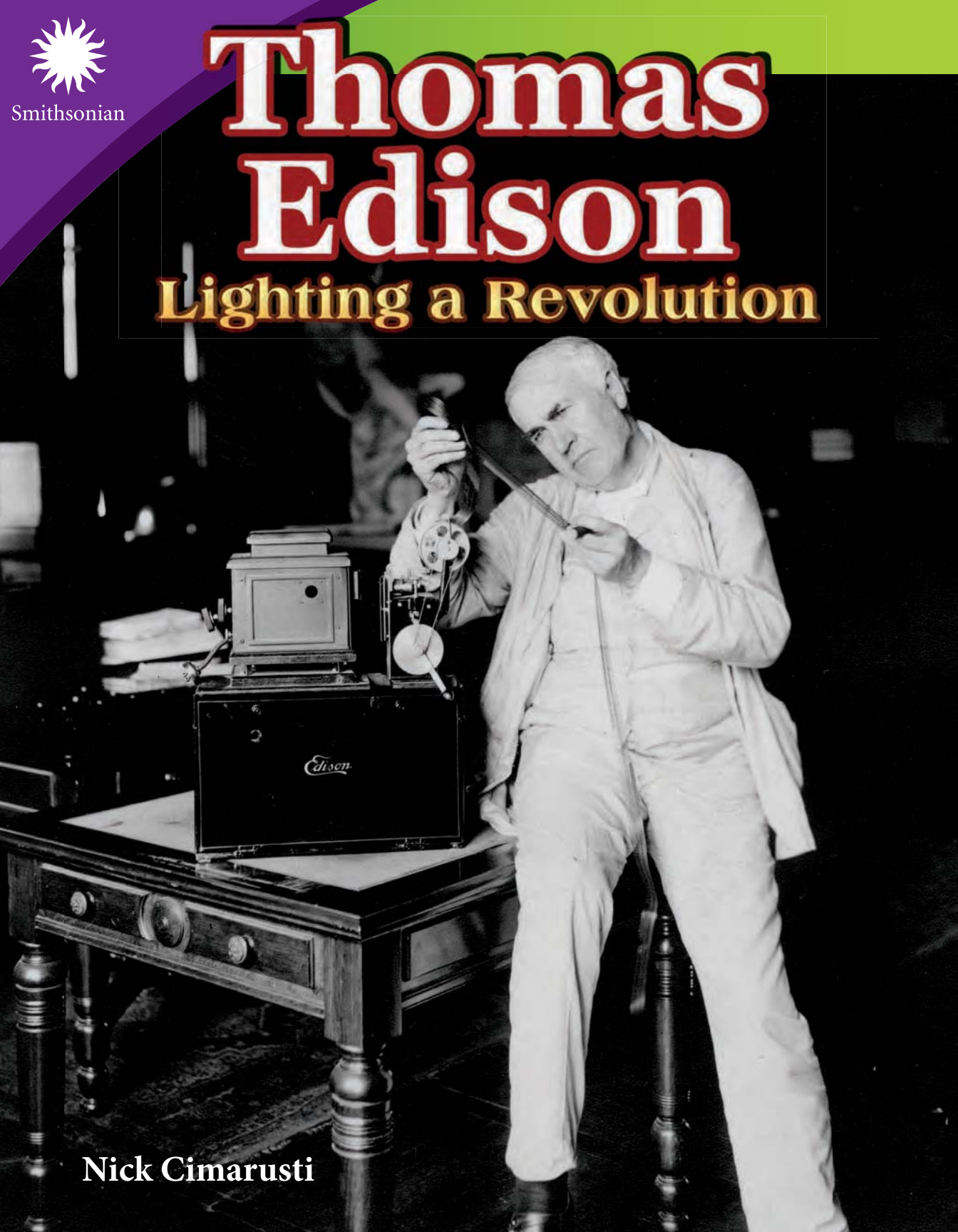
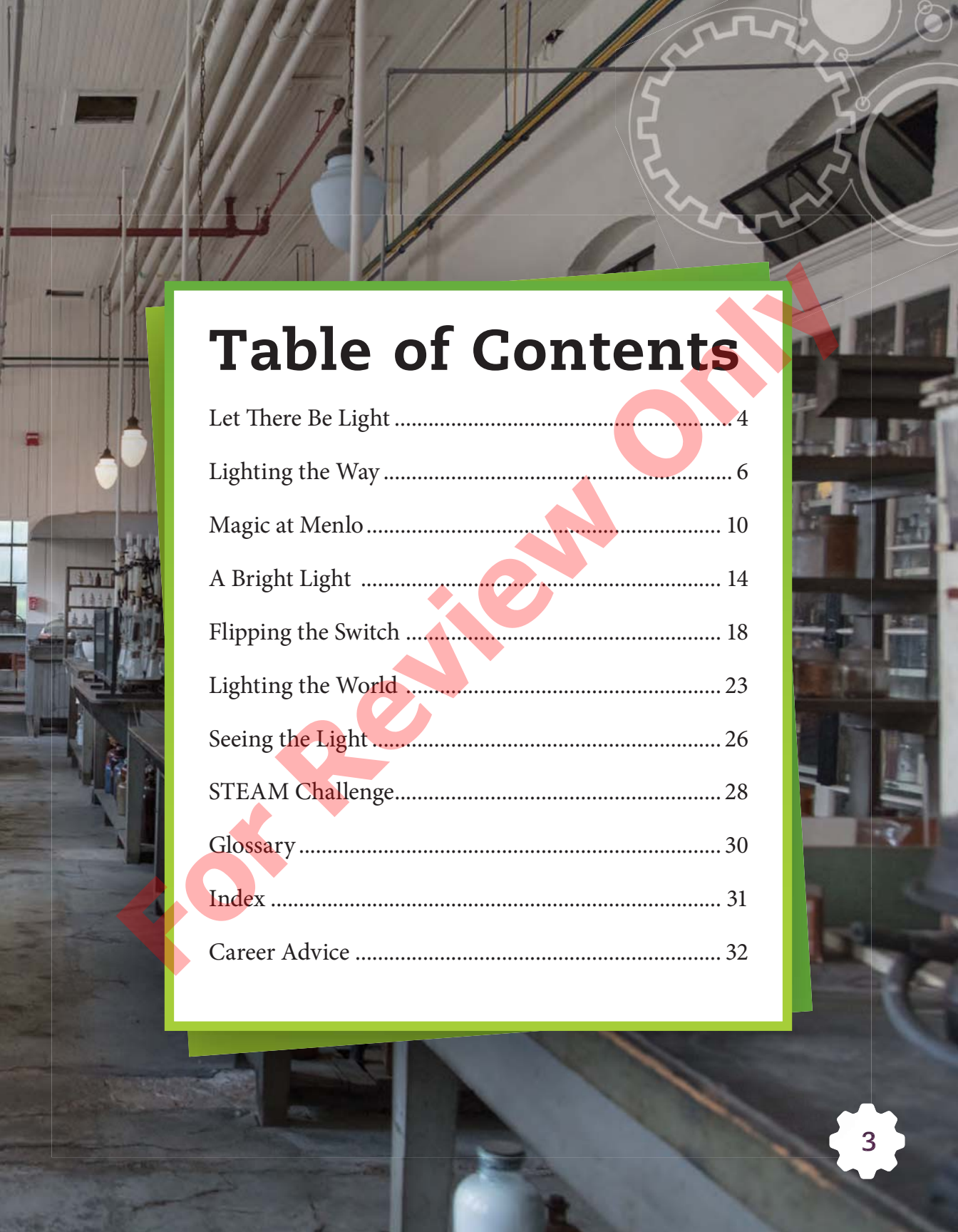
Smithsonian

Thomas Edison

Lighting a Revolution



Nick Cimarusti



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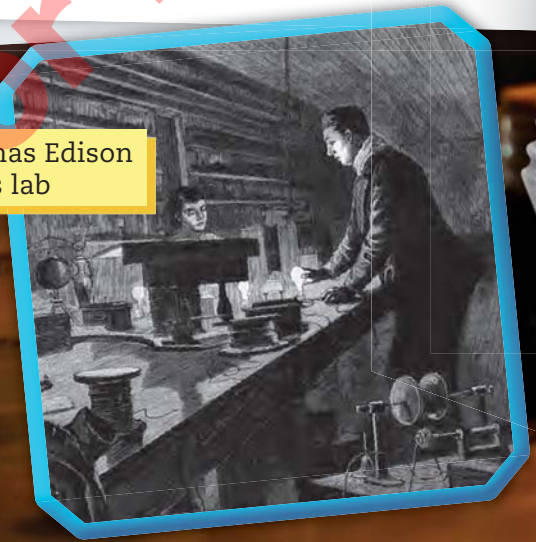
Let There Be Light

With each new year, people look forward to a brighter future. On New Year's Eve in 1879, the future was especially bright. That evening, Thomas Edison showed off his most famous invention. Electric light bulbs lit up the night as never before.

People came from all over to see Edison's electric light bulbs. Edison and his team used the new light bulbs to light his laboratory and the surrounding buildings. Buildings were filled with light! The street could be seen clearly. A dark winter night suddenly became bright. The visitors could not believe it! There were no gas lamps in sight, just little electric bulbs. Edison created a new way to bring light into the world.

Thomas Edison did not see himself as a scientist. Edison was an inventor. What is the difference? A scientist wants to understand the world. They look for new information. But an inventor uses information to create something new. These inventions help people. Some inventions also make people money. Inventors work to **patent** their inventions.

Edison made many devices. He is most famous for his work with electricity. The electric light bulb gave people a reason to use electricity. But it was not easy getting there.



Thomas Edison in his lab

modern version of Edison's electric light bulb

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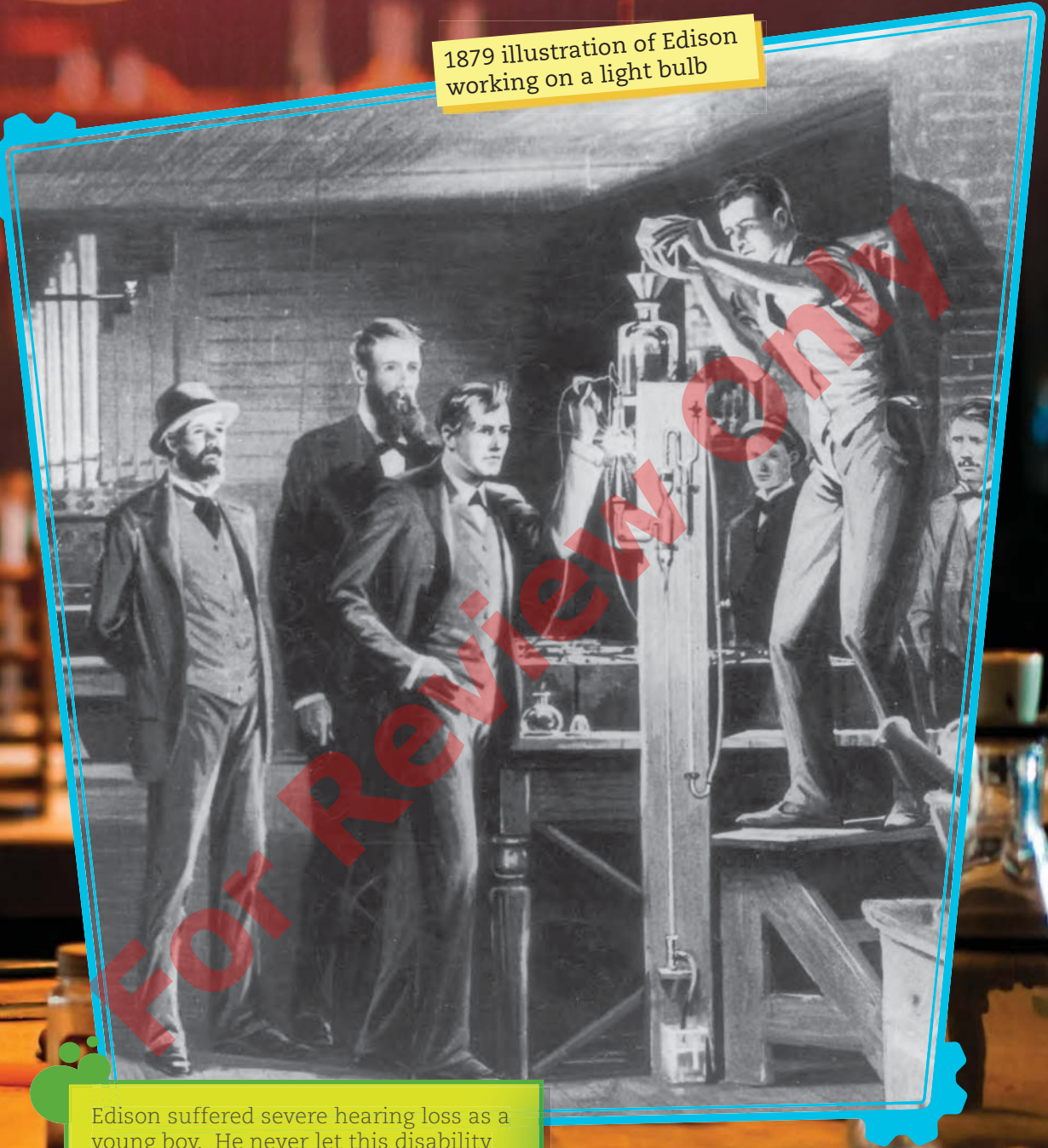

1879 illustration of Edison working on a light bulb

Edison suffered severe hearing loss as a young boy. He never let this disability stop him from working hard and following his passion for inventing.

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Lighting the Way

It is no surprise that Thomas Edison was curious about the world. He loved science and experimenting. He was always looking for new information. Young Edison liked to take everything apart to understand how it worked.

At 12 years old, Edison sold newspapers and other small items, such as candy, on a train. For about six months, he even ran his own newspaper. It was called the *Weekly Herald*. His newspaper was popular with travelers on the train. Edison made enough money to build a small laboratory on the train. Once, his experiments even caused a fire!

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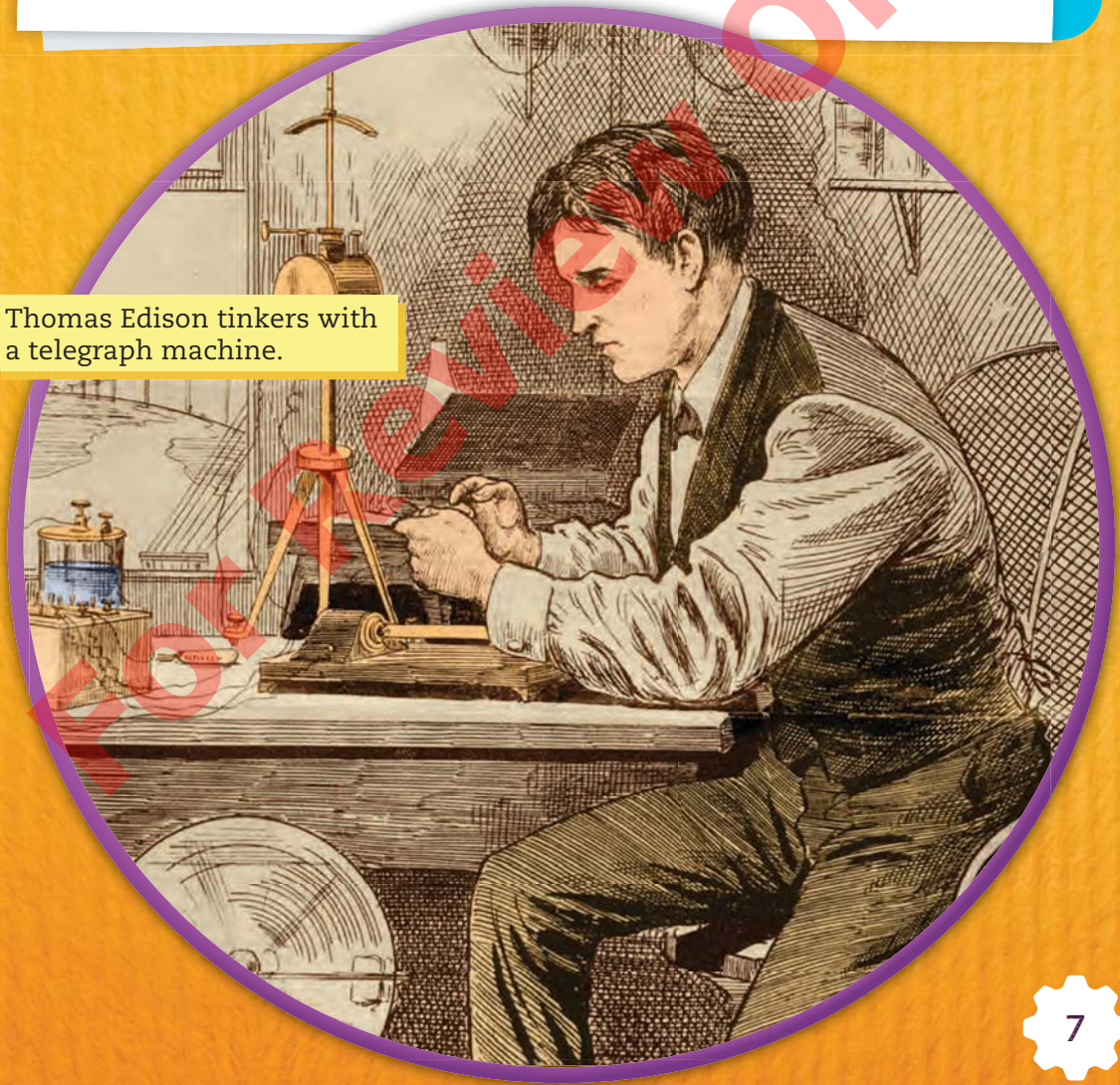
A young Edison prints newspapers on a train.

Edison struggled in school, so his mother decided to homeschool him.

Edison to the Rescue!

When Edison was 16 years old, his life changed. One day, he was walking near the railroad when he saw a scary sight. A little boy was about to step onto the train tracks! Edison sprang into action and grabbed the boy before a train came.

The boy's father was so happy that he offered to train Edison for a new job. Edison would be a telegraph operator. It was a very important job. It required quick thinking and a lot of skill. Plus, Edison would earn more money as a telegraph operator than he did selling newspapers.



Thomas Edison tinkers with a telegraph machine.

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On the Wire

Long before cell phones, telegraphs were used to talk with people who were far away. In 1844, Samuel Morse invented a practical electric telegraph. People at telegraph stations sent messages to other stations through electric wires. Operators copied the messages. All messages came in Morse code.

Morse code uses dots and dashes. Different dot-and-dash combinations stand for each letter of the alphabet. This was much faster than sending letters through the mail. News traveled with the press of a button.

Long wires were also placed along ocean floors. This helped people in different countries quickly send messages. People used the wires to talk to banks. This way, they could send money quickly.

Edison worked as an operator for four years. The job was an important one. Edison also fixed the machines. It was during this time that he learned a lot about electricity.

Edison learned about **conductors**. Electricity moves through conductors, such as wires, in a controlled manner. He learned about **insulators** too. They keep people safe from the dangerous effects of electricity. This knowledge helped Edison later in life.

These glass insulators prevent electricity from flowing between conductors.

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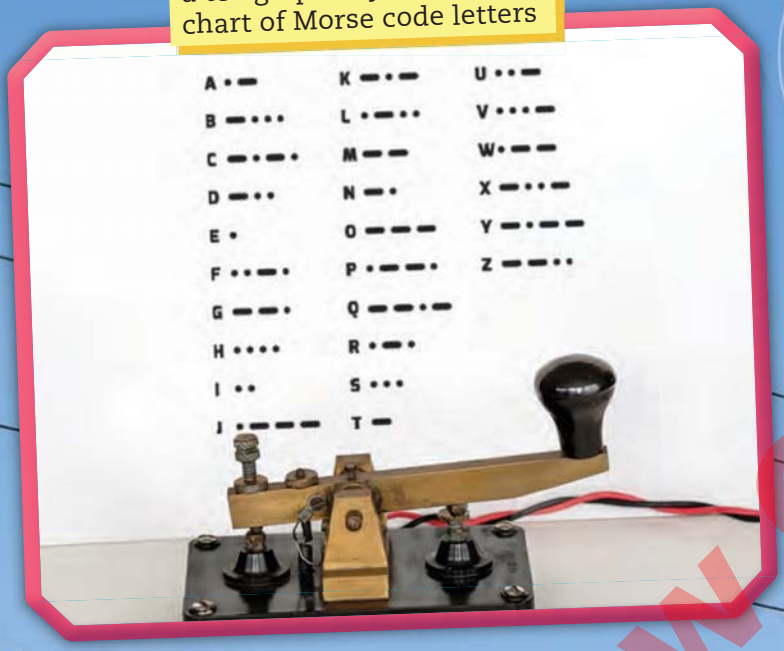
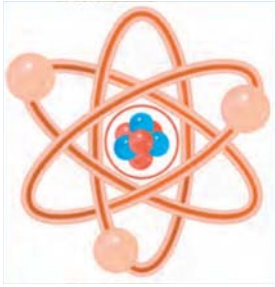
a telegraph key with a chart of Morse code letters



SCIENCE

All Charged Up

Everything is made of tiny atoms. Each atom has a center called a nucleus, which is made of protons and neutrons. Protons have a positive charge. Electrons have a negative charge, and they circle a nucleus. Electricity flows when electrons pass their charge from one atom to another.



electron neutron
nucleus proton

For Preview Only

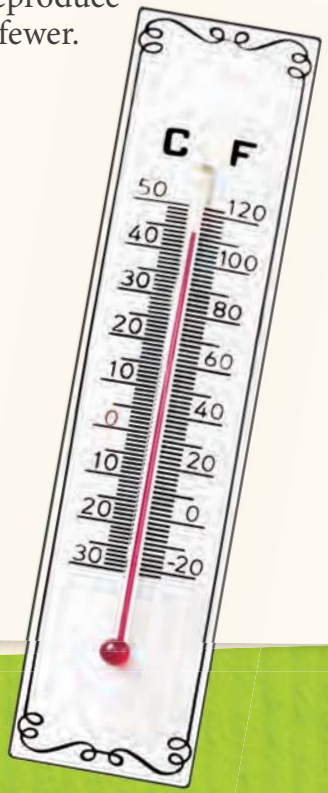
STEAM CHALLENGE

Define the Problem

Electricity is in limited supply in some parts of the world. People in these areas have turned to solar ovens for cooking and heating water to make it safe for drinking. You are part of an engineering team that will introduce a solar oven design and materials to a community in Kenya. Your task is to design and build an effective way to capture energy from the sun.

Constraints: Your model must be easy to reproduce and should be made with three materials or fewer.

Criteria: Your solar oven must increase the temperature of 50 milliliters (10 teaspoons) of water by 5° Celsius (9° Fahrenheit).



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Research and Brainstorm

What types of materials and colors would be most useful in a solar oven? How can you use Edison's inventing failures as inspiration?

Design and Build

Sketch your solar oven design. What purpose will each part serve? What materials will work best? Build the model.

Test and Improve

Place 50 mL (10 tsp.) of water and a thermometer in the oven. Place the oven in an outdoor area with direct sunlight. Record the temperature of the water every 5 minutes for 20 minutes. Did it work? How can you improve it? Modify your design and try again.

Reflect and Share

Compare your team's design to other designs in the class. How is your team's design similar and different? What can you learn from other designs? Why is it important for scientists and engineers to share their work?

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