



2020
EPISODE 1
SPACE EXPLORATION
& GLOBAL
LEADERSHIP



Nuclear Science Week™

V I R T U A L

SPACE EXPLORATION

DISCUSSION POINTS

On the Nuclear Network we learned that nuclear technology (radioisotope power systems) helps power NASA spacecraft and instrumentation that's exploring our atmosphere. NASA missions visit some of the harshest, darkest, coldest locations in the solar system, and many of these missions would not be possible or would be extremely limited, without the use of nuclear power.

Did you know NASA is also looking at nuclear technologies to send humans to MARS?

- Astronauts bound for Mars will travel about 140 million miles into deep space. It is too soon to say which propulsion system will take astronauts to Mars, but we know it needs to be nuclear-enabled to reduce travel time.
- Here's a video showing how nuclear propulsion works: www.youtube.com/h?v=U1g2aSj9ZTc&list=PLgUOcHea5t3rzrpZj9pFAPrYcCcZkGSdh&index=9&t=0s&app=desktop
- Just like we use electricity to charge our devices on Earth, astronauts will need a reliable power supply to explore Mars. The system will need to be lightweight and capable of running regardless of its location or the weather on the Red Planet. Mars has a day and night cycle like Earth and periodic dust storms that can last for months, making nuclear fission power a more reliable option than solar power.
- Learn more here: www.nasa.gov/directorates/spacetech/6_Technologies_NASA_is_Advancing_to_Send_Humans_to_Mars

ACTIVITY IDEAS

- Build a cardboard Mars Rover. See instructions here: www.jpl.nasa.gov/edu/teach/activity/roving-on-the-moon/
- Check in on Perseverance to see real time information about where it's at on its journey and learn more about the rover and how students can send their names to Mars on future missions! mars.nasa.gov/mars2020/



NASA'S CASSINI SPACECRAFT

FURTHER LEARNING & RESOURCES

- mars.nasa.gov/mars2020/mission/overview/
- www.energy.gov/ne/nuclear-reactor-technologies/space-power-systems

GLOBAL LEADERSHIP

DISCUSSION POINTS

The U.S. has a rich history in pioneering nuclear technology.

- In 1942, a team of scientists achieved the first nuclear chain reaction, under a stadium at the University of Chicago.
- In 1953, the first usable electricity from nuclear fission was produced at the National Reactor Testing Station, now called the Idaho National Laboratory.
- In 1958, the first commercial nuclear power plant was opened by President Dwight D. Eisenhower known as the Shippingport Atomic Power Station, located on the Ohio River in Beaver County, Pennsylvania.



INTERIOR OF STAGG FIELD



EXTERIOR OF STAGG FIELD



MAINTENANCE AT PALO VERDE GENERATING STATION

Today there are 94 commercial nuclear reactors providing clean electricity in the U.S. We are exploring the deepest, darkest parts of the galaxy with nuclear powered spacecraft. Our military is a global leader because of nuclear science and technology, and we are detecting diseases with nuclear medicine. It's safe to say that nuclear science has infiltrated our lives.

Because we have such a strong history of developing nuclear technology, America's nuclear energy industry shapes international standards. U.S. nuclear suppliers have influence and a positive impact on issues like global poverty and climate change. If America doesn't stay at the forefront of innovation and continue leading in nuclear technology development, our influence across the world will lessen.

Did you know you have to get a nomination from your congressman or congresswoman, senators and/or the Vice President for a nomination to apply to the U.S. Naval Academy? Learn more about the application process and summer programs available to high schoolers here:

- www.usna.edu/Admissions/

ACTIVITY IDEAS

- Construct a submarine: sciencing.com/make-homemade-submarine-science-class-6187776.html

FURTHER LEARNING & RESOURCES

- www.world-nuclear.org/information-library/country-profiles/countries-t-z/usa-nuclear-power.aspx