Third Grade

DISCOVER AMERICA

Course 22 - Teacher Guide

Skyward Pioneers: The Wright Brothers

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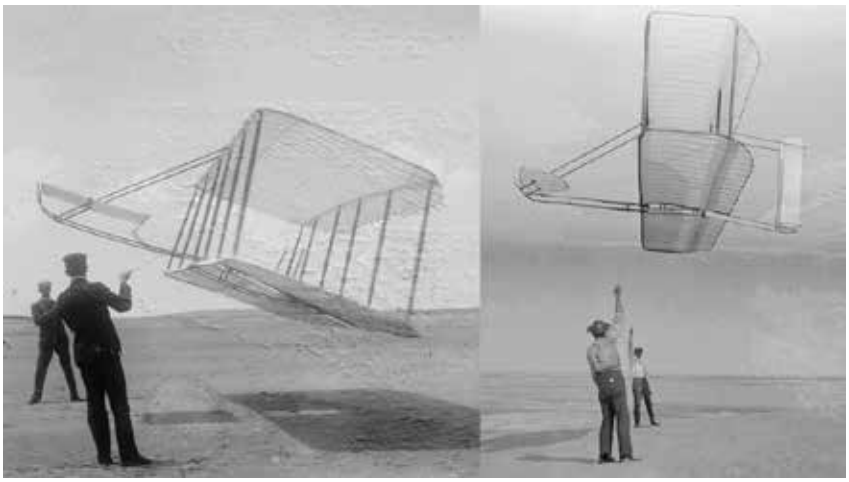

Key Themes

- Imagination
- Freedom to Explore
- Flight
- Perseverance
- Teamwork

Core Values

- Community
- Life
- Liberty

Learning Objectives

Students will be able to

- List two obstacles the Wright brothers faced.
- Define aviation.
- Compare and contrast a glider and an engine-powered airplane.
- List two characteristics of the Wright brothers that led to their success.
- Compare and contrast Wilbur and Orville Wright.

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Key Terms

01	**aviation:** the making and flying of aircraft that are heavier than air.
02	**coaster brakes:** also known as pedal or foot brakes, devices that allow riders to stop their bikes by pedaling backward.
03	**engine-powered airplane:** aircraft with a motor that provides thrust, allowing it to move forward and stay in flight.
04	**fascinated:** extremely interested.
05	**glider:** an aircraft that soars through the air without the help of a motor.
06	**mischievous:** behavior that is slightly bad but is not intended to harm anyone.
07	**perseverance:** the ability to keep doing something in spite of obstacles.
08	**pursue:** to search for something.
09	**wing warping:** the twisting, or warping, of plane wings to control the roll of the plane.

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Introduction

TELL Students

Here's a riddle for you: I soar high up in the sky, with wings that help fly. I am not a bird, but I can glide. In the air, I love to ride. What am I?

Yes, an airplane! Create and throw a paper airplane.

ASK Students

What made my airplane fly? Why did my airplane only fly a short distance?

TELL Students

Today, we are going to learn about engine-powered airplanes. We are also going to learn about two remarkable brothers, Wilbur and Orville Wright. These brothers were pioneers in aviation, which means they were among the first people to successfully build and fly airplanes. Aviation refers to the making and flying of aircraft that are heavier than air. The Wright brothers were born to Milton and Susan Wright, who taught them strong values and a love for learning. Wilbur and Orville's curiosity and determination led them to achieve something incredible: inventing the first successful piloted engine-powered airplane. Let's watch another episode of Star Spangled Adventures to learn more about the Wright brothers!

WATCH

Star Spangled Adventures Cartoon Ep. 22: The Wright Brothers

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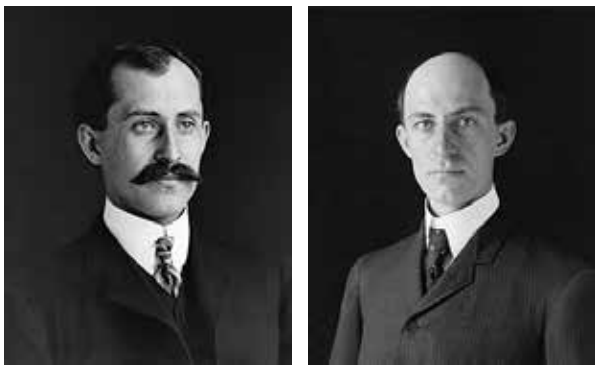
Lesson

TELL Students

Wilbur was the older Wright brother. He was known as someone who stayed calm. Even as a young boy, Wilbur showed intelligence, confidence, and a knack for speaking and writing. He really enjoyed math and science. When Wilbur was about to finish high school, his family moved, but he still planned to attend Yale University. Unfortunately, he wasn't able to finish high school because of some unexpected events. Instead, he took college preparatory courses to pursue his dream of teaching. Pursue means to search for something.

At the age of 18, Wilbur faced a setback when he lost his teeth in an accident playing a game of ice hockey called "shinny." This event made him less confident and caused other health issues. He eventually abandoned his school goals. But, Wilbur continued to learn. He spent much of his time in his father's library, reading and practicing his writing skills. He also cared for his mother, who was ill and unfortunately passed away.



Orville (left) and Wilbur Wright in 1905

ASK Students

What are two obstacles that Wilbur Wright faced? What is "shinny?"

TELL Students

Orville, similar to his brother Wilbur, excelled in math and science. But he also had a mischievous side. **Mischievous describes behavior that is slightly bad but is not intended to harm anyone.** Despite his mischievous side, Orville showed strong leadership qualities, enthusiasm, energy, and had a knack for being inventive and curious. Orville gained local recognition for his skill in designing, building, and selling kites. He was also known for dismantling items to understand how they work. He left school in the 11th grade because he did not feel challenged. He went on to take college preparatory courses. Like Wilbur, he continued to learn outside of the traditional school setting. As a teenager, Orville started a

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printing business with his friend, Ed Sines. Wilbur later joined Orville in the printing business. Together they not only operated but also wrote and published two local newspapers.

ASK Students

List three characteristics of Orville Wright. As a child, what was he known for?

TELL Students

The Wright brothers moved from the printing business to a bicycle rental and repair shop. Over time, the business grew to include bike sales. Then, they introduced their own brand of bicycles. They used innovative features like coaster brakes, which allow riders to slow down by pedaling backward. Even though their bicycle business was successful, Wilbur and Orville were drawn to their lifelong passion for flight.

ASK Students

What are coaster brakes? What are some similarities between bicycles and airplanes?

Wright brothers bicycle

TELL Students

Their fascination with flying began in childhood when their father gave them a toy helicopter. Fascinated means extremely interested. But it wasn't until later that the Wright brothers decided to seriously pursue their dream of flight. Wilbur and Orville had become skilled in mechanics from working on printing presses and bicycles. They also saved up enough money to start this new adventure in flight. In 1899, Wilbur wrote to the Smithsonian Institution in Washington, D.C., asking for information on flying experiments. Orville joined in, and together they began to study everything they could find about flight.

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ASK Students
What experiences prepared the Wright brothers for their new adventure in flight?

TELL Students
The Wright brothers didn't start out trying to invent the airplane. They were curious about flying and wanted to learn more about it. They looked at what other people had tried before, what questions still needed answers, and how they could make improvements. After studying everything they could find about flight, they were surprised to see that not much progress had been made, even though people had been interested in flying for a long time.

ASK Students
What did the Wright brothers find out after doing research on flight?

TELL Students
The Wright brothers didn't just work on their flying machine for a short time. They spent many years on it! They figured out that there were three big problems they needed to solve to make their airplane work: how to balance and control it, how to design the wings to lift it up, and how to make it go forward. While some people focused on just one problem, the Wright brothers worked on all three at the same time.

ASK Students
What are the three big problems that the Wright brothers needed to solve to make the airplane work? How did they approach the problems?

TELL Students
The Wright brothers believed that the biggest challenge was making sure the pilot could control the airplane. They thought of it like riding a bike, where the rider keeps the bike balanced and on course. But they had to figure out how to do that in the air!

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ASK Students

Think about riding your bicycle without training wheels. Does it require a lot of balance?

TELL Students

To solve the three big flight problems, the Wright brothers tried a lot of experiments and tested different kites and gliders. They did most of their work in their bicycle shop in Dayton, Ohio. Then, they went to Kitty Hawk, North Carolina, because it had perfect conditions for testing their inventions. The brothers discovered many important things during their experiments. They came up with an idea called "wing warping." **Wing warping is the twisting, or warping, of plane wings to control the roll of the plane.** This helped balance the airplane during flight and controlled how it moved sideways. The Wright brothers tested their ideas with gliders in 1900 and 1901, but the results weren't what they expected. **A glider is an aircraft that soars through the air without the help of a motor.**

The Wright brothers built a wind tunnel and did over two hundred tests with different wings and shapes. They learned important things about how wings should be shaped and how air moves over them.

Glider airplane

ASK Students

What is "wing warping?"

TELL Students

The Wright brothers began by experimenting with gliders and eventually found success. Then, they focused on adding power to their aircraft. With the help of their mechanic, Charlie Taylor, they designed a gasoline engine and connected it to propellers made from airplane wings. The Wright brothers achieved the first successful piloted engine-powered airplane on

Kitty Hawk

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December 17, 1903 in Kitty Hawk. On this historic day, Orville took the first flight, covering 120 feet in 12 seconds. This marked the first powered flight in history. The brothers made three more flights that day, with Wilbur's final flight covering 852 feet in 59 seconds. Although the aircraft was damaged after the last flight, their achievement paved the way for modern aviation.

ASK Students

What did the Wright brothers focus on after they found success with gliders? What is the difference between a glider and an engine-powered airplane?

TELL Students

The Wright brothers made history with their continuous improvements in aircraft design. Just two years after their first flight, they achieved another milestone when their airplane flew for 39 minutes, covering a distance of 24.5 miles. Their determination and innovative spirit paved the way for modern flight. They inspired future generations, including Neil Armstrong, who carried a piece of the Wright Flyer to the moon. Their legacy reminds us to persevere and dream big, because anything is possible with determination and hard work. Perseverance is the ability to keep doing something in spite of obstacles.

ASK Students

What inspired the Wright brothers? Who did the Wright brothers inspire? How can you inspire others?

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Glider vs. Engine

Objective: To help students understand the difference between a glider and an engine-powered airplane and to learn about the contributions of the Wright brothers to aviation.

Materials Needed:
1. Pictures or models of a glider and an engine-powered airplane
2. Large poster boards or paper
3. Markers
4. Printed images or illustrations of the Wright brothers' inventions

Introduction:
- Gather students and review aviation and flight.
- Briefly review the Wright brothers and their contributions to aviation.

Discussion:
- Show pictures or models of a glider and an engine-powered airplane.
- Discuss the differences between the two:
    - A *glider is an aircraft without an engine that relies on natural forces like wind to stay airborne.*
    - *An engine-powered airplane has a motor that provides thrust, allowing it to move forward and stay in flight.*
- Ask students to identify the key components of each flying machine.

Group Activity - Poster Creation:
- Divide students into small groups.
- Provide each group with a large poster board, markers, and printed images or illustrations of the Wright brothers' inventions.

- Instruct each group to create a poster showcasing the differences between a glider and an engine-powered airplane.
- Encourage students to use drawings, labels, and written explanations to highlight the differences. Students may also use a Venn diagram to compartmentalize their information.

Presentation:
- Have each group present their posters to the class.
- As each group presents, facilitate discussion by asking questions about the features of gliders and engine-powered airplanes.
- Encourage other students to ask questions or share their observations.

Conclusion:
- Recap the main points of the lesson, emphasizing the importance of the Wright brothers' influence on aviation.
- Encourage students to continue exploring the topic of flight and the contributions of other inventors and aviators.

Extension Activity:
- For an extension activity, students can create paper gliders and test them to understand the principles of flight. They can experiment with different designs and modifications to see how they affect the glider's performance.

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Multiple Choice Review

Instructions: Read each question and answer set carefully. Circle the correct answer.

1. What inspired the Wright brothers to pursue their childhood fascination with flight?
   A) a book about aviation
   B) their father's toy helicopter
   C) a trip to an airshow
   D) their mother's encouragement

2. Where did Wilbur and Orville test their flight inventions?
   A) New York City
   B) Kitty Hawk, North Carolina
   C) Chicago, Illinois
   D) Los Angeles, California

3. How many key problems did the Wright brothers identify that needed to be solved for successful flight?
   A) four
   B) two
   C) three
   D) five

4. What did the Wright brothers develop to balance the wings in flight and control the lateral movement of the aircraft?
   A) wing flaps
   B) rotor blades
   C) wing warping
   D) ailerons

5. What was the name of the Wright brothers' mechanic who helped them build their engine?
   A) Charlie Taylor
   B) Samuel Langley
   C) Octave Chanute
   D) Otto Lilienthal

6. In which year did the Wright brothers make their first successful piloted engine-powered flight?
   A) 1896
   B) 1901
   C) 1903
   D) 1905

7. How long did Orville's first flight on December 17, 1903, last?
   A) 12 seconds
   B) 5 minutes
   C) 30 seconds
   D) 1 hour

8. Which of the following did the Wright brothers NOT operate as a business before focusing on flight?
   A) printing business
   B) bicycle rental and repair shop
   C) auto dealership
   D) newspaper publishing

9. What significant historical event did Neil Armstrong bring a piece of the Wright Flyer for?
   A) the first moon landing
   B) the first airplane flight across the Atlantic Ocean
   C) the invention of the jet engine
   D) the opening of the first commercial airport

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Answer Key

1. B) Their father's toy helicopter
2. B) Kitty Hawk, North Carolina
3. C) Three
4. C) Wing warping
5. A) Charlie Taylor
6. C) 1903
7. A) 12 seconds
8. C) Auto dealership
9. A) The first moon landing

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Resource List

https://kids.nationalgeographic.com/history/article/wright-brothers

https://www.nps.gov/articles/wright-brothers.htm

https://www.nps.gov/people/wilburwright.htm

https://www.nps.gov/people/orvillewright.htm

https://airandspace.si.edu/stories/editorial/who-were-wright-brothers

https://www.smithsonianmag.com/smithsonian-institution/how-the-wright-brothers-took-flight-180981001/

https://memory.loc.gov/diglib/legacies/loc.afc.afc-legacies.200002919/

https://airandspace.si.edu/stories/editorial/wright-before-aviators

https://airandspace.si.edu/explore/stories/researching-wright-way#aerodynamics

https://www.wright-brothers.org/History_Wing/Wright_Story/Inventing_the_Airplane/Kitty_Hawk/Afflicted.htm

https://wright.grc.nasa.gov/overview.htm

https://airandspace.si.edu/collection-objects/1903-wright-flyer/nasm_A19610048000

https://www.nps.gov/articles/roadtofirstflight.htm

https://www.nps.gov/articles/firstflight.htm?utm_source=article&utm_medium=website&utm_campaign=experience_more&utm_content=small

https://airandspace.si.edu/explore/stories/researching-wright-way#aerodynamics

https://time.com/5418950/first-man-neil-armstrong-wright-flyer/

Notes