

SPACE: A Journey to Our Future

Teacher's Exhibit Guide

Gerald R. Ford Presidential Museum
Grand Rapids, Michigan

Index

November 5, 2016 - May 29, 2017

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Relevant Michigan Content Standards

Elementary Social Studies Standards

History

K – H2.0.4 Describe ways people learn about the past (e.g., photos, artifacts, diaries, stories, videos).

6 – H1.4.3 Use historical perspective to analyze global issues faced by humans long ago and today.

6 – H1.4.1 Describe and use cultural institutions to study an era and a region (political, economic, religion/ belief, science/technology, written language, education, family)

6 – H1.2.5 Identify the role of the individual in history and the significance of one person's ideas.

6 – H1.2.2 Read and comprehend a historical passage to identify basic factual knowledge and the literal meaning by indicating who was involved, what happened, where it happened, what events led to the development, and what consequences or outcomes followed.

6 – H1.2.3 Identify the point of view (perspective of the author) and context when reading and discussing primary and secondary sources.

Civics and Government

7 – C4.3.2 Explain the challenges to governments and the cooperation needed to address international issues (e.g., migration and human rights).

High School Social Studies Standards

World History and Geography

WHG -- Era 7: Global Crisis and Achievement (1900-1945)

7.2 Interregional or Comparative Expectations

7.2.3 World War II – Analyze the causes, course, characteristics, and immediate consequences of World War II by describing the emergence of the United States and the Soviet Union as global superpowers.

WHG -- Era 8: The Cold War and Its Aftermath: The 20th Century Since 1945

8.1 Global and Cross-Temporal Expectations

8.1.2 Cold War Conflicts – Describe the major arenas of conflict, including the arms and space race.

United States History and Geography

USHG -- Era 8: Post-World War II United States (1945-1989)

8.1 Cold War and the United States

8.1.2 Foreign Policy During the Cold War

Civics

USHG -- C4: The United States of American and World Affairs

4.1 Formation and Implementation of U.S. Foreign Policy

- 4.1.3 Evaluate the means used to implement U.S. foreign policy with respect to current or past international issues
- 4.1.4 Using at least two historical examples, explain reasons for, and consequences of, conflicts that arise when international disputes cannot be resolved peacefully.
- 4.2 U.S. Role in International Institutions and Affairs
 - 4.2.2 Analyze the impact of American political, economic, technological, and cultural developments on other parts of the world.

K-12 Science Standards

Space Systems

- 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
- 5-PS2-1 Support an argument that the gravitational force exerted by Earth on objects is directed down.
- MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.

Engineering

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Vocabulary

Aeronautics - the science or practice of travel through the air.

Apollo - A series of spacecraft designed for the U.S. space program to carry astronauts to the moon and back.

Soyuz - A series of spacecraft designed for the Soviet space program to conduct scientific research as part of the Soviet Manned Lunar program.

Astronaut - A person who is trained to travel in a spacecraft.

Cosmonaut - An astronaut of the Soviet or Russian space program.

Detente - A relaxing of tension, especially between two nations, as by negotiations or agreements.

Galaxy - A system of millions or billions of stars, together with gas and dust, held together by gravitational attraction.

Orbit - the curved path of an object in space as it revolves around a star, planet, or moon.

NASA - The National Aeronautics and Space Administration was started in 1958 as part of the United States government and is in charge of U.S. science and technology that has to do with airplanes and space.

Satellite - A device designed to be launched into orbit around the earth, another planet, the sun, etc.

Solar System - The sun together with the eight planets and all other celestial bodies that orbit the sun.

Universe - All space-time, matter, and energy, including the solar system, all the stars and galaxies, and the contents of space regarded as a whole.

SPACE: A Journey to Our Future

Presented by Evergreen Exhibitions, ***SPACE: A Journey to Our Future***, explores humankind's past explorations and future destiny in space. Visitors to the exhibit are reminded that only through dreaming and exploration can we truly begin to live as inhabitants of this universe we call home. Audiences are reintroduced to generations of dreamers and thinkers who have at times risked their lives to give us all a better understanding of who we are and how we fit into the universe around us. Most importantly, we will meet today's explorers and innovators who continue to seek to understand more about our planet and how to protect it. They are on the forefront of the search for answers to our questions about the beginning of the universe and what life exists out there. The exhibit reminds each visitor that it is these unknown questions about our existence that makes us all the same, inexorably tied together on this fragile, blue planet. Through this exhibit, we will realize once again that it is a moral imperative for us as the human race and as a planet to continue the search for answers.

With immersive scenic elements, impressive interactive exhibits, and hands-on opportunities, visitors are able to take their own personal journey of discovery. An "out of this world" story becomes a reality in front of audience's eyes. Touch actual rocks from the surface of Mars, explore a full-size Lunar Base Camp, help NASA design a new spacecraft, and take a spin on the centrifuge. The exhibit hopes to spark imaginations and inspire a new generation of dreamers and explorers. The future is the focus here and the possibilities are endless.

Content Collaborators: Corporate Sponsors:

National Aeronautics and Space Administration (NASA)

General Motors

National Science Teachers Association (NSTA)

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Space Day

Exhibit Section Overview

Dare to Dream

Humankind's knowledge of space and our place in the universe has been shaped by centuries of dreamers who dared to go where no one had ever gone before. This area is a tribute to those dreamers and their amazing achievements, and will start us on our own journey to discovery. A video is devoted to questions about the universe and our existence: How big is the universe? How did the universe begin? Are we alone? Are you the next Galileo?

A Dream Come True

On July 17, 1969, humans first got a glimpse of their home planet, seen from the surface of the Moon. To this day, we are still awed by this image and the success of the Apollo program in placing a man on the Moon. This area is dedicated to that remarkable achievement and the people that made the dream into a reality.

Living the Dream

Today, all over the world, people and organizations continue to unlock the many secrets of the universe by envisioning new ideas and creating new tools. The wonders of discovery are taking place all around us and we as a planet, are truly living the dream. Multimedia, graphic and interactive displays describe NASA's current research in the areas of robonauts, deep space probes, next generation telescopes, living in space and space tourism.

Dream of Tomorrow

While we have achieved remarkable feats in our journey into space, there is still much to discover. Today's dreamers, like those before them, dare to imagine what secrets the universe still holds. Visitors may board the Lunar Expedition Station in the year 2020 on a mission to the moon. They encounter the leader of the base expedition team who invites them inside to explore the living quarter modules.

SPACE: A Journey to Our Future encourages all visitors to continue their personal journey of discovery in space exploration. Details on additional resources and information can be found in the exit area of the exhibit and in the back of this packet.

A History of the United States Space Program

Following World War II, two superpowers, the United States and the Soviet Union, emerged and quickly became locked in a battle of competing ideals and national interests. The Cold War as it came to be known, was a broad war rooted in governmental ideologies, technological superiority, and economic vitality, and space exploration became one major battleground. Both countries had experimented with long-range missiles and rockets near the end of the Second World War in order to defeat Hitler and the Axis Powers, but the Cold War intensified these efforts and turned them skywards. In the United States, the Department of Defense led the effort in the late 1940's. When Dwight Eisenhower became president, he approved a plan to launch a scientific satellite into orbit in order to collect data about the Earth. A major blow to the United States came, however, on October 4, 1957 when the Soviet Union announced that they had successfully launched a satellite, Sputnik 1, into orbit. Fearing that the nation was falling behind and a technological gap was forming, President Eisenhower signed the National Defense Education Act in 1958 which increased federal spending for education and emphasized math and science programs. Additionally, on October 1, 1958, the National Aeronautics and Space Administration (NASA) was created to oversee United States research in space and space travel. The new federal agency absorbed the older National Advisory Committee for Aeronautics (NACA) as well as their 8000 employees, \$100 million budget, laboratories, and test facilities. Today, NASA's budget exceeds \$19 billion a year.

NASA quickly started work on its first major project, Project Mercury, with the goal of putting a man into Earth orbit and returning him safely before the Soviet Union. Project Mercury had six successful missions and proved that man could survive in space, however, the USSR beat the U.S. in sending a man into orbit. Russian cosmonaut, Yuri Gagarin, became the first human in space in April 1961 and was followed closely by American Alan Shepard in May of 1961. Hoping to inspire the United States and make space exploration a top national priority, President John F. Kennedy committed the country to placing a man on the moon by the end of the 1960's. Project Gemini began in 1961 and succeeded in sending ten, two-man spacecraft into space. NASA worked on docking spacecraft in space, researched how astronauts responded to spending long periods of time in space, and carried out the first spacewalk. By 1968, NASA believed they were ready to go to the moon, and taking what they learned from Projects Mercury and Gemini, launched Project Apollo. On July 20, 1969, Apollo 11 landed on the moon and astronauts Neil Armstrong and Buzz Aldrin became the first humans ever on the lunar surface. The United States had achieved President Kennedy's goal and transformed the dreams of so many into a reality. Apollo would successfully land on the moon five more times and collect hundreds of tons of lunar material and data that helped the world understand the moon and its history. In addition to manned missions, NASA conducted extensive aeronautics research, launched communication and navigation satellites, and sent robots and probes to the Moon, Venus, Mars, and the outer reaches of the solar system.

After the success of the 1960's, NASA hoped to carry that momentum into the next decade. In 1973, a project eight years in the making, Skylab, was launched. Skylab was the United

States first and only independently built space station and it was equipped with a laboratory and an observatory. Three crews occupied the space station for a total of 171 days, but budget cuts during the Johnson and Nixon Administrations limited available resources for the project and Skylab re-entered the Earth's atmosphere in 1979. At the same time, NASA was working on the Space Shuttle program. To save costs, NASA sought to create a spacecraft that could be used multiple times. The development of the Space Shuttle became the major focus in the late 1970's and the first, *Columbia*, was launched in 1981. The program achieved 133 successful missions and lasted thirty years, finally ending in 2011. With all its success, the Space Shuttle program was forced to endure tragedy in 1986 and again in 2003 when the spacecraft *Challenger* and *Columbia* exploded, killing all aboard. The disasters increased NASA's commitment to achieving safe and reliable space travel.

Before the close of the 20th century, NASA launched the International Space Station (ISS). The ISS is the length of a football field and five times larger than America's first space station, Skylab. With its crews, engineers, test facilities, launch vehicles and scientists spread out over the globe, the ISS is a testament to what is possible when the world's nations work together towards a common goal. Since its launch in 1998, the ISS has been the site of hundreds of scientific experiments that have helped humankind learn more about our planet and the universe around us. Today, NASA's goals include, but are not limited to, continuing to use the International Space Station to conduct scientific experiments, studying asteroids through the Asteroid Redirect Mission, and launching a manned mission to Mars in the 2030's.

Timeline of Space Exploration

- October 4, 1957: The Soviet Union launched the first satellite, Sputnik, into space.
- November 3, 1957: The Soviet spacecraft Sputnik 2 was launched with a dog named Laika on board. Laika did not survive the voyage
- January 31, 1958: Explorer 1, the first satellite launched by the United States, was sent into orbit.
- August 19, 1960: The Soviet craft Sputnik 5 was launched, carrying the dogs Strelka and Belka. They became the first living things to survive a trip into space.
- April 12, 1961: Russian cosmonaut Yuri Gagarin became the first human in space.
- May 5, 1961; Astronaut Alan Shepard became the first American in space.
- May 25, 1961: President Kennedy challenges the country to put a man on the moon by the end of the decade.
- February 20, 1962: Astronaut John Glenn became the first American in orbit.
- June 16, 1962: Valentina Nikolayeva Tereshkova became the first woman in space.
- March 18, 1962: While tethered to his spacecraft, cosmonaut Alexei Leonov became the first man to walk in space.
- June 3, 1962: Astronaut Ed White became the first American to walk in space.
- July 14, 1962: The spacecraft Mariner 4 transmitted the first pictures of Mars.
- June 2, 1966: Surveyor 1 became the first American spacecraft to land on the moon.
- January 27, 1967: Astronauts Gus Grissom, Ed White, and Roger Chaffee were killed in an accidental fire in a command module on the launch pad.
- December 21, 1968: Apollo 8 was launched and her crewmembers became the first men to orbit the moon.
- July 20, 1969: Neil Armstrong and “Buzz” Aldrin became the first men on the moon.
- April 11, 1970: Apollo 13 was launched
- April 19, 1971: The Soviet space station Salyut 1 was launched.
- July 30, 1971: The moon rover was driven on the moon for the first time.
- December 11, 1972: Eugene Cernan and Harrison “Jack” Schmitt became the last men to walk on the moon.
- May 14, 1973: The U.S. launched its first space station, Skylab.
- July 17, 1975: The American Apollo 18 and Soviet Soyuz 19 dock in the Apollo-Soyuz Test Project
- March and August 1979: Voyagers 1 and 2 begin transmitting images from Jupiter.
- September 1979: The U.S. probe Pioneer 11 begins transmitting images from Saturn.
- April 12, 1981: Columbia became the first Space Shuttle to be launched
- April 4, 1983: The second Space Shuttle, Challenger, was launched.
- June 19, 1983: Sally Ride became the first American woman in space on Challenger’s second mission.
- August 30, 1984: The third Space Shuttle, Discovery, was launched.
- October 3, 1985: The fourth Space Shuttle, Atlantis, was launched.
- January 28, 1986: The Space Shuttle Challenger exploded seconds after liftoff killing all onboard.
- August 24, 1990: The Hubble Space Telescope was launched from the Space Shuttle Discovery.
- May 7, 1992: The Space Shuttle Endeavor was launched.

- Nov. 2, 2000: Russian and American astronauts begin living on the International Space Station.
- April 28, 2001: American Dennis Tito became the first tourist in space after he paid the Russian space program \$20 million
- February 1, 2003: The Space Shuttle Columbia broke up on re-entry into the Earth's atmosphere killing all seven astronauts aboard.
- May 25, 2008: The Phoenix Mars Lander discovers chunks of ice on Mars.
- March 6, 2009: The NASA spacecraft Kepler was launched. Its mission is to search for planets outside our solar system.
- June 18, 2009: NASA discovered "significant amounts" of ice found on the moon's South Pole.
- October 11, 2010: President Obama signed legislation focusing NASA's efforts on exploring Mars and asteroids.

Biographies

Leonid Brezhnev served as the General Secretary of the Communist Party of the Soviet Union. As head of the party, Brezhnev focused primarily on foreign and military affairs. During the 1970's, Brezhnev saw to it that the Soviet Union's nuclear weapons equaled those of the United States, and increased the size of its army so that it was the largest in the world. He worked tirelessly to ensure that the Soviet space program surpassed that of the U.S., but in 1975, Brezhnev worked with President Gerald R. Ford on a joint mission known as the Apollo-Soyuz Test Project. Brezhnev remained leader of the Soviet Union until his death in November 1982.

Dwight Eisenhower served as the 34th President of the United States. A decorated general and hero of World War II, President Eisenhower led the United States through the end of the Korean War and into the beginning of the Cold War. National security was of top priority during the Eisenhower presidency. When the Soviets launched Sputnik, Eisenhower ordered the creation of NASA and so began the "Space Race." Eisenhower signed the National Defense Education Act in 1958, placing a greater emphasis on math and science programs in United States schools, and approved Project Mercury. In an attempt to improve U.S. - Soviet relations, Eisenhower invited Soviet Premier Nikita Khrushchev to visit the United States. In September 1959, Khrushchev toured parts of the country and held private talks with Eisenhower, also inviting him to visit the Soviet Union. However, after a U.S. U-2 spy plane piloted by American Francis Gary Powers was shot down over the Soviet Union in May 1960, Khrushchev angrily withdrew Eisenhower's invitation to visit.

John F. Kennedy served as the 35th President of the United States. Kennedy narrowly defeated Republican candidate Richard Nixon, making him the youngest man and the first Roman Catholic ever elected to the American presidency. Kennedy's presidency was dominated by international tensions and conflict with the Soviet Union. In 1961, with the Soviets still beating the U.S. in the Space Race, Kennedy challenged the nation to put a man on the moon by the end of the decade. Kennedy famously said, "We choose to go to the moon in this decade and do 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, and the others, too." Kennedy made space exploration a national priority and a public fascination. He increased NASA's budget and approved projects Gemini and Apollo. On November 22, 1963, Kennedy was shot and killed by Lee Harvey Oswald, while riding in an open limousine in Dallas. The Kennedy Space Center was named in his honor.

Lyndon B. Johnson served as the 36th President of the United States. As President Kennedy's Vice President, Johnson was sworn in as President of the United States two hours after Kennedy's assassination on November 22, 1963. Johnson was a master politician and was able to push mass amounts of major legislation through Congress at impressive speeds. He was known for being aggressive and domineering, using the "Johnson treatment" to persuade people to advance his agenda. Johnson worked to support many of Kennedy's domestic initiatives, including the U.S. space program. He encouraged political and monetary

support for the Apollo program and pushed for passage of the United Nations Outer Space Treaty which preserved outer space as a peaceful territory. However, after a successful manned mission to the moon, Johnson did not discuss any future plans for NASA and allowed funding for the space program to drop. Amidst mounting opposition to the Vietnam War and domestic instability, Johnson announced that he would not run for president in the 1968 election.

Richard M. Nixon served as the 37th President of the United States. Nixon's presidency was dominated by the Vietnam War and United States foreign policy. With his attention elsewhere, Nixon rejected the ambitious post-Apollo plans proposed by NASA and let funding fall from four to one percent of the federal government's budget. This drop caused NASA to close production lines for the Apollo spacecraft and the Saturn V rocket, and to cancel Apollo missions 18, 19, and 20. Nixon believed that, "We must think of [space activities] as part of a continuing process and not as a series of separate leaps, each requiring a massive concentration of energy. Space expenditures must take their proper place within a rigorous system of national priorities." However, Nixon did see the scientific and cost-efficient benefits of the space shuttle and approved funding for the program. Nixon won reelection in the 1972 presidential election with one of the largest landslides in American history. During the summer leading up to the election, five men were arrested with burglary of the national headquarters of the Democratic Party at the Watergate office complex in Washington, D.C. It was later discovered that Nixon had a hand in the subsequent attempts to cover up the Nixon administration's involvement in Watergate. With near-certain impeachment by the House and conviction by the Senate, Nixon announced his resignation on August 8, 1974.

Gerald R. Ford served as the 38th President of the United States. Born in Grand Rapids in 1913, Ford served in Congress for twenty-five years before being appointed Richard Nixon's Vice President and eventually assuming the presidency following Nixon's resignation. During his 895 days in office, Ford sought to heal the nation and international relations. One attempt at detente came in the form of a joint space mission with the Soviet Union. During the Apollo-Soyuz Test Project, American and Soviet space programs worked together to successfully dock the Apollo module with the Soyuz spacecraft in space. The mission was an important step forward in improving relations between the two countries. Ford continued to support the space program and NASA's efforts. He saluted the landings of the Viking robotic explorers on Mars, awarded the crews of the Apollo-Soyuz Project the NASA Distinguished Service Medal, and encouraged Congress to re-establish the Science Advisor to the President, a position President Nixon had abolished. Ford sought reelection in 1976, but was narrowly defeated by the Democratic candidate Jimmy Carter.

Jimmy Carter served as the 39th President of the United States. Least supportive of manned missions, but supportive of engineering goals to create robotic explorers. Considered ending space shuttle program, but needed to launch satellites to monitor arms limitations which was important to the administration so it was kept. Provided a message of peace to be included in the golden phonograph records placed aboard the twin Voyager spacecraft and bestowed first Congressional Space Medal of Honor to astronauts on NASA's 20th birthday.

Ronald Reagan served as the 40th President of the United States. During his presidency, Reagan provided strong rhetorical support for NASA and called for a presidential commission to investigate the Challenger disaster. Reagan approved the space station Freedom program and invited US allies to join in the project. Eventually, despite describing Russia as the “evil empire”, Reagan worked towards cooperation in space with the Soviet Union and its leader Mikhail Gorbachev near the end of his presidency.

George H.W. Bush served as the 41st President of the United States. The nation was still recovering from the Challenger tragedy and NASA sought a new challenge to inspire the nation. Bush announced a bold new plan, the Space Exploration Initiative, which involved the Space Station Freedom program, a trip back to the moon, and even a manned mission to Mars. Both NASA and Congress were skeptical and in 1990, a commission on NASA’s overall effectiveness concluded that NASA had been overcommitting itself. Bush pushed to increase NASA’s budget and made changes to top levels of its administration. Another program during Bush’s Time in office, a Mission to Planet Earth, which involved using satellites to understand global climate change, created a much stronger legacy and the Space Exploration Initiative ended with Bush’s presidency.

Bill Clinton served as the 42nd President of the United States. For Clinton, space exploration was not a huge priority and he allowed NASA’s budget to drop during his presidency. However, when he was advised to cut the over-budget and delayed space station program, he instead accepted a proposal to redesign the space station to include American and Russian elements, thus creating the International Space Station. Clinton stated, “This is a promising moment. Instead of building weapons in space, Russian scientists will help us build the International Space Station.”

George W. Bush served as the 43rd President of the United States. Soon after taking office in 2001, Bush put the ISS program on probation due to budget and management issues. The move was internationally unpopular. In 2003 after the Columbia disaster, no White House commission was established to research the incident so NASA decided to charter an independent board to investigate. In their findings, NASA’s board expressed a lack of national leadership in replacing the aging space shuttle and providing a future vision for the space program. Bush and his advisors quickly responded to the observations and announced a new national agenda in space. Sustained and affordable human and robotic space missions of the solar system and beyond, a manned mission to the moon by 2020, and preparation for a human mission to Mars were all included in this new vision. Bush did place a limit, however, on the space shuttle program, scheduling the last flight for 2010.

Barack Obama served as the 44th President of the United States. In 2010, he outlined his administration’s plan for the nation’s space program. Obama proposed increasing NASA’s budget by six billion dollars over the next five years, extending the life of the ISS program, and further developing mankind’s capabilities in space, specifically learning more about to live and work in space for long periods of time. Obama provided strong rhetorical support for the nation’s space program and the scientific knowledge gained through space exploration. For the 2017 fiscal year, President Obama did propose a slight decrease in NASA’s budget, but increased the amount of funding for Earth Science research. Private companies were also

encouraged to compete to help develop new technology and space crafts. The goal of launching a manned mission beyond the moon by 2025 was also expressed by the President.

“Buzz” Aldrin was born on January 20, 1930 in New Jersey. He graduated from Montclair High School and earned a Bachelor of Science degree from the United States Military Academy at West Point in 1951. He graduated third in his class. Aldrin served as a USAF jet fighter pilot during the Korean War and flew 66 combat missions while on duty. He was selected to join NASA in 1963 and on November 11, 1966, Aldrin and James Lovell were launched into space aboard the Gemini 12 spacecraft. During this mission, he set a new record for extravehicular activity (EVA) when he spent 5-½ hours outside the spacecraft. Aldrin is best known, however, for serving as the lunar module pilot for Apollo 11 which landed on the surface of the moon on July 20, 1969. Aldrin would become the second man to step foot on the moon, following Neil Armstrong out of the spacecraft.

Neil Armstrong was born on August 5, 1930 in Ohio. He earned a degree in Aeronautical Engineering from Purdue University and a Master of Science in Aerospace Engineering from the University of Southern California. Armstrong served as a naval aviator from 1949 to 1952 and joined the National Advisory Committee for Aeronautics (NACA) in 1955. Armstrong served as a test pilot, engineer, astronaut, and administrator for NACA and its successor, NASA. In 1962, Armstrong became an astronaut and achieved the first successful docking of two vehicles in space in 1966. On July 20, 1969, he became the first man ever to land on the moon and walk its surface. Subsequently, Armstrong was a professor at the University of Cincinnati, Chairman of the Presidential Advisory Committee for the Peace Corps, and was the Deputy Associate Administrator for Aeronautics at NASA Headquarters. Neil Armstrong has received countless medals and awards from seventeen different countries.

John Glenn was born on July 18, 1921 in Ohio. He received a degree in engineering from Muskingum College and was commissioned in the Marine Corps in 1943. Glenn served as a Marine Fighter Pilot during WWII and the Korean War, flying over 100 missions. In 1957, while he was a project officer with the Navy Bureau of Aeronautics, Glenn set a transcontinental speed record when he flew from Los Angeles to New York in 3 hours and 23 minutes. Glenn was selected to be a Project Mercury Astronaut in 1959 and on February 20, 1962, John Glenn became the first American to orbit the Earth. In 1974, Glenn was elected senator and served in Congress until 1999. In late 1998, Glenn returned to space one last time aboard the Space Shuttle *Discovery* and became the oldest person to ever travel into space. Glenn logged 218 hours in space and has been honored with dozens of medals and awards.

Sally Ride was born on May 26, 1951 in California. Upon graduating high school, Ride earned a degree in physics from Stanford University. While she was a student, Ride came across an ad in the school newspaper encouraging women to apply for the astronaut program. Ride applied and was one of six women chosen. She officially joined NASA in 1978 and on June 18, 1983, Sally Ride became the first woman in space. After one more mission aboard the space shuttle in 1984, Ride stopped working for NASA and began teaching at the University of California in San Diego. She wanted to help women and girls who wanted to study science and mathematics. Ride helped develop NASA’s EarthKAM project which

allows middle school students to take pictures of space from a camera on the International Space Station and study them, and was inducted into The Astronaut Hall of Fame in 2003 for her efforts.

Roger B. Chaffee was born on February 15, 1935 in Grand Rapids, Michigan. He graduated from Central High School in Grand Rapids, Michigan and received a degree in Aeronautical Engineering from Purdue University in 1957. That same year, he entered the United States Navy. Eventually becoming a Lieutenant Commander, Chaffee logged more than 2,300 hours of flying time. In 1963, he was selected by NASA to participate in the overall training program and work on various communication and control systems in the Apollo Branch of the Astronaut office. On March 21, 1963, Chaffee was one of three pilots chosen for the first 3-man Apollo flight. On January 27, 1967, a fire broke out in the pure oxygen environment of the Apollo 1 space capsule during training. The fire killed all three astronauts: Virgil “Gus” Grissom, Edward White, and Roger Chaffee. Several years earlier, on March 23, 1961, a similar tragedy occurred when cosmonaut, Valentin Bondarenko, died in a fire in the oxygen-saturated environment he trained in. More openness between the Russian and U.S. space programs may have helped prevent the second disaster. Chaffee was posthumously awarded the Congressional Space Medal of Honor and the Roger B. Chaffee Memorial Drive in Grand Rapids was named in his honor.

Gerald R. Ford and the Space Race

With the Soviet launching of Sputnik 1, President Dwight Eisenhower had a national emergency on his hands. It was feared that a technological gap had emerged between the United States and the Soviet Union and military strategists believed that the launch had given the Soviet Union an advantage in delivering nuclear weapons. Eisenhower, to combat the new threat, asked Speaker of the House, Sam Rayburn, and Senate Majority Leader, Lyndon B. Johnson, to create a new government agency in charge of exploring space. Just days after the successful launch of Sputnik, Representative Gerald R. Ford was summoned by Sam Rayburn into his office. Rayburn explained to Ford that a bipartisan House and Senate Special Committee was being formed to create the National Aeronautics and Space Administration (NASA) and that Ford had been selected to be a member. Ford quickly accepted. Under the master negotiator and legislator, Lyndon B. Johnson, who appointed himself as chair, the committee created NASA in less than a year. Ford was an early advocate of the space program, saying in a speech in 1957, "Despite all the headlines which have accompanied launchings, there is reason to question whether the people as a whole fully recognize that our life has begun to change, following a new, irreversible path.... We stand at the edge of a new age. We have but to life our eyes, to work to meet the challenge, and the destiny of our kind will be shaped by these great opportunities now before us." While working on the committee, Ford realized the importance space research had on national security as well as on the everyday lives of Americans. Ford believed that the benefits of the space program extended to advances in weather prediction, medical care, communications, metallurgy, and even "freight and mail ballistic rockets."

Throughout the Kennedy, Johnson, and Nixon administrations, he continued to support the space program and efforts of brave Americans willing to explore the last frontier. On May 24, 1972, President Nixon and Soviet Chairman Alexei Kosygin signed the Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes. This laid the groundwork for one of the greatest accomplishments of Ford's Presidency, the Apollo-Soyuz Test Project. Training for the joint mission with the Soviet Union began in July 1973. The two nation's crews, engineers, and scientists visited each other's facilities and the Russian crew took English language classes while the American crew took classes on the Russian language. When President Richard M. Nixon resigned on August 9, 1974 and Gerald R. Ford became the 38th President of the United States, Ford continued work on the project and assured that through every stage of the operation, the United States and the Soviet Union worked together.

After months of planning and training, on July 17, 1975, the Russian and American crews met in space when the Apollo command and service module successfully docked with the Soyuz spacecraft. The crews orbited the Earth for two days, shared meals, conducted joint experiments, and exchanged gifts. Both President Ford and Soviet Brezhnev called the crews to congratulate them. To highlight the importance of the project, Ford stated, "The Apollo-Soyuz Flight was an encouraging reminder that - in an atmosphere of mutual trust and respect - men from different countries and different systems can work together toward a common goal with courage, intelligence, and success.... If we can bring the spirit of Apollo-Soyuz to bear on the many challenges mankind faces here on Earth, the future for all of us is

bright.” The significance of the mission was further emphasized when Edward Teller stated that, “The ongoing joint space operation of the United States and the Soviet Union is the biggest step that has been taken as yet toward an international space program.” The Apollo-Soyuz Test Project represented an attempt at detente between the warring nations and greatly laid the foundation for the International Space Station. After the project’s conclusion, Ford continued to publicly commend the accomplishments of NASA and the United States space programs. Furthermore, Ford approved the development of two large scientific missions that would become the Hubble Space Telescope and the Galileo mission to Mars.

Gerald R. Ford became president at a time of great unease. The leader of the nation had just resigned amidst scandal, humiliating the presidency and the United States was still reeling from the consequences of its unpopular fight in Vietnam. The nation needed something and someone to put their faith in. Ford understood the importance of this and saw space exploration as one area in which the possibilities for American ingenuity and growth were infinite. He believed that, “Our achievements in space represent[ed] not only the height of technological skill, they also reflect[ed] the best in our country - our character, the capacity for creativity and sacrifice, and a willingness to reach into the unknown. Space became a frontier of hope and Ford worked to give it to America.

Pre- and Post-Activities

Pre-Activities

(K-5)

1. Draw or paint a picture of the solar system. Label the planets.
2. Read *Dogs in Space* by Nancy Coffelt. Tell children the story of Belka and Strelka, the Soviet space dogs.

(6-8)

1. Create a timeline or list of the U.S. Space Program's major achievements.
2. Create a map of the solar system. Place flags or markers next to all important sites of exploration.
3. Analyze primary sources from Presidents Eisenhower-Ford. How did they feel about the space program and outer space exploration? What contributions did they make?

(9-12)

1. Analyze primary sources from Presidents Eisenhower-Ford. How did they feel about the space program and outer space exploration? What contributions did they make?

Post-Activities

(K-5)

1. Write a letter to President Trump. What would you like to explore in space?
2. Design your own spacecraft.
3. Pretend you are an astronaut. Write a short story about your own trip to space.

(6-8)

1. Write a letter to President Trump. What should the nation explore next in space? Should space exploration still be a priority?
2. Critical Thinking Questions
 - a. Should tourists go into space? What are the advantages and disadvantages?
 - b. Should space exploration still be a priority?
 - c. Has the United States fulfilled its goals in space? If so, how? If not, how can those goals be achieved?
3. Research one way space exploration has benefitted the average person. What technology has it produced? What have we learned?

(9-12)

1. Write a letter to President Trump. What should the nation explore next in space? Should space exploration still be a priority?
2. Critical Thinking Questions
 - a. Should tourists go into space?
 - b. What are the advantages and disadvantages of private companies designing and launching their own spacecraft?
 - c. Should space exploration still be a priority?
 - d. Has the United States fulfilled its goals in space? If so, how? If not, how can those goals be achieved?
3. Research one way space exploration has benefitted the average person. What technology has it produced? What have we learned?

Additional Resources

- Gerald R. Ford Presidential Library - Ann Arbor, MI
 - Address: 1000 Beal Avenue, Ann Arbor, MI 48109
 - Phone: (734) 205-0555
 - Email: ford.library@nara.gov
 - Website: www.fordlibrarymuseum.gov
- Air Zoo - Kalamazoo, MI
 - Address: 6151 Portage Road, Portage, MI 49002
 - Phone: (269) 382-6555
 - Website: www.airzoo.org
- James C. Veen Observatory - Grand Rapids Amateur Astronomical Association
 - Address: 3308 Kissing Rock Ave. S.E., Lowell, MI 49331
 - Phone: (616) 897-7065
 - Email: graaa@graaa.org
 - Website: www.graaa.org
- National Archives Website - www.archives.gov
- The Smithsonian Air and Space Museum Website – www.airandspace.si.edu