

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

5-12

Subject Areas:

Science
Technology
Engineering
Media Literacy

Synopsis:

Radio is still new when John Logie Baird comes up with the idea to transmit moving images. With parts collected from around his home, Baird constructs a machine that will transmit images, but it is imperfect. It takes him several years to transmit a recognizable human face.

Learning Objectives: Students will:

- Understand the creativity that went in to constructing the first machine that would transmit images.
- Explain how John Logie Baird first transmitted images.
- Analyze how Baird had to tweak the design of his machine to create clear images.

Vocabulary:

Image, television, broadcast

Pre-Viewing Discussion:

What do you think the first television looked like? How do you think it worked?

Post-Viewing Discussion:

What was John Logie Baird's background and history? What drove him to create the TV?

How did Baird's TV work?

Further Activities:

Research the evolution of the television from Baird's first machines to the 3D, smart televisions on sale today. How did the invention of the TV change the 20th century and our history?

Describe the personal characteristics inventors seem to share. Evaluate why these traits seem to be important for the successful inventor.

The Liquid Fuel Rocket**Inventions that Shook the World Series****Grade Levels:**

5-12

Subject Areas:

Science

Technology

Engineering

Synopsis:

Robert Goddard is obsessed with space flight in a time when airplanes are just getting off the ground. Using inspiration from fireworks, he designs rockets, eventually inventing the liquid fuel engine. His work spans decades, and eventually leads to man landing on the moon.

Learning Objectives: Students will:

- Understand the creativity and perseverance Robert Goddard employed to help him be successful.
- Explain the problems with solid fuel and Goddard's solutions.
- Explain how the liquid fuel engine works.

Vocabulary:

Fuel, rocket, Da Laval nozzle, Robert Goddard, thrust

Pre-Viewing Discussion:

What common objects can you think of that remind you of rockets? Do you think the technology is similar to what is used in spacecraft?

Have you ever wanted to be an astronaut? Why or why not?

Post-Viewing Discussion:

Why didn't Goddard want to write up his findings? Do you think his concerns were justified? How were his ideas received when he finally did publish a paper?

How did Goddard view failure?

How did Goddard eventually solve the problems he had with solid fuels? Did liquid fuels cause him any other problems?

Why was Goddard known as the father of space travel?

Further Activities:

Write a biography of Robert Goddard. Be sure to include his personal characteristics that ultimately made him successful, his challenges, and his accomplishments.

Movie Sound**Inventions that Shook the World Series****Grade Levels:**

5-12

Subject Areas:

Technology

Engineering

Synopsis:

Lee de Forest had already worked on audio amplification before he began to try to record sound to go with silent films. His initial attempts presented sync and audibility issues, but his eventual, uneasy partnership with Theodore Case led to the development of Phonofilm and, eventually, to films as we know them today.

Learning Objectives: Students will:

- Understand the creativity and perseverance Lee de Forest and Theodore Case employed to help create movie sound.
- Explain the problems de Forest encountered after his first and second attempts.
- Explain how sound was recorded on the record and how it was recorded on the film.

Vocabulary:

Lee de Forest, Audion tube, Photion, Optical Sound, Theodore Case, Exciter Lamp, Hugo Riesenfeld

Pre-Viewing Discussion:

What do you think it would be like to see a summer blockbuster without any sound? How do you think it would be a better experience? What would be some of the major drawbacks?

What are some of the differences between silent films of the early 20th century and the sound films that followed? How does the storytelling differ? How is the storytelling the same?

Post-Viewing Discussion:

What are the problems that de Forest has to combat during his tests? How does he change his process to solve the problems?

What do you think about de Forest's relationship with Case? What can we do to help make it easier to work with people we may not get along with?

Further Activities:

Write a biography of Lee de Forest. Be sure to include his personal characteristics that ultimately made him successful, his challenges, and his accomplishments.

The Lie Detector**Inventions that Shook the World Series****Grade Levels:**

5-12

Subject Areas:

Technology

Engineering

Synopsis:

John Larson was brought into the Berkeley police department to help modernize the force. He thought there was a better way to interrogate suspects, other than physical intimidation. With his background in physiology, Larson created a machine that measured blood pressure, heart rate and breathing: the lie detector.

Learning Objectives: Students will:

- Understand how Larson's medical background contributed to his creation of the lie detector.
- Explain how the lie detector works and the science behind the structure of the questions asked of the suspect.

Vocabulary:

Lie detector, polygraph, John Larson, physiology

Pre-Viewing Discussion:

Have you ever taken a lie detector test? What do you think that would be like?

Why do you think lie detector tests are effective? Do you think their results should be allowed in court? Why or why not?

Post-Viewing Discussion:

Why was John Larson opposed to physical intimidation of suspects?

How did Larson's device measure physiological factors? How were those measurements represented on the device?

What was important about the questions that Larson asked the test subject and the suspects in the robbery? Why are the actual questions so important?

Further Activities:

Write a biography of John Larson. Be sure to include his personal characteristics that ultimately made him successful, his challenges, and his accomplishments.

Einstein's Fridge**Inventions that Shook the World Series****Grade Levels:**

5-12

Subject Areas:

Technology

Engineering

Synopsis:

When Albert Einstein reads about a family that is killed in their home because their refrigerator leaked ammonia into the house, he is inspired to create a safer fridge. With his friend, Leo Szilard, Einstein proposes to use electromagnetic energy to move the refrigerator's coolant. With a few tries they create the first electromagnetic pump.

Learning Objectives: Students will:

- Understand the creativity and perseverance that helped Einstein and Szilard create the electromagnetic pump.
- Explain how the electromagnetic pump moves coolant in Einstein's fridge.
- Understand why Einstein's fridge never became commonplace, and where his invention is currently used.

Vocabulary:

Coolant, compressor pump, electromagnetic energy, electromagnetic pump, Freon, nuclear energy

Pre-Viewing Discussion:

Did you know that Einstein created a refrigerator? Why do you think he did so?

How are refrigerators cooled today? How do you think that is different from how they were cooled in the 1920s?

Post-Viewing Discussion:

Why did Einstein want to create a better way to cool a refrigerator?

How did Einstein think he could move the coolant without having moving, mechanical parts on the fridge? Did his idea work?

Why do we not use electromagnetic pumps to cool our fridge today? Where are electromagnetic pumps used?

Further Activities:

Write a biography of Albert Einstein. Be sure to include his personal characteristics that ultimately made him successful, his challenges, and his accomplishments.