

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

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

Igor Sikorsky thought the helicopter would be a unique flying machine that would aid in rescues and saving human life. His first attempts in the early 20<sup>th</sup> century were unsuccessful, but he tried again after moving to the United States. His designs were very different from others trying to create a hovering aircraft, and after several years and many tweaks, he had a successful flight. Just a few years later during World War II, Sikorsky's helicopter was used in its first rescue missions, and its design has changed very little even today.

**Learning Objectives:** Students will:

- Understand the creativity and perseverance that was required by Igor Sikorsky to successfully create the helicopter.
- Explain how Sikorsky's design differed from other inventors'.
- Understand what drove Sikorsky to keep pursuing his dream of creating the helicopter.

**Vocabulary:**

Helicopter, Igor Sikorsky, rotor, rudder, torque

**Pre-Viewing Discussion:**

Why do you think inventors wanted to create the helicopter? How was it different from fixed wing aircraft?

What challenges do you think were presented by helicopters that were not present when inventing fixed wing aircraft?

**Post-Viewing Discussion:**

Why did Igor Sikorsky want to create the helicopter? How did he think it would be different from fixed wing aircraft?

What challenges did Sikorsky have to overcome throughout the 30+ years it took him to create a successful design? What personal characteristics do you think kept him going?

How has the design of the helicopter changed since Sikorsky's first successful model?

**Further Activities:**

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

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

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

Chester Carlson is working in a patent office in the 1930s, where each patent document has to be copied twelve times. Copying by hand, photograph, or mimeograph just isn't ideal, so Carlson sets off to create a machine that will make copying easier. Using a photoconductor, Carlson successfully creates his first copy: the date and location which he has written on a piece of paper. Eventually, this technology is purchased and renamed Xerography, launching one of the most successful businesses of all time: Xerox.

**Learning Objectives:** Students will:

- Understand the need that drove Chester Carlson to create a photocopier.
- Understand the creativity and perseverance that was required by Carlson to successfully create the photocopier.
- Explain how Carlson's photocopier worked.

**Vocabulary:**

Chester Carlson, photocopier, mimeograph, photoconductor, xerography

**Pre-Viewing Discussion:**

How would life be different without the photocopier?

What do you think gave Chester Carlson the idea to create a photocopier?

**Post-Viewing Discussion:**

Why was photography not a good solution to the copying problem?

How did Carlson's photocopier work? How is the underlying technology similar or different in today's copiers?

**Further Activities:**

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

**The Parking Meter****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

In the three decades between the turn of the century and the mid-1930s, the number of automobiles in Oklahoma jumped 500%, but the number of parking spaces did not. Frustrated with office workers parking their cars in one place for an entire shift, Carl Magee had the idea to have drivers pay to park for a certain amount of time. He and Professor Holger Thuesen established a contest for university engineering students to engineer a parking meter. Once installed, the parking meters generated \$60,000 of revenue for Oklahoma City, and cities around the nation installed parking meters on their streets.

**Learning Objectives:** Students will:

- Understand the need that drove Carl Magee to the idea for the parking meter.
- Understand the creativity and perseverance that was required by Magee, Holger Thuesen, and the engineering students to create the parking meter.
- Explain how the parking meter worked and why it was an attractive option for cities around the nation.

**Vocabulary:**

Parking meter, Carl Magee, Professor Holger Theusen

**Pre-Viewing Discussion:**

What do you think drove the invention of the parking meter? What do you imagine parking in the city would be like without parking meters?

**Post-Viewing Discussion:**

Why did Carl Magee want to create a parking meter? What gave him the idea? Why did he need Professor Holger Thuesen's help?

What did Magee and Thuesen eventually do to expedite the design of the marking meter? How successful were they?

Why was the parking meter an important innovation for cities around the United States?

**Further Activities:**

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

**The Walkie Talkie****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

**Synopsis:**

After being stranded in British Columbia with a team of geologists, Donald Hings begins to evaluate ways people in different locations can communicate with one another. His challenge is to create something powerful enough to transmit the human voice over distance, but still small enough that it can be hand carried.

**Learning Objectives:** Students will:

- Understand the experience Donald Hings had that inspired him to create the walkie talkie.
- Understand the creativity and perseverance that was required by Hings to create the walkie talkie.
- Explain the challenges of miniaturizing the radio while allowing for clear transmission of the voice over distance.

**Vocabulary:**

Radio, radio waves, Morse Code, Donald Hings, walkie talkie

**Pre-Viewing Discussion:**

Have you ever used a walkie talkie? What are the benefits of having one? What do you think were the challenges associated with creating it?

**Post-Viewing Discussion:**

What was the challenge Donald Hings faced when it came to using radio technology to create the walkie talkie? How did the demands of the walkie talkie compete with one another?

How successful were Hings' first tests of the walkie talkie? Where was the walkie talkie first used? How was it beneficial in that setting?

Why did Hings receive the Order of Canada? Do you think he should have received the honor?

**Further Activities:**

The walkie talkie was a complex invention that required many different innovations along the way. Research the various components and explain how they contributed to the whole.

Journalists came up with the term "walkie talkie." Evaluate how the media influences consumer habits and the products that ultimately are adopted by the public at large.

## The Electric Guitar

### Inventions that Shook the World Series

**Grade Levels:**

5-12

**Subject Areas:**

Technology

Engineering

Music

**Synopsis:**

As bands became larger and louder in the 1920s, guitarists suddenly found themselves drowned out by other instruments. George Beauchamp set out to keep the guitar relevant. His attempts eventually lead to the electric guitar, an instrument that changed the face of music and of the 20<sup>th</sup> century.

**Learning Objectives:** Students will:

- Understand what drove George Beauchamp to invent the electric guitar.
- Understand the creativity and perseverance that was required by Beauchamp to create the electric guitar.
- Explain the different methods Beauchamp tried before successfully creating a true electric guitar.

**Vocabulary:**

Electric Guitar, George Beauchamp, volume, tricone, frying pan, electromagnetism

**Pre-Viewing Discussion:**

Where do we hear the electric guitar today? How was music different before the invention of the electric guitar?

**Post-Viewing Discussion:**

What did the three aluminum cones that the violin store-owner inserted into the guitar do?

Why did Beauchamp believe the horseshoe-shaped magnet was ideal?

Why wasn't George Beauchamp's name on his electric guitar? Why did they call it "The Rickenbacker"?

**Further Activities:**

Research ways in which the electric guitar changed the face of music. Trace the evolution of American music from the 1920s to the present day.