

**The Lunar Lander****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

In the early 1960s, the Soviet Union was making major strides in space travel. The United States needed a “first,” and in 1961 President Kennedy announced we would put a man on the moon. The design and engineering behind the lunar lander presented many challenges, but Tom Kelly and his team were ultimately successful, and in 1969, Neil Armstrong and Buzz Aldrin landed on the moon.

**Learning Objectives:** Students will:

- Understand what sparked the United States to commit to putting a man on the moon.
- Understand the design challenges present for creating a lunar lander.
- Explain how the lunar lander landed on the moon.
- Understand the creativity and perseverance Tom Kelly had to have to complete his invention.

**Vocabulary:**

Tom Kelly, NASA, President John F. Kennedy, lunar lander

**Pre-Viewing Discussion:**

Why do you think it was important for the United States to put a man on the moon? What was happening in the world that made such an accomplishment so important?

What was the “space race”?

**Post-Viewing Discussion:**

How did Kelly’s idea for landing a man on the moon differ from other engineers’?

What were some of the challenges faced by Kelly when designing the lunar lander? How did Kelly and his team overcome them?

How did the lunar lander safely land on the moon and then return to the command module?

**Further Activities:**

Research the development of the lunar lander and the challenges associated with it. How did the public react to the moon landing? What impact has the moon landing had on our world today?

**The Weather Satellite**  
**Inventions that Shook the World Series**

**Grade Levels:**

5-12

**Subject Areas:**

Science

Technology

Engineering

**Synopsis:**

In the 1940s, hurricanes are still a mystery. Dr. Harry Wexler is the first to fly a plane into the heart of a hurricane. Despite gaining valuable information, it doesn't save any lives. He wants to devise a warning system for extreme weather. Dr. Wexler receives a letter from Sci-Fi writer Arthur C. Clarke about his idea for a weather satellite. Clarke's idea serves as inspiration, and Dr. Wexler turns it into a reality.

**Learning Objectives:** Students will:

- Understand why extreme weather was even more dangerous in the mid-20<sup>th</sup> century than it is today.
- Explain how the weather satellite orbited the earth.
- Understand the creativity and perseverance Dr. Wexler had to have to complete his invention.

**Vocabulary:**

Dr. Harry Wexler, Arthur C. Clarke, satellite, meteorology, TIROS-1

**Pre-Viewing Discussion:**

How do you get the weather forecast today? How do you think people got the weather forecast in the 1960s?

How do you think people dealt with severe weather in the 1960s?

**Post-Viewing Discussion:**

What did Dr. Wexler learn when he flew a plane into a hurricane? Why wasn't the information enough? What did Dr. Wexler want to create?

Where did Dr. Wexler get the idea for a weather satellite? How did that inspire him?

How successful was TIROS-1?

**Further Activities:**

Arthur C. Clarke was a science fiction writer, but he contributed to the development of a weather satellite. What does this tell you about how art and humanities can influence science and technology? How do you think science and technology influences art and the humanities?

**The Video Game Console****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

Ralph Baer is an electronics wizard, and is always thinking several steps ahead of everyone else. He looks for a way to make TV more interactive. Rather than take his idea to his superiors at a military contracting firm, he works on the project on the sly. Eventually, he unveils his gamebox to his superiors, and they are immediately hooked. They give him \$2,500 in R&D money, and he ends up launching the gaming revolution.

**Learning Objectives:** Students will:

- Understand how revolutionary the idea of “interactive TV” was in the 1960s.
- Explain the challenges associated with creating a gamebox.
- Understand the creativity and perseverance Ralph Baer had to have to complete his invention.

**Vocabulary:**

Ralph Baer, video game, Bill Harrison, RF Signal, glass vacuum tubes, transistor, semiconductor

**Pre-Viewing Discussion:**

Do you play video games? Which are your favorites? Why do you like them?

How do you think the first video games were created? What do you think sparked the idea?

**Post-Viewing Discussion:**

What was Ralph Baer’s background? What did he want to do to the TV experience? How did he think he might accomplish this?

Why do you think Baer kept his project a secret?

What were some of the challenges Baer had to overcome to create his first gamebox? How did he resolve them?

How did his superiors react the first time he unveiled his creation? How did he launch the entire gaming industry?

**Further Activities:**

Research Ralph Baer’s life. Write a biography that includes his childhood, background, professional life, and major accomplishments. How are his accomplishments felt in our world today?

**The Taser****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

In the 1960s, Vietnam War protests and race riots increased the need for a non-lethal weapon that could be used to subdue crowds. John Cover reads a newspaper story about a hiker that tried to climb an electrified fence. The hiker could not let go of the fence, but once the electrical current was removed, he walked away without a scratch. This gave Cover the idea of using electrical impulses to subdue protesters or criminals, and led to the Taser.

**Learning Objectives:** Students will:

- Understand the political and social environment of the 1960s that made a non-lethal weapon so appealing.
- Explain how the Taser works on the body to subdue a person.
- Understand the creativity John Cover had to have to complete his invention.

**Vocabulary:**

John Cover, non-lethal weapon, electrical current, Taser

**Pre-Viewing Discussion:**

What do you know about a Taser? Have you ever seen one used on TV? What usually happens to the person?

What do you think spurred the invention of the Taser? What element of the 1960s would have made a non-lethal weapon so appealing?

**Post-Viewing Discussion:**

What incidents inspired Cover to create a non-lethal weapon? Where did he get his idea?

How does a Taser work?

Why do you think Tasers are so popular with law enforcement around the world?

**Further Activities:**

Research the ways law enforcement are using Tasers in the United States. Are there rules for their use? What would justify a police officer using a Taser on a suspect?

Research what was happening in American society during the 1960s. What changes were happening in our culture and how did the 1960s shape the coming decades?

**Teacher's Guide****The Industrial Robot****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

The industrial robot revolutionized the manufacturing process. George Devol was inspired to create a robotic arm when he sees a photo of an assembly line. He's a brilliant inventor, but doesn't know how to market his idea. Once he meets Joe Engelberger, they complete the project together. Robots, however, have a negative image in America, so their first customers are Japanese automakers.

**Learning Objectives:** Students will:

- Understand George Devol's personality, including his challenges and what made him a successful inventor.
- Explain how the robotic arm worked to complete tasks.

**Vocabulary:**

George Devol, robot, Unimate, Joe Engelberger

**Pre-Viewing Discussion:**

What do you think inspired the invention of a robot? Where are robots used today?

What personal characteristics do you think make for a successful inventor? What personal challenges do you think they face?

**Post-Viewing Discussion:**

What was George Devol's personality like? What were his strengths? What were some of his weaknesses?

How does Devol's robot work?

Why did robots have a negative public image in America? How was that image different in Japan? How did Japan's adoption of the robot change the perception of robotics in America?

**Further Activities:**

Research the first industrial robots. How are they different from those used today? How are they the same?

Write a story set 20, 50, or 100 years in the future. Where do robots fit in to the society you create?