



Lesson Title: Astronauts and the ISS

Subject	Grade Level	Timeline
Education and career paths, physical fitness	5 - 8	20 - 30 minutes

Objectives

This lesson investigates the path to become an astronaut with NASA. In the accompanying video, astronaut Joe Acaba tells us about his path from starry-eyed young boy, to classroom teacher, to space-bound astronaut. He discusses what inspired him to pursue this career, and imagines what the future might still have in store for him. Students will consider what might motivate them to participate in spaceflight, and what practical steps they would need to take to achieve that goal.

Standards

Common Core State Standards Connections:

ELA/Literacy –

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS2-6)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HSPS1-3)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-PS1-3)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS1-3)

Materials

Internet access





Vocabulary

- Astronaut - the title for those selected to join the NASA corps of astronauts who make "space sailing" their career profession.
- Low Earth Orbit (LEO) - an orbit of altitude 200 miles or less (about 320 km).

Lesson Plan

Background for teachers:

NASA's Vision: "We reach for new heights and reveal the unknown for the benefit of humankind."

NASA was commissioned in 1958 by the Congress and the President of the United States, Dwight D. Eisenhower, in direct response to the flight of the artificial satellite Sputnik 1 by the USSR. NASA began to conduct space missions almost immediately. In 1961, the USSR sent the first human into space (Yuri Gagarin) and NASA matched that feat less than a month later (Alan Shepard).

Since then, spaceflight has captured the attention of the world, inspiring generations of young people to pursue careers in aerospace as astronauts, engineers, and scientists. Others pursue lives inspired by space exploration as educators, journalists, novelists, film makers, artists, entrepreneurs, and more. These professional fields are full of people with a passionate curiosity and love for spaceflight. More than 530 people from more than 37 countries have traveled to space, and we aren't planning to stop any time soon.

As of today, only 24 humans ever have gone beyond low Earth orbit. Those 24 were all men in NASA's Apollo program, and all of those flights occurred between December 1968 and December 1972. Twelve of those men landed on the Moon. No humans have ever been to another planet - yet. But we do have our sights on returning to the Moon, and going to Mars - and beyond.

Joe Acaba was selected for the NASA Astronaut Candidate Class of 2004 while teaching middle school mathematics and science at Dunnellon Middle School in Florida. As a kid, Joe was inspired by the Apollo missions to the Moon. Through hard work and some luck, he has been able to fulfill his dream of going to space. He flew to space in 2009 aboard the Space Shuttle *Discovery* on a mission to the International Space Station (ISS), and in 2012 he returned to the ISS on a Soyuz spacecraft. And he expects to return to space again.





Student activity:

Have students work in pairs on a WebQuest to investigate the requirements to becoming an astronaut, as put forth by NASA. The list is short, but what does each requirement mean? What would count toward these requirements, and what would not? The website lists three basic qualification requirements:

https://www.nasa.gov/audience/forstudents/postsecondary/features/F_Astronaut_Requirements.html

- Requirement #1 has to do with having a bachelor's degree.
 - What is a bachelor's degree?
 - Where can you get a bachelor's degree?
 - What kind of professions besides astronaut could a person do with the degrees listed? (Come up with at least two professions for each degree NASA lists.)
- Requirement #2 talks about related professional experience.
 - What kind of jobs would be related experience for the degrees listed?
 - It says OR time as a pilot-in-command of a jet aircraft.
 - Where can a person learn how to become a pilot?
 - Count up the number of hours you spend in school each day. Use that to figure out how many hours you spend in school each week, and then each year. Compare these values to the hours you would need to spend as a pilot.
- Requirement #3 has to do with a long-duration physical.
 - Are you between 62 and 75 inches tall?
 - Is your vision 20/20 in both eyes? If not, is it that good with glasses?
 - What kind of lifestyle choices do you make today that would increase your chances of being healthy enough to pass a NASA physical someday?
- Astronaut candidates must also have skills in leadership, teamwork, and communications.
 - Do you feel you already have these traits?
 - Are these traits you can develop over time? If so, how?





Extensions

NASA Lesson: Train Like an Astronaut

Consider visiting the website:

https://www.nasa.gov/offices/education/programs/national/summer/education_resources/lifescience_grades4-6/LS_train-like-astronaut.html.

This lesson is a physical and inquiry-based approach to human health and fitness on Earth and in space. Students can participate in physical activities modeled after the real-life physical requirements of humans traveling in space.

Objectives: Students will:

- Set goals and challenge themselves, as well as other students, in the [Fit Explorer Challenge](#).
- Practice physical activities as they train like an astronaut with [Mission Handouts](#).
- Make observations on physical improvements, research fitness and exploration topics, and log their goals in a [Mission Journal](#).
- Engage in hands-on activities to learn about the science of physical activity and the science of nutrition.

NASA isn't the only way to go to space!

In the early days of spaceflight, the only way to get to space was through the space programs of the government of the USA or the USSR. Today, astronauts from many other nations can travel to space through the international cooperation inherent in the ISS program.

In addition to that, there are many private companies that are looking to play a role in human spaceflight. Students can investigate Scaled Composites' SpaceShipOne, SpaceX's Dragon capsule, LuxSpace's Manfred Memorial Moon Mission, and other private space enterprises. The future of spaceflight may center on NASA, but there are many other possibilities!

Resources

A little more detail about requirements to become an astronaut:

https://www.nasa.gov/centers/johnson/pdf/606877main_FS-2011-11-057-JSC-astro_trng.pdf

<https://astronauts.nasa.gov/content/broch00.htm>

<http://www.astronautabby.com/how-to-become-an-astronaut-2/>

NASA: 5 myths about becoming an astronaut

<https://nasa.tumblr.com/post/132538793869/5-myths-about-becoming-an-astronaut>

NASA: Biography of Joe Acaba

<https://www.isc.nasa.gov/Bios/htmlbios/acaba-jm.pdf>





Wikipedia: List of every person who has gone to space
https://en.wikipedia.org/wiki/List_of_space_travelers_by_name

Video en español: Astronaut Joe Acaba encourages educators to spark student interest in STEM
<https://www.youtube.com/watch?v=T7TQ8hf2wD0>

