

THE WRIGHT BROTHERS

American aviation pioneers

Wilbur • 1867–1912

Orville • 1871–1948



Wilbur and Orville Wright had a dream, learned from failure, and persisted. Their interest in flight took off when, as boys, their dad bought them a toy helicopter. They always liked fiddling with machines and making things – when Orville was 12, he made kites that he sold to other children.

In 1895, a famous mathematician and engineer called Lord Kelvin, stated that “heavier-than-air flying machines are impossible”.

But just eight years later, the Wright brothers flew the first aeroplane.

Wilbur and Orville began their careers by building their own printing press, but the two newspapers they published were not successful. When the bicycling craze hit the USA, they opened the Wright Cycle Company, selling and repairing bikes. However, the brothers were still fascinated by flight, and by a gliding pioneer called Otto Lilienthal.

Is it a bird?

When they were constructing their plane, the brothers studied how birds fly. They noticed the way that birds tilt their wings to steer.

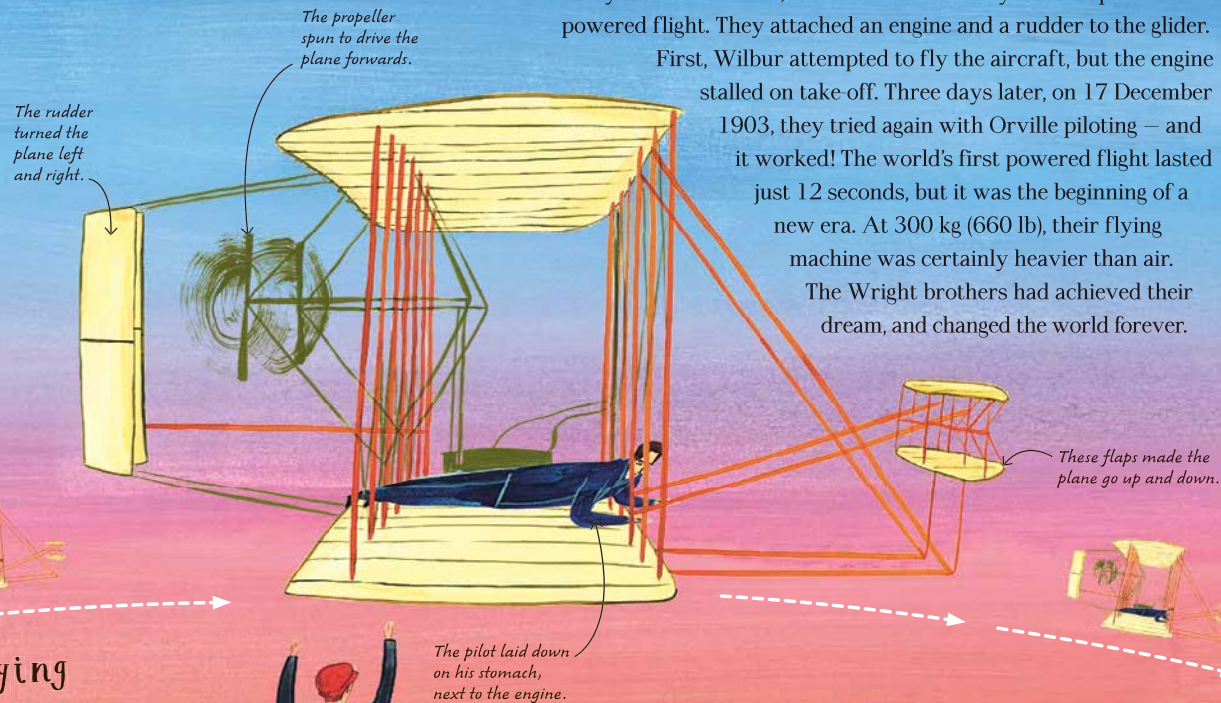
Getting it Wright

In 1896, Otto Lilienthal died in a gliding accident, but the Wright brothers were far from put off. Feeling sure that they could improve Otto's glider design, they set out to build their own. They created miniature wings (called airfoils) and tested these in a homemade wind tunnel. Then, they built a series of gliders and took turns flying them at Kitty Hawk, a beach in North Carolina, USA, where the sand allowed for a relatively soft landing.

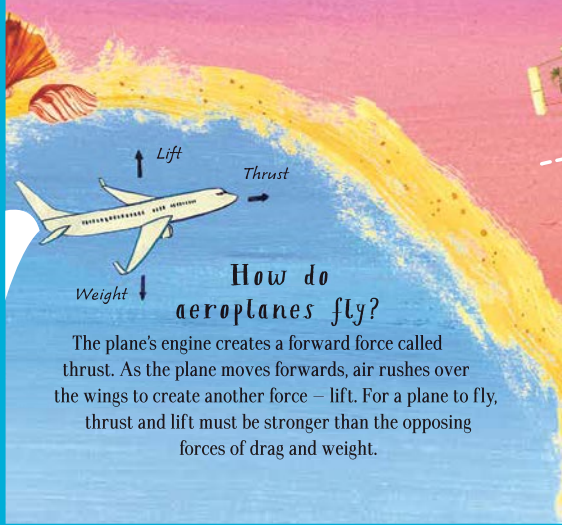
By December 1903, the brothers felt ready to attempt a powered flight. They attached an engine and a rudder to the glider.

First, Wilbur attempted to fly the aircraft, but the engine stalled on take-off. Three days later, on 17 December 1903, they tried again with Orville piloting – and it worked! The world's first powered flight lasted just 12 seconds, but it was the beginning of a new era. At 300 kg (660 lb), their flying machine was certainly heavier than air.

The Wright brothers had achieved their dream, and changed the world forever.



Building a flying machine was their boyhood dream.



How do aeroplanes fly?

The plane's engine creates a forward force called thrust. As the plane moves forwards, air rushes over the wings to create another force – lift. For a plane to fly, thrust and lift must be stronger than the opposing forces of drag and weight.

The first plane was called the Wright Flyer.



What are your interests? Write them down and see what inventions they inspire!

Suitable for 7–9 years

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CHARLES BABBAGE

British mathematician
1791–1871

Charles Babbage was a bright but sickly boy, who almost died of fever when he was eight. Often too ill for school, he studied at home and got to learn about what interested him most – maths. He grew up to become a man with many gifts: he was rich, had good looks, famous friends, and studied at Cambridge University, becoming a professor, but never giving a lecture!

Charles was so clever that he designed the first-ever computers. In his time, people worked out calculations by themselves, which led to errors that could have serious consequences, such as ships becoming stranded due to navigation mistakes. Charles wanted to replace people with the steam-driven machines that he designed: the “Difference Engine” and then, later, the “Analytical Engine”, which would complete more difficult calculations. However, his designs were complex and very expensive to build – a working model wouldn’t be completed for 150 years!

Charles became increasingly grumpy in old age. His beloved wife died very young as did three of his children. This, together with the failure of his most ambitious plans, led to frustration and sadness.

The Analytical Engine

Charles’ computer was designed to solve tricky calculations and store information. A series of cards with holes would be fed into the machine to tell it what to do.



In 1820, Charles set up the Astronomical Society with some friends to promote scientific research. It is still active today.

There is a smaller version of the Analytical Engine, now finally working, in London’s Science Museum.



ADA LOVELACE

British mathematician
1815–1852

Ada Lovelace was a lively little girl, born into a famous family. Her father, the poet Lord Byron, had many lovers and left his wife within weeks of Ada’s birth. Lady Byron did not want Ada to become a poet like her dad, so made her follow strict rules and study intensely. Ada worked hard, but never lost her creativity, writing a book when she was 12 called *Flyology*, with designs for a winged flying machine.

Ada was 17 when she met Charles Babbage at a party. They got on very well, Charles calling her “Lady Fairy” because of her fascination with flying. He was impressed by her mathematical skill and Ada was excited by his ideas of a calculation engine.

Number cruncher

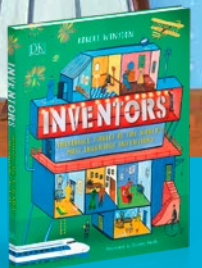
The Italian mathematician Luigi Menabrea published a paper about Charles’ Analytical Engine, which Ada translated and expanded. It seems Ada, rather than Charles, understood that machines might do tasks far beyond counting numbers – they had potential to write secret codes or compose music. This is why she is often regarded as the first computer programmer. Sadly, Ada died young and the music she imagined a computer creating wouldn’t sound for a hundred years.



Lady Byron loved maths. Lord Byron called her “the princess of parallelograms”.



Ada wrote to Charles to explain that the Analytical Engine could be programmed.



Not all inventors work alone! Team up with a friend to come up with a great idea for an invention.

Suitable for 7–9 years

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BECOME AN INVENTOR!

Using the space on this page, have a go at drawing and designing your very own invention!

If you are stuck for ideas, have a read about some more famous inventors below.



G. D. Naidu: Excited about motorised transport, Naidu designed the first electric motor ever to be made in India.



Hedy Lamarr: An actor and inventor, her inventions have led to the technology we use today, including Wi-Fi.



Alexander Graham Bell: The inventor of the telephone. His very first phone call is said to have been an accident!



Ruth Amos: A young engineer and YouTuber, Ruth came up with an invention to help elderly people and those less able.

