

## The Parachute

### Inventions that Shook the World Series

**Grade Levels:**

5-12

**Subject Areas:**

Science  
Technology  
Engineering  
Physics  
Physical Sciences

**Synopsis:**

Stefan Banic is a Slovakian immigrant working in coal mines when he witnesses a plane crash on his way home. The tragedy inspires Banic to strive to create something that will allow pilots to return safely to the ground if their plane malfunctions. He builds his parachute design on that of an umbrella, eventually securing a patent. His patented parachute is adopted by the military in exchange for lifetime membership in the Army Air Corps.

**Learning Objectives:** Students will:

- Explain the circumstances that inspired Stefan Banic to create a parachute.
- Explain how the umbrella factored into Banic's design.
- Compare and contrast Banic's parachute with the one designed by Franz Reichelt.
- Analyze how Banic's patent affected the military in World War I.

**Vocabulary:**

parachute, Stefan Banic, Franz Reichelt, drag, air resistance

**Pre-Viewing Discussion:**

When was the parachute invented? Who designed the first parachute?

Many ideas for inventions are formed when a creative mind sees a problem to solve or opportunity to seize. What problem or opportunity do you think might inspire the creation of a parachute?

What are some of the risks inventors of the parachute would need to take to recognize success?

**Post-Viewing Discussion:**

What inspired Banic to invent the parachute? Why was it important to him?

What happened to Franz Reichelt?

How did increasing the surface area of his parachute help improve Banic's design?

What did Banic do to get a patent for his parachute? What did he do with the patent once he secured it?

How did Banic's parachute shape our military?

**Further Activities:**

Research the history of aviation in the military. Describe initial applications of flight and how we use aviation in the military today. What innovation helped make airpower so integral to our military forces? What are/were some of the biggest challenges to making airpower practical?

Compare and contrast the inventors Stefan Banic and Franz Reichelt. Include their parachute designs and personal characteristics.

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

**Teacher's Guide****The Safety Hood (Gas Mask)**  
**Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Science

Technology

Engineering

**Synopsis:**

Garrett Morgan is a successful businessman, but when he reads about a factory fire that kills over 140 people, he is prompted to create a safety hood that firefighters can wear to help them breathe while rescuing victims.

**Learning Objectives:** Students will:

- Explain the circumstances that inspired Garrett Morgan to create a safety hood.
- Explain how Morgan's design worked.
- Analyze the connection between crisis and innovation.

**Vocabulary:**

Garret Morgan, safety hood, gas mask

**Pre-Viewing Discussion:**

Why do you think tragedy sometimes spurs innovation? What kind of working environment or problem do you think inspired the creation of a gas mask?

How successful do you think rescues were before firefighters had equipment to protect them?

**Post-Viewing Discussion:**

How did the safety hood filter inhaled air? How did it release exhaled air?

What happened the first time Morgan used the hood in a real life-and-death situation?

**Further Activities:**

Research the life of Garrett Morgan. What were his accomplishments other than inventing the safety hood?

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

**The Pop-Up Toaster**  
**Inventions that Shook the World Series**

**Grade Levels:**

5-12

**Subject Areas:**

Science  
Technology  
Engineering  
Chemistry

**Synopsis:**

Charles Strite is a man who loves toast, but can't stand when it burns! He sets out to create a new kind of toaster—one that will make perfect, brown toast. Little does he know how fickle toast can be!

**Learning Objectives:** Students will:

- Explain why Charles Strite wanted to create a new toaster.
- Examine the challenges Strite encountered when designing the toaster.
- Analyze how the pop-up toaster allowed Strite to create his own business.

**Vocabulary:**

Toaster, Charles Strite, baffle, entrepreneur

**Pre-Viewing Discussion:**

How do you like your toast? How do you make it just the way you like it?

How did people toast bread before the modern toaster?

**Post-Viewing Discussion:**

Why did Strite create the pop-up toaster?

What challenges did Strite face when he was inventing the toaster? How did he overcome them?

How did Strite create a business for himself with his toaster?

**Further Activities:**

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

***Teacher's Guide*****The Thompson (Tommy) Submachine Gun****Inventions that Shook the World Series****Grade Levels:**

5-12

**Subject Areas:**

Science

Technology

Engineering

**Synopsis:**

General John Thompson is a weapons expert in the military leading up to World War I. He leaves the military to develop his ideas for a portable machine gun. Overcoming challenges with weight, portability, and ammunition, Thompson invents the submachine gun. He finishes in 1918, just missing World War I, but the submachine gun is a hit with law enforcement and gangsters alike.

**Learning Objectives:** Students will:

- Explain how General John Thompson overcame the challenges associated with creating a submachine gun.
- Analyze how prior inventions helped General Thompson accomplish his task.

**Vocabulary:**

machine gun, General John Thompson, World War I, stalemate, breech lock, John Blish

**Pre-Viewing Discussion:**

Discuss how weaponry has evolved during the 20<sup>th</sup> century. How do you think machine guns have evolved since General Thompson invented the submachine gun in 1918?

How important do you think previous innovation and inventions are in the development of new weapons?

**Post-Viewing Discussion:**

Why did General Thompson leave the army? What benefits did he think the private sector would provide?

What were some of the differences between the bolt action rifle and a machine gun?

How did Thompson solve the ammunition problem? What other problems did he have to solve?

**Further Activities:**

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

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

5-12

**Subject Areas:**

Science  
Technology  
Engineering  
Physical Sciences

**Synopsis:**

After the sinking of the Titanic, Reginald Fessenden expands on his work with sound waves to harness the power of sonar. He creates a machine that will send out a signal, and uses the returning echo to detect objects and distance.

**Learning Objectives:** Students will:

- Understand how tragedy can inspire innovation.
- Explain how Fessenden's oscillator worked.
- Analyze how prior inventions helped Fessenden accomplish his task.

**Vocabulary:**

Sound waves, Reginald Fessenden, navigation, hydrophone, oscillator, sonar

**Pre-Viewing Discussion:**

How do you think Fessenden's previous work creating the AM radio might have helped him create sonar?

What are some examples of sonar in the natural world? Where do we see sonar being used today?

**Post-Viewing Discussion:**

How did the Titanic fit in to Fessenden's work with sonar? Why did he want to create better navigation?

How did the Oscillator work? How effective was it when Fessenden went out to sea to test it?

**Further Activities:**

Research Reginald Fessenden's other inventions. How were they all related or unrelated? Do you think he built upon initial successes to create new inventions?

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