



Kennedy Space Center's Pioneering Woman NASA LESSON 2

Kennedy Space Center (KSC) has been an important part of Central Florida's history since the 1960s. KSC became NASA's main launch site for human spaceflight in 1968 and has seen the takeoff of some of history's most famous space missions, including the Apollo 11 mission that put the first man on the moon in 1969.

Many of us have heard the names of American icons like Neil Armstrong – the first man on the moon. We may not have heard, though, of the women who have been central to some of NASA's most important achievements. In fact, from NASA's beginnings, women filled important roles in the space program, working as mathematicians, engineers, and astronauts.



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It wasn't easy for NASA's female pioneers. Central Florida's own JoAnn Hardin Morgan was the only woman in the launch room for Apollo 11. Her long, successful NASA career began in the 1950s with an internship as an engineer's aide. She persevered despite many obstacles. This was a time when women were not always considered equal to men in the workplace. When Morgan started full-time work for NASA in 1963, her supervisor had to tell her fellow male engineers that they could not ask her to make coffee for them. Her work area didn't even have a women's restroom, so she had to be escorted by a security guard who would clear out the men's restroom for her. Morgan later recalled her early NASA years as being lonely ones because everywhere she went, she was the only woman in the room and her male co-workers did not always make her feel very welcome. But this pushed her to work even harder to prove them wrong.

Morgan didn't let the challenges stand in the way of her making important contributions. Despite working on several missions and being promoted to senior engineer, Morgan was not allowed to be in the firing room for launches. That changed with the Apollo 11 mission, when her supervisor went all the way to the top of the organization to fight for her place in the room. She held the very important role of instrumentation controller for that historic launch.

Morgan's incredible career with NASA would only continue to prove that women had a place in the space program. She later became the first woman senior executive at KSC, winning medals and many honors, including two from President Clinton in 1995 and 1998. Her tireless advocacy for women in science and engineering spans nearly six decades.



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Kennedy Space Center's Pioneering Woman PAPER STRAW ROCKET ENGINEERING - ACTIVITY

JoAnn Hardin Morgan was a pioneering female NASA engineer! Engineer and launch your own rocket in her honor!

What you'll need:

- Straw rocket template (printed on paper)
- Pencil
- Drinking straw*
- Tape
- Scissors

*For a straw alternative: cut a 3-inch-wide by 8-inchlong piece of paper, and tightly wrap it around a pencil to form a straw. Tape to secure.



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What to do:

- Make the rocket fuselage (body): cut out the rectangle from the template. Wrap around the pencil and tape to create tube.
- 2. Make the cone: pinch and fold the top of the fuselage around the sharpened end of the pencil to create a cone shape and tape in place.
- 3. Attach the fins: cut out the fins and tape to either side of the rocket on the opposite end from the cone (tape on both sides of the pencil). Bend the fins so they are at a 90-degree angle from the fuselage.
- 4. Launch: remove the pencil and replace it with the drinking straw. Go outside to launch, make sure you are not launching toward any person or animal. Blow into the straw to see how far your rocket flies!
- 5. Improve your design: now that you know the basics, create your own template to try to improve the distance your rocket can travel. Experiment with different fuselage lengths, fin size, fin shape, etc.



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Sources

Patrinos, Thalia. "Rocket Fuel in Her Blood: The Story of JoAnn Hardin Morgan." NASA.gov, July 12, 2019. https://www.nasa.gov/ feature/the-story-of-joann-morgan

National Women's History Museum. "The Women of NASA." October 2, 2017. https://www.womenshistory.org/exhibits/ women-nasa

National Aeronautics and Space Administration. "History of John F. Kennedy Space Center." Accessed on Tuesday, April 21, 2020. https://www.nasa.gov/offices/history/center_history/kennedy_ space_center

This lesson helps reinforce these Florida State Standards for K-5th grade:

- SS.1.A.2.1 Understand history tells the story of people and events of other times and places.
- SS.1.A.2.2 Compare life now with life in the past.
- SS.4.A.6.1 Describe the economic development of Florida's major industries.
- SS.4.A.6.3 Describe the contributions of significant individuals to Florida.
- SS.4.A.8.3 Describe the effects of the United States space program on Florida's economy and growth
- SS.4.E.1.1 Identify entrepreneurs from various social and ethnic backgrounds who have influenced Florida and the local economy.



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Paper Straw Rocket	1. Cut out the rectangle and wrap around a pencil and tape to create a tube.	2. Pinch and fold the top of the fuselage around the sharpened end of the pencil to create a cone shape and tape in place.	3. Cut out the fins and tape to either side of the rocket on the opposite end from the cone (tape on both sides of the pencil). Bend the fins so they are at a 90 degree angle from the fuselage.	4. Remove the pencil and replace it with the drinking straw. Go outside to launch, make sure you are not launching toward any person or animal. Blow into the straw to see how far your rocket flies!	5. Now that you know the basics, create your own template to try to improve the distance your rocket can travel. Experiment with different fuselage lengths, fin size, fin shape, etc.		Fuselage
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