

Thurs, March 28,
2019

Pick up: Cornell notes

Today you will: Notes on
Space Exploration & Florida

HOMEWORK: Finish timeline
& study for quiz



Space Exploration

Past, Present, Future



Space Exploration

The Big Picture

- Space exploration is still in infancy. Although we have learned a lot, we still have a lot of questions.
- The cost of space exploration mandates that we work together with other countries.

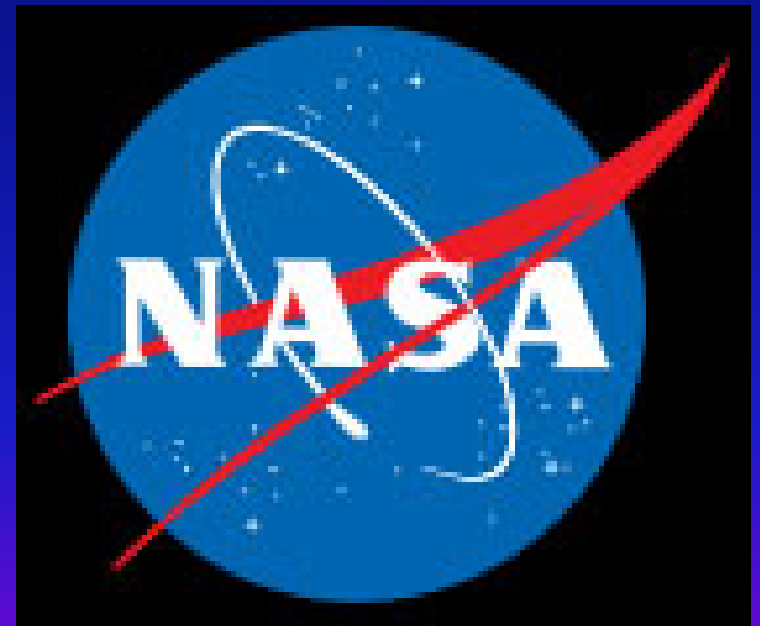
Example: International Space Station (ISS)

NASA

National Aeronautics and Space Administration

Accomplishments:

- First to land someone on the moon
- Invented the space shuttle
- Developed many products for space that we now use as everyday products (Spin offs)



Example: Velcro

We Are Curious

...and so we study space.
Things that we need to know
about space exploration
include:

- Rockets
- Artificial satellites
- Space probes
- Space stations
- Space shuttles
- Remote sensing devices
- Space suits
- Radar
- Computers
- Fuel sources
- Landing modules
- Materials that can survive heat and pressure
- Solar panels
- Living quarters
- Biomedical equipment
- Air purification devices
- Telescopes
- And many more...

Space Exploration History



- The space age began on October 4, 1957, when the Soviet Union launched Sputnik, the first artificial satellite to orbit Earth.

- The Soviets also achieved the first piloted space flight on April 12, 1961.



I got this...

- The first cosmonaut was Yuri Gagarin. He orbited Earth in a ship named Vostok.

Let's Go to the Moon



- Apollo 8 orbited the moon 10 times and returned to Earth safely on December 21, 1968
- Neil Armstrong and Buzz Aldrin landed Apollo 11 on the moon on July 20, 1969.
- Neil Armstrong was the first person to set foot on the moon.

- The laptops in our classroom are more powerful than the computers used to run the Apollo program!

Space Shuttles

- A space shuttle is a reusable space craft.
- First used in 1981.
- Able to land on an ordinary airfield.
- Two shuttle tragedies in 1986 and 2003.
- Shuttles replaced the previous method of space flight – Rockets and capsules.



The Space Race and Cold War



Khrushchev & Kennedy

- Our ability to achieve our space goals became an indicator of our status as a great nation, and the Soviets were our top competitors.
- This occurred during a time in our history known as the Cold War.
- This was a time when our relationship with the Soviets was, well, cold.
- The intense rivalry between our two countries led us to some amazing accomplishments.

Probes Vs. Human Pilots

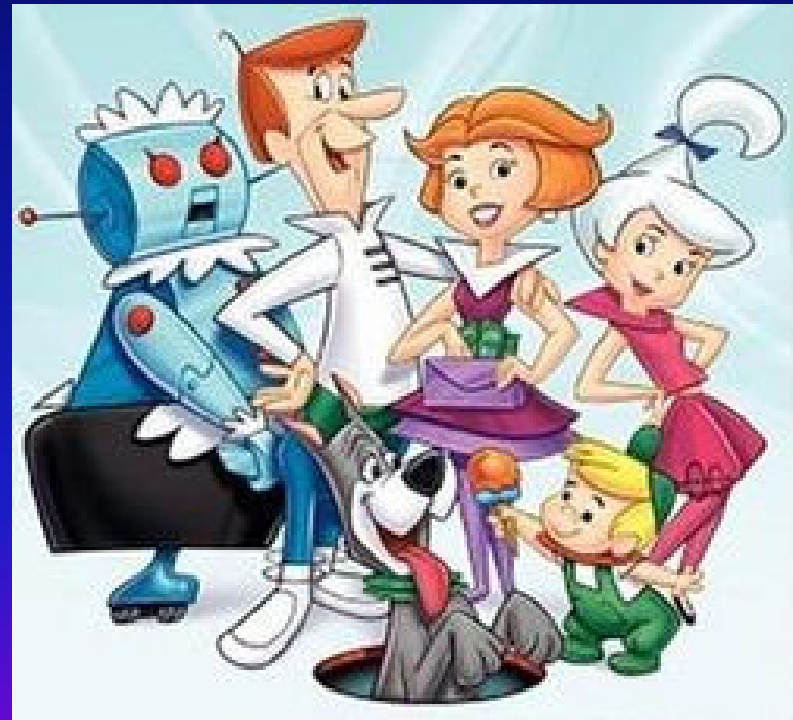
- Probes can make space flight cheaper, safer, and faster.
- Human pilots can make decisions when things don't go as planned.



We need both.
We need balance.

The Future

- Exploration at greater distances
- Extended stays
- Humans need to be ready and educated for the space travel of the future



Some Difficulties Include

- Radiation exposure
- Lunar dust
- Food and Nutrition
- Exercise
- Differing levels of pressure, atmosphere composition, and gravity
- Sleep loss
- Risk of bone fracture
- Reduced muscle mass
- Reduced aerobic capacity
- Mental disorders arising from extreme, confined, and isolated conditions

A History of Space

What is NASA's history?

- The National Aeronautics and Space Administration, or **NASA**, was formed in 1958.
- A **launch** is the process of setting a rocket or spacecraft in motion.
- Projects for launching to the moon included project *Mercury*, project *Gemini*, and the *Apollo* program.

What is NASA's history?

- *Skylab* and the *International Space Station* were a result of work at NASA.
- NASA also launches probes and satellites to other planets.
- Rovers such as the *Sojourner*, *Spirit*, and *Opportunity* have explored Mars.

Cape Space

What are the NASA sites in Florida?

- The first NASA space operations were carried out at the Cape Canaveral Air Force Station, east of Orlando.
- In 1962, NASA established the Kennedy Space Center on Merritt Island near Cape Canaveral.



Why launch from Cape Canaveral?

- NASA chose Florida as a launch center because it is close to the equator.
- A rocket launched near the equator needs less fuel to reach orbit.
- Eastward launches over open water provide a safe place for booster rockets and fuel tanks to fall.

An Economy of Space

How does the space program affect Florida's economy?

- Tourism is increased by space-related activities in Florida, adding money to the Florida economy.
- Revenue for Florida is increased by employees and tourists that spend money at local businesses.

How does the space program affect Florida's economy?

- Private firms and the military rent and use NASA facilities for other types of launches.
- Launches of satellites encourage private industry.
- NASA and related aerospace firms provide thousands of jobs for people.

What is a spin-off?

- A **spin-off** is a product that uses NASA technology and benefits the public.
- Aerogels for insulation, imaging devices in cameras, and thermal blankets all began with NASA technology.

Research a Spinoff

- You have 5 minutes to create a list of NASA spin-offs with your partner.

Did you find....

- Cordless tools?
- Bar code?
- Ear thermometer?
- Smoke detector?
- MRI or CAT scans?
- Cold Weather Gloves/ thermal boots?
- Invisible braces?

Living Together

- The Kennedy Space Center shares its site with the Merritt Island National Wildlife Refuge.
- Endangered species are protected because of restricted human access to the site.
- Species at the refuge include the West Indian manatee and five species of sea turtles.

On Solid Ground in Florida

How has the space program affected Florida's culture?

- Many high-tech industries have developed in Florida.
- Workers are drawn to Florida for new opportunities in aerospace careers.
- There is more emphasis on science and mathematics in Florida's schools.