Sloan Foundation Science and Technology Project. Stephanie was born and raised in Rochester, New York, where she still lives. She is a graduate of Monroe Community College and SUNY Brockport and obtained her M.F.A. in playwriting from Goddard College.

About the Play

“*When people have their biases and prejudices, yes I am aware. My head is not in the sand. But my thing is, if I can't work with you, I will work around you. I was not about to be discouraged that I'd walk away. That may be a solution for some people, but it's not mine!*”

The words above, spoken by Annie Easley, defined how a young African American woman worked to break gender and color boundaries while excelling for 34 years in a field dominated by white men. Easley was a groundbreaking rocket scientist, mathematician, and computer engineer who worked on the Centaur rocket project and early versions of batteries for hybrid vehicles.



Annie Easley

Annie Easley was born on April 23, 1933, in Birmingham, Alabama and was raised by a single mother. Annie moved to Cleveland, Ohio originally to finish a degree in pharmaceuticals, but the local university had eliminated the program. She read an article about twin sisters working as human computers at NACA, the National Advisory Committee for Aeronautics, and the next day Annie applied for the job. When she was hired in 1955, she was one of four African Americans working for NACA out of 2,500 employees. While working for NACA (soon to be changed to NASA), Annie received her Bachelors of Science in Mathematics from Cleveland State University. As computers changed, Annie was prepared to change with them. She became a computer programmer for NASA once electronic computers were capable of reading and deciphering code to help solve obstacles that space engineers would face daily. Annie used FORTRAN (Formula Training System) and SOAP (Simple Object Access Protocol) to elevate NASA's programming. Annie retired from NASA in 1989 after 34 years of dedication, tenacity, and hard work for the organization. Annie passed away in Cleveland on June 25, 2011, at the age of 78.



Did you know...

Annie was the first woman to wear pantsuits to her office. It set a precedent for women in the workplace, "It's not how you look in the workplace, it's what you can do!"

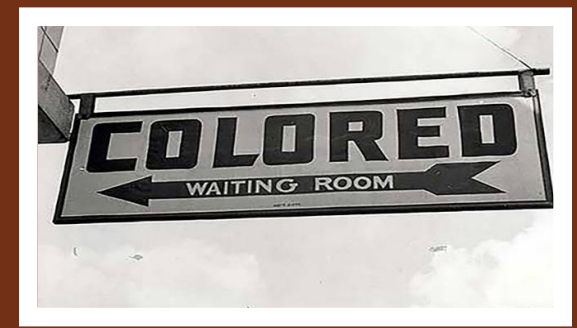
Annie learned to snowboard at 65 years old and was a founding member of NASA's ski club.

JIM CROW LAWS

“Separate but equal treatment”

Jim Crow laws were a set of laws dividing white people and African Americans in the Southern United States. These laws began in the 1890s and continued for the next 75 years. Signs stating “Whites Only” and “Colored” were posted in every public facility, which created clear visual lines of segregation throughout communities. In the education system, school classrooms from elementary to collegiate were separated and not provided with the same quality of materials, giving African-Americans an inferior education. Segregation extended to almost all public facilities including drinking fountains, restrooms, restaurants, public transportation, and public parks. While these laws promised equal facility care and treatment for all races, this was not the case. Bathrooms and drinking water designated for people of color were not maintained to standard hygiene protocols.

Two of the most well-known topics of discussion regarding Jim Crow laws are segregated public transportation and the lack of voting rights for Black people. Local government officials and court actions required people of color to fill out separate voting applications and take unreasonable literacy tests to assess their reading and writing skills. The application system was selective and an abuse of power. Public transportation systems also upheld discriminatory practices for people of color. Black people were forced to sit in the back of the bus, give up their seats to white patrons, or were not allowed to ride the same public buses as white people at all. Thankfully, the Civil Rights Act of 1964 abolished Jim Crow laws and outlawed discrimination in any public setting.



Racial Discrimination in the 50s & 60s

In the 1950s and 1960s, many African American activists fought to end the widespread discrimination and segregation caused by Jim Crow laws. Black people mobilized to participate in nonviolent protests and specific acts of civil disobedience. This movement, now known as The Civil Rights Movement, brought about major changes in legislation between 1954 and 1968. The nonviolent protests of the Civil Rights Movement were often met with extreme violence from those who opposed the movement. The targeted violence against Black people already present in this country also did not stop during this time.



(Federal Bureau of Investigation)

Freedom Riders

In 1961, 13 African American and white activists set out to take 13 bus rides through the American South to protest segregated bus terminals. During these rides, they would peacefully violate racist restrictions in the bus terminals by using "whites only" restrooms, lunch counters, and waiting rooms. On their route, they were often met with violence. In South Carolina, three Freedom Riders were attacked viciously when they tried to enter a "whites only" waiting room. Upon arrival to Alabama, the bus was met with an angry mob of 200 people. The driver continued past the station but was followed until the tires on the bus blew out. A bomb was tossed onto the bus, and as the Freedom Riders escaped, they were attacked by the mob. The Freedom Riders continued their rides through the next several months and were often met with violence. They also gained hundreds of new Freedom Riders and drew widespread attention to the cause. In the fall of 1961, the Interstate Commerce Commission finally issued regulations that prohibited segregation in bus terminals.

Lamar Smith

Lamar Smith was a WWI veteran and a passionate voting rights activist in Mississippi. In 1955, he stood on the steps of the courthouse assisting African American voters in filling out absentee ballot forms to avoid the danger that often came with voting in person. He was shot on the steps by Noah Smith, a white supporter of the incumbent candidate, in front of a crowd of about forty people. Noah Smith, covered in blood, was stopped by a sheriff nearby and taken in for questioning but later released. When the case went to court, the jury of all white men heard the testimony of 50 to 75 witnesses who all stated they had seen no crime take place. Noah Smith faced no charges for his crime.



Racial Discrimination in the 50s & 60s (cont.)



Watch the BBC News Interview with Elizabeth Eckford, the youngest of the Little Rock Nine:

https://www.youtube.com/watch?v=G1Zzo_wLjX8

Little Rock Nine

In September of 1957, nine Black students were permitted to attend an all-white high school, Central High, in Little Rock, Arkansas. This was due to a Supreme Court ruling (*Brown V. Board of Education*) that stated that segregation in public schools was unconstitutional. In the months leading up to their arrival, the Little Rock Nine had to go through extensive counseling and safety training through the NAACP. On the day of their arrival, the Governor of Arkansas, Orval Faubus, sent the National Guard to the high school to block the Black students from entering the building. The nine students approached the building with more than 1,000 protestors screaming racial slurs, pushing them while holding up demeaning signs, and threatening to attack them. The bullying, ridicule, and violence lasted all year. One of the students was kicked to the ground, beaten, and had acid thrown in their face. Another student was spat on and pushed down a flight of stairs. The oldest student of the nine, Ernest Green, graduated on May 25, 1958, right before the school was shut down in September of 1958 for an entire year. This shutdown forced the rest of the Little Rock Nine to complete their high school careers elsewhere. The Little Rock Nine students went on to have established careers including honored Military members, NBC news reporters, and even Deputy Assistant Secretary for Workforce Diversity in the Department of the Interior under President Bill Clinton. These students were a monumental force in the Civil Rights movement and our nation's history on race and discrimination.

Emmett Till

Emmett Till was an innocent, sweet, and bright-eyed 14-year-old boy raised by his mother, who was a clerk for the Air Force. While Till never knew his father, he was an Army private during WWII. In 1955, Emmett Till was kidnapped and lynched in Mississippi for allegedly offending a white woman while shopping in a grocery store. After a 67-minute deliberation, an all-white jury ruled the attackers "not guilty," and the two male white adults were relieved of all charges. The brutal murder shocked and outraged the nation. Till's death was ruled a homicide and unsolved on both counts of lynching and kidnapping.



Voting before the Voting Rights Act of 1965

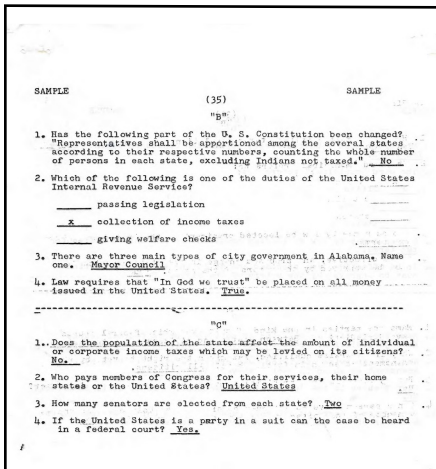
Voting rights were not defined in the US Constitution, so until 1870, only white men were allowed to vote. The Fifteenth Amendment changed this and extended voting rights to men of all races. However, this amendment was not enforced, and state laws, institutions, literacy tests, poll taxes, and intimidation at the polls prevented African American men from voting. In the 1920s, women were granted the right to vote with the passing of the 19th Amendment, but African American women faced the same struggles as African American men at the polls. The 24th Amendment corrected some of this injustice by outlawing the use of poll taxes in federal elections, yet there were still many challenges to overcome.



(Florida Memory)

Literacy Tests

Literacy tests were one of the many challenges Black voters faced at the polls. The stated goal of the tests was to determine whether or not the person was literate enough to cast a vote. However, the tests were at the discretion of the voter registration officials. Officials could ask one voter a single question and other voters upwards of forty questions. The tests were often intentionally confusing and had unreasonable time limits. They were also graded by biased judges, and one wrong answer meant failure. These tests were largely given to Black voters and often prevented them from registering to vote. To combat this unfair practice, individuals and organizations tutored African American voters on the ever-changing literacy tests.



(Workbook from Citizenship School used to tutor voters)

Voting Rights Act of 1965

On May 26, 1965, the Voting Rights Act was passed by the US Senate after an overwhelming majority vote. It was signed into law on August 6, 1965, by President Johnson, who was surrounded by many civil rights leaders including Dr. Martin Luther King Jr. This law banned the use of literacy tests and authorized federal oversight to voting registration in states where less than 50% of the non-white population was not registered to vote. The law also stated that any form of intimidation or coercion during the voting process was illegal. After this law was passed, voting turnouts increased tremendously among African Americans. Although the law was not heavily enforced in all states, Black people now had the legal means to challenge voter restrictions.



President JFK

“ We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win.”

John Fitzgerald Kennedy (JFK) was the 35th President of the United States. He was sworn into office in January of 1961 and quickly became known for his passion and stance on civil rights, progression for all of mankind, peace initiatives, and the Peace Corps. President Kennedy was also eager for the United States to lead the way in exploring space. The Soviet Union was ahead of the United States in its space program, and President Kennedy was determined to catch up. He said, “No nation which expects to be the leader of other nations can expect to stay behind in this race for space.” Kennedy asked Congress to approve more than \$22 billion for Project Apollo, which had the goal of landing an American man on the moon before the end of the decade. JFK also proposed new bills to Congress for Civil Rights and ending racism in the 1960s. He was constantly fighting for change and seeking answers on how to reach equality as a nation. JFK was assassinated by Lee Harvey Oswald in Dallas, Texas on November 22, 1963. Kennedy was visiting the state to give a speech when shots were fired as he was driving past excited crowds in the streets of Dallas. America will forever remember President John Fitzgerald Kennedy for his honesty, forward-thinking, and exciting efforts to progress as a nation.



Listen to JFK's Moon Speech
from September 12th, 1962

<https://www.youtube.com/watch?v=th5A6ZQ28pE>

EEO Counseling

Staffer fills slot as EEO counselor

Annie J. Easley, recently appointed an Equal Opportunity counselor, sees her new position “as an instrument of justice — not a tool for either employee or management.”

She replaces Ruth E. Arnholt who resigned as an EEO counselor after serving for several years.

The Computing Services Division employee joins six other EEO counselors whose duties include “establishing an open and sympathetic channel through which employees may, on an informal basis, get problems connected to EEO resolved.”

Mrs. Easley went on to state that part of her job also includes maintaining a



communications pipeline with the Personnel Division and other organizational elements on EEO matters.

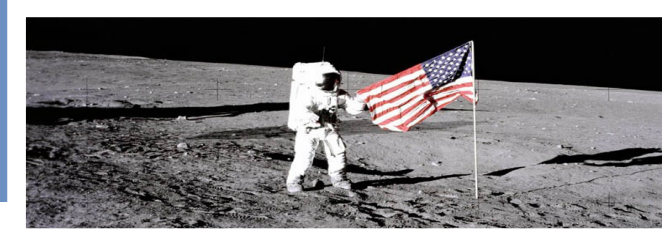
At Lewis since 1955, she works as a math technician in the Automatic Data Processing Branch. She has attended Xavier University and Cleveland State University, majoring in mathematics.

During Annie Easley's career with NASA, she became an Equal Employment Opportunity (EEO) counselor. In this position, she assisted in fighting for equal rights for employees regardless of race, gender, religion, or any other discriminatory issues that came about in the workplace. Easley specifically fought against gender and race biases in the male-dominated workforce. The Equal Opportunity Employment Commission (EEOC) was created in 1964, after the signing of the Civil Rights Act of 1964. The Civil Rights Act of 1964 banned discrimination in the workplace based on race, sex, color, religion, and national origin. The EEOC is a government agency designed to enforce employment anti-discrimination laws passed by the national government. Additional laws exist that prohibit employers from discriminating against people in the workplace based on age, pregnancy, and disability. “The laws apply to all types of work situations, including hiring, firing, promotions, harassment, training, wages and benefits,” states the EEOC. This ensures a safe, healthy, and diverse environment for all employed.



Space Race & Cold War

"One small step for man, one giant leap for mankind." - Neil Armstrong



The Cold War

cold war. *noun.* a state of political hostility and military tension between two countries or power blocs, involving propaganda, subversion, threats, economic sanctions, and other measures short of open warfare.

The Cold War began in 1947, at the end of WWII, and was the geopolitical, ideological, and economic struggle between two world superpowers, the United States and the Soviet Union. The US and the Soviet Union fought together as allies in WWII, but that quickly ended after the end of the war. The Soviet Union began to set up communist regimes in several countries in Europe including Romania, Albania, Bulgaria, Hungary, and Poland. The US then intervened to stop the communist influence of the Soviet Union from spreading into Western Europe. Both countries avoided direct military confrontation, but the tensions on both sides were high.

Space Race

The Space Race was seen as an opportunity for the US and the Soviet Union to exert power in the areas of technological advancements and military strength. For years, series of new probes, satellites, and explorations occurred both on the US and Soviet sides pressing both countries for the next great jump in space history, launching a person into space. Russia made the first successful attempt by having its astronaut orbit earth in a small capsule. This brought JFK to announce that we would land the first man on the moon before the end of the decade. December 1968 saw the launch of Apollo 8, the first manned space mission to orbit the moon. On July 16, 1969, U.S. astronauts Neil Armstrong, Edwin "Buzz" Aldrin, and Michael Collins set off on the Apollo 11 space mission, the first lunar landing attempt. After landing successfully on July 20th, Armstrong became the first man to walk on the moon's surface. He famously called the moment "one small step for man, one giant leap for mankind."



Sputnik I

Sputnik meaning "fellow traveler" was the first artificial space satellite. The pressurized sphere made of aluminum alloy had five primary scientific objectives: test the method of placing an artificial satellite into Earth's orbit; provide information on the density of the atmosphere by calculating its lifetime in orbit; test radio and optical methods of orbital tracking; determine the effects of radio wave propagation through the atmosphere; and check principles of pressurization used on the satellites. Sputnik 1 was launched by the Soviet Union on October 4, 1957, originally placing them in the lead of the Space Race.

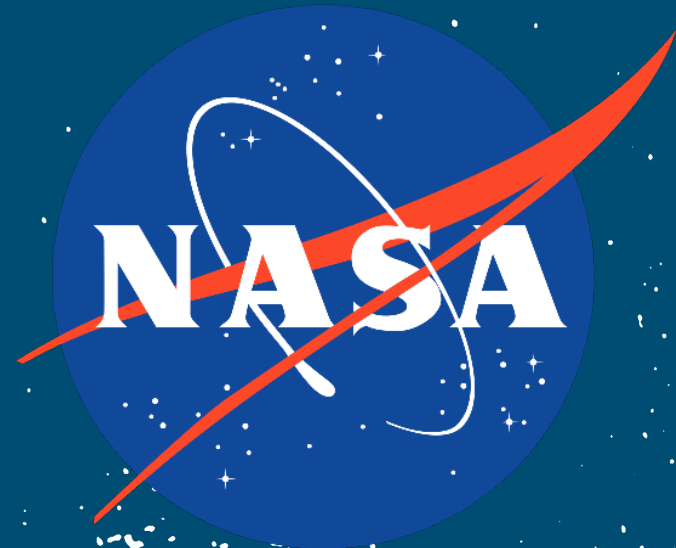
NACA, NASA, & The Space Act of 1958

NACA: National Advisory Committee for Aeronautics was founded by Congress on March 3, 1915. This agency reported directly to the President and was an independent organization sourced solely through the government at the time. In 1920, NACA established its own laboratories in Virginia called the Langley Aeronautical Laboratory. Due to mounting fears that the US would fall behind in the Space Race, Congress passed the Space Act of 1958, which officially replaced NACA with a new agency dedicated to making strides in space exploration and travel.

NASA: The National Aeronautic Space Administration is officially based in Washington, but it has a variety of labs and offices across the country conducting research and other experiments.



Space Act of 1958: Officially known as the National Aeronautics and Space Act, this law established NASA as the new official space agency for the United States. It set out eight main objectives for NASA to achieve through its operations. The primary objective was " the preservation of the role of the United States as a leader in aeronautical and space science and technology and in the application thereof to the conduct of peaceful activities within and outside the atmosphere."



The Centaur Rocket & Cleveland, Ohio

The Centaur Rocket is a group of rockets placed on the upper-stage of a launchpad used to give the aircrafts and shuttles an added boost.

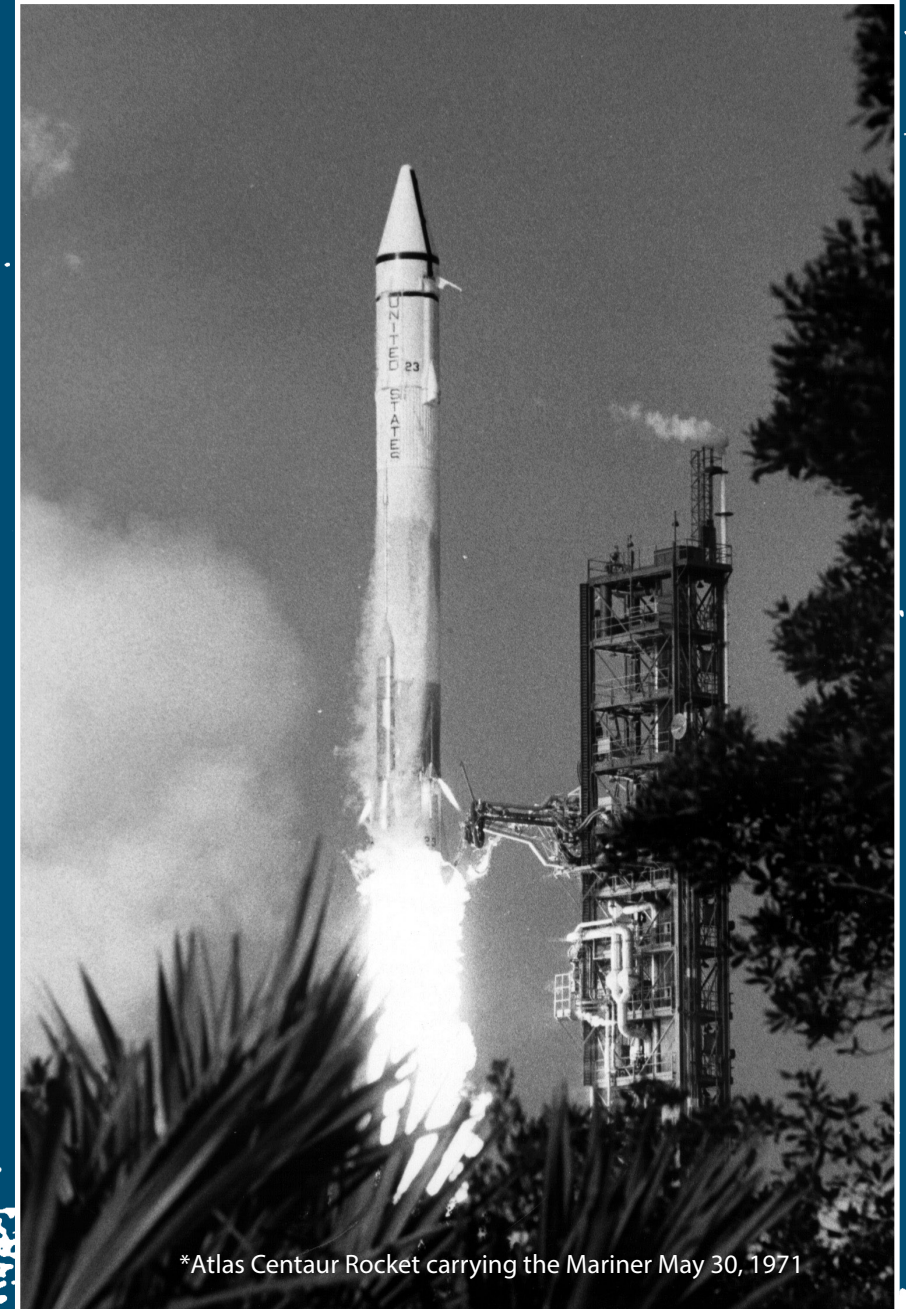
"Reflecting long-range U.S. space strategy, on July 1, 1959, NASA took over the jurisdiction of Centaur from the Department of Defense. Soon after, the first Centaur flight test was set for January 1961. Centaur was not to be just another booster, but the rocket by which NASA would conduct extensive Earth orbit missions, lunar investigations, and planetary studies. Aside from military satellite missions assigned to Centaur, which were to be considerable, NASA planned to launch one operational Centaur every month for a period extending well into the 1970's and beyond." (Dunbar, NASA.gov '15)

<https://www.nasa.gov/centers/glenn/about/history/centaur.html>

The first successful launch was on November 27, 1963. It was the first in flight burn of a liquid-hydrogen to liquid-oxygen engine.

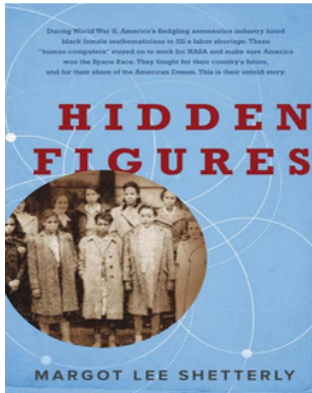
Cleveland Research Facilities:

NACA Lewis Flight Propulsion Laboratory became NASA Lewis Research Center, 1958–1999, and eventually the John H. Glenn Research Center in Cleveland, Ohio. Aircraft Engine Research Facility then turned in to John H. Glenn Research Center. The research and outreach centers are still there today.



*Atlas Centaur Rocket carrying the Mariner May 30, 1971

Human Computers & Hidden Figures



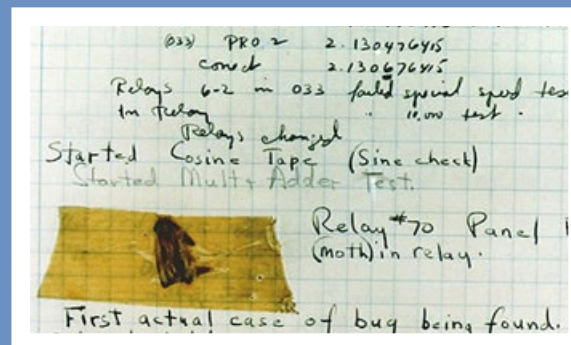
(NASA)

On September 6, 2016, Margot Lee Shetterly published a pioneering book titled *Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race*. As said by Shetterly, “*Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* recovers the history of these pioneering women and situates it in the intersection of the defining movements of the American century: the Cold War, the Space Race, the Civil Rights movement and the quest for gender equality.” In 2017, a movie based on the book was released into theaters. It was a smash hit at the box office, and it was the 14th highest-grossing film of 2017.

Margot Lee Shetterly grew up surrounded by Black scientists and scholars. Her father was a lifetime NASA professional, eventually becoming a highly respected climate expert. Five of her aunts and uncles were engineers or technologists, and her father’s best friend was an aeronautical engineer. As she grew older and learned more about Black people and women’s roles in the success of NACA and NASA, she decided to bring the stories of these people to the light. In addition to writing *Hidden Figures*, she is also the founder of The Human Computer Project, which seeks to reveal the stories of all women who worked for NACA and NASA as scientists, mathematicians, and engineers from the 1930s to the 1980s.

What is a human computer?

Dating back to the 17th century mathematicians, a human computer or “one who computes,” refers to people who performed mathematical calculations before electronic computers were available and capable to perform equations, calculations, and troubleshooting. Human computers were used for everything from mapping the stars and tracking their longevity on glass plates to creating code to help launch orbiters and astronauts into space.



Fun Fact:

The first “debugging” of a computer occurred in September at the end of WWII. A group of engineers found an actual moth stuck inside that was obstructing the relay contacts within the computer.

Human Computers & Hidden Figures (cont.)

These are some of the real human computers depicted in the film, *Hidden Figures*



Dorothy Vaughan

Education: B.A., Mathematics, Wilberforce University, 1929
Hired: NACA, 1943
Retired: NASA, 1971
Role at NACA/NASA: Dorothy Vaughan served as NACA's first Black supervisor for the West Area Computing Unit. This was a huge accomplishment for Vaughan, yet it still came with its challenges. This unit was segregated for people of color who worked at NACA. Bathrooms and dining facilities were separate from their white coworkers.



Mary Jackson

Education: B.S., Mathematics and Physical Science, Hampton Institute 1942
Hired: NACA, April 1951
Retired: NASA, 1985
Role at NACA/NASA: She was an Aeronautical engineer at NASA for 34 years.
Fun Fact: During her time at NASA, Mary Jackson took a step down from her position as a pioneering engineer and writing important research reports to focus on a career helping establish equal employment opportunities at NASA. At the Langley Aeronautical Laboratory, she became the Women's Program Manager and began working vigorously to change the dynamic for hiring and promoting up-and-coming women interested in careers in science, mathematics, and engineering through NASA.



Katherine Johnson

Education: B.S., Mathematics and French, West Virginia State College, 1937
Hired: NACA, June 1953
Retired: NASA, 1986
Role at NACA/NASA: Several different positions
Fun Fact: Katherine's brilliance with numbers allowed her to skip a few grade levels in school, and she began high school at the West Virginia State College at 13. She enrolled in college at the same campus at 18 and graduated with the highest honors from college at 19. Furthermore, Katherine did all of the preflight checks (all numbers and equations) for John Glenn's Friendship 7 Mission of taking an orbital flight to space. She did all of the equations by hand after they were already placed into a machine, in order to avoid any difficulties during the mission. Glenn refused to take the mission until he knew all checks were done by Johnson. "Glenn's flight was a success, and marked a turning point in the competition between the United States and the Soviet Union in space." (Loff, NASA.gov '18)

Projects

- Interactive learning in the classroom (click or copy the link)
<https://spaceplace.nasa.gov/menu/science-and-technology/>
- Space Battery <https://spaceplace.nasa.gov/batteries/en/> How long would your gaming battery last in space? Did you know?! Annie Easley worked on the early development of hybrid batteries during her time at NACA!
- “NASA is not alone in space!”
<https://spaceplace.nasa.gov/other-agencies/en/> -Choose one government space agency to do a fun slideshow and present it to the class!
- Become a Cosmic Poet & other activities for the classroom
<https://spaceplace.nasa.gov/classroom-activities/en/>

Common Core Standards

English/Language Arts Grades 6-8 6W3, 7W3, 8W3.

English/Language Arts Grades 9-10R1,
Grades 11-12R1

Grade 8 Social Studies B1-9, E1-6, F1-9

Grade 9-12 Social Studies 11.9 (a-d) 11.10 (a-c)

elements of drama

PLOT

What is the story line? What happened before the play started? What do the characters want? What do they do to achieve their goals? What do they stand to gain/lose?

THEME

What ideas, conflicts, or actions are presented in the play? What questions does the play pose? Does it present an opinion?

CHARACTER

Who are the people in the story? What are their relationships? Why do they do what they do? How does age/status/etc. affect them?

LANGUAGE

What do the characters say? How do they say it? When do they say it?

MUSIC

How do music and sound help to tell the story?

SPECTACLE

How do the elements come together to create the whole performance?

Other Elements: Conflict/Resolution, Action, Improvisation, Non-verbal communication, Staging, Humor, Realism and other styles, Metaphor, Language, Tone, Pattern & Repetition, Emotion, Point of view.

Any piece of theatre comprises multiple art forms. As you explore this production with your students, examine the use of:

WRITING
VISUAL ART/DESIGN
MUSIC/SOUND
DANCE/MOVEMENT

ACTIVITY

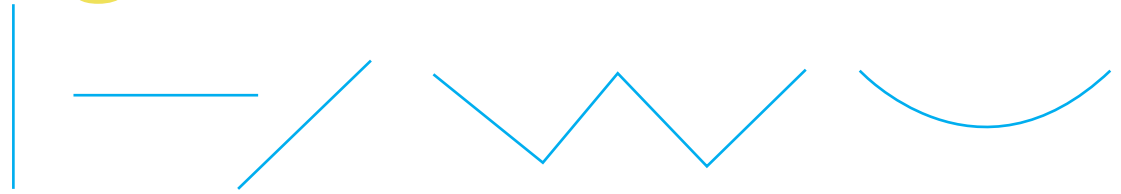
Drama is about characters working toward goals and overcoming obstacles. Ask students to use their bodies and voices to create characters who are: very old, very young, very strong, very weak, very tired, very energetic, very cold, very warm. Give them an objective to fulfill as well as an environmental obstacle. Later, recap by asking how these obstacles affected their characters and the pursuit of their objectives.

INQUIRY

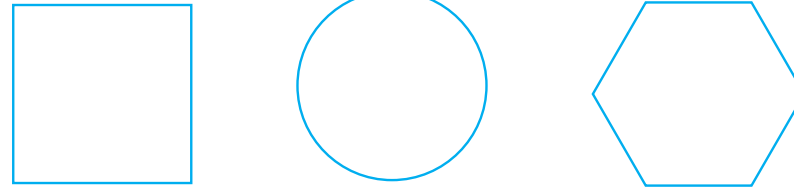
How are each of these art forms used in this production? Why are they used? How do they help to tell the story?

elements of design

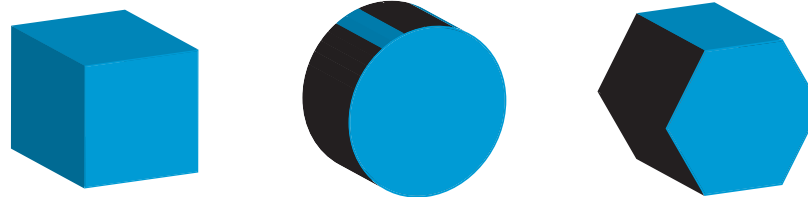
LINE can have length, width, texture, direction, and curve. There are five basic varieties: vertical, horizontal, diagonal, curved, and zig-zag.



SHAPE is two-dimensional and encloses space. It can be geometric (e.g. squares and circles), man-made, or free-form.



FORM is three-dimensional. It encloses space and fills space. It can be geometric (e.g. cubes and cylinders), man-made, or free-form.



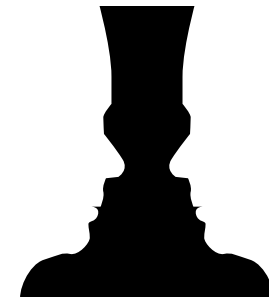
COLOR has three basic properties: **HUE** is the name of the color (e.g. red, blue, green), **INTENSITY** is the strength of the color (bright or dull), **VALUE** is the range of lightness to darkness.



TEXTURE refers to the “feel” of an object’s surface. It can be smooth, rough, soft, etc. Textures may be **ACTUAL** (able to be felt) or **IMPLIED** (suggested visually through the artist’s technique).



SPACE is defined and determined by shapes and forms. Positive space is enclosed by shapes and forms, while negative space exists around them.



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