

Grade 4

Unit 2: *Eureka! The Art of Invention*



Use the Interactive Read-Aloud lesson and text on the following page to kick off this unit with your students.

Unit-level Essential Question

How can an invention change the world?

Lessons 1–5

Guiding Question: What skills or traits make a good inventor?

Writing Prompt: Consider a household invention—such as the light bulb—you use every day. Who invented it? Research to find out more about that person and how they came to invent what they did.

Lessons 6–10

Guiding Question: How does “invention breed invention”?

Writing Prompt: What has been the most difficult process of inventing so far, and what has been the most rewarding?

Unit 2 Culminating Activity

You have learned a lot about different types of inventors in this unit. How is your inventing process similar to an inventor you have read about? What struggles and successes did they encounter that you did too?

GRADE 4 UNIT 2

Read-Aloud

Use the following Read-Aloud to introduce **Grade 4 Unit 2**.

Tell students that throughout this unit, they will think about the following **Essential Question**: How can an invention change the world?

Explain that over the next few weeks they will be part of a very special experience—a game show in which they learn from famous inventors throughout history and work to invent their own creations. Before starting that game show, though, they will hear new insights from a famous inventor they have already encountered—Benjamin Franklin.

Read the Read-Aloud, pausing after each section to discuss the text-based questions.

Benjamin Franklin, An American Inventor

by Elizabeth Wade

You may remember learning about Benjamin Franklin before. Today, you'll hear more about him and his inventions—and you will get to hear some of his own words about being an inventor. You may remember that Franklin, who was born in the colony of Massachusetts, had an important role during the American Revolution. He served the American people by speaking on their behalf in front of Parliament, part of the British government. He also traveled to France to ask for its help when they decided to form their own independent nation. In fact, the work Franklin did to help establish the young nation even made one historian claim that he helped invent America!

It might seem unusual to talk about inventing a country, but it is important to remember that the world had never seen a nation quite like the United States. Franklin and his fellow Founding Fathers had to imagine and create the new country they wanted to live in.

Literal. What were some of Franklin's contributions as a statesman?

- » He represented the American colonists in front of other governments and helped create the new nation, the United States of America.

Evaluative. Why might a historian say that a country could be invented? What kinds of things would you have to create to form a new nation?

- » Answers will vary, but students may recall documents such as the Bill of Rights and the Declaration of Independence.

This may sound like a big challenge—and it was! But Franklin was actually no stranger to this kind of challenge. In fact, he invented many things throughout his long life, and we still use some of his creations today.

Franklin had a keen interest in science and the way things work. His brain was working constantly, spilling over with questions and ideas. Often he answered those questions—and solved problems—by creating new things. When he was a child, he thought of a way that he could be a faster swimmer. He found some wood and carved some wooden paddles to fit over his hands and feet, kind of like the flippers that divers use today.

As Franklin grew older, he encountered new kinds of problems, and he kept trying to produce solutions through his inventions. For example, he had two pairs of glasses, one for reading and one to help him see things far away. He didn't like having to switch glasses all day long, so he asked a glass cutter to slice all of his lenses in half. He made one new pair of glasses, with the distance lenses on top and the close-up lenses on the bottom. Franklin had just invented bifocal glasses, still worn by many people today.

Of course, most people know about Benjamin Franklin's experiments with lightning. Though it was not really safe to fly a kite during a thunderstorm, by doing this, Franklin discovered that lightning was electricity! Franklin used his discovery to invent the lightning rod, a pole that helps carry electricity away from buildings and into the ground. His creation is still used today to prevent fires caused by lightning strikes.

Literal. What were some of the things Franklin invented?

- » flippers, bifocals, the lightning rod

Evaluative. Which of Franklin's inventions do you believe is most important? Use evidence from the Read-Aloud in your answer.

- » Answers will vary, but students should cite an invention and a reason for its importance, such as stating that the bifocals were his most important invention because they are worn by many people.

That experiment was pretty dramatic—and even quite dangerous. Other times, though, Franklin got his inspiration for an invention while relaxing. For example, while sitting by the fire one night, Benjamin Franklin watched warm air disappearing up the chimney and wondered how he could trap more warm air inside the house. He made a wood-burning stove out of iron. It put out twice as much heat as a regular fireplace and burned less wood. This stove was named the Franklin stove, after its inventor.

In his autobiography, Franklin described inventing this stove. Here's what he had to say:

"Having, in 1742, invented an open stove for the better warming of rooms, and at the same time saving fuel, as the fresh air admitted was warmed in entering, I made a present of the model to Mr. Robert Grace, one of my early friends, who, having an iron-furnace, found the casting of the plates for these stoves as a profitable thing, as they were growing in demand."

Literal. What problem was Franklin trying to solve when he invented a new stove?

- » He wanted to stop warm air from going up the chimney.

Literal. What were two ways Franklin's stove was better than other stoves?

- » It saved fuel, and it did a better job heating rooms.

Inferential. Why might Mr. Grace benefit from the stove, besides being warmer from using it?

- » He had an iron furnace, which meant he could make and sell the stoves.

Franklin continued:

“To promote that demand, I wrote and published a pamphlet ...This pamphlet had a good effect. Governor Thomas was so pleased with the construction of this stove, as described in it, that he offered to give me a patent for the sole vending of them for a term of years, but I denied it from a principle which has ever since weighted with me on such occasions ...That, *as we enjoy great advantages from the inventions of others, we should be glad of an opportunity to serve others by any invention of ours, and this we should do freely and generously.*”

Literal. How did the governor feel about Franklin's stove?

- » He liked it.

Inferential. Franklin writes that the governor offered him “a patent for the sole vending” of the stoves. What is a patent?

- » A patent gives someone the right to be the only person to make or sell a product.

Franklin could have charged people a lot of money for his invention of the stove, but by deciding to share it, he made life better for many people throughout the world. You might say that Franklin had a philosophy of inventing, or an idea of its purpose and meaning. Franklin's philosophy was that that inventions should be used to help others.

Of course, not every inventor has felt that way throughout history. In this unit, you'll meet some other inventors with their own ideas—strong ideas—about inventing. And maybe you'll start to develop your very own philosophy, just like Benjamin Franklin!

Literal. What is Franklin's philosophy of inventing, and why does he hold this philosophy?

- » He believes that inventors should share their inventions because they benefit from the inventions of others.

Inferential. Franklin writes that he declined the patent because of a principle. What is the kind of principle he is referring to?

- » a strong feeling or belief

Use the following prompts to extend student understanding of the Read-Aloud.

Guiding Question: How did Franklin's inventions help improve people's lives?

Writing Prompt: Think about the things Franklin invented and how he liked to use inventions to solve problems. Describe a problem in your everyday life, and imagine what you could invent that could eliminate that problem.