

The Wright Brothers

Humans have always wanted to fly. Centuries ago, Leonardo da Vinci (1452–1519) drew plans for a flying machine. In 1783, the French brothers Joseph and Jacques Montgolfier were the first to put to flight a hot-air balloon, using a balloon that held a duck, a rooster, and a sheep because the brothers did not know if it would be safe for humans!

Wilbur Wright and Orville Wright were the first to achieve powered, controlled flight in a full-sized **aircraft**. The brothers owned a bicycle shop in Ohio and had always been interested in flying. They built their first unpowered (no one on board) glider in 1896. The Wright brothers had an idea for flying. They called their idea an aircraft. They wanted to build a heavier-than-air machine that could take off under its own power, be controlled in flight by a pilot, and land. The Wright brothers knew the pilot had to have some control over the flight, not just steer the aircraft. To create a successful aircraft, they invented:

- a way for the pilot to control the aircraft in flight by twisting the wings with cables that ran from the wings to levers;
- a special engine strong enough to turn the propellers but light enough not to weigh down the plane; and
- a new propeller design.

The Wright brothers were the first inventors to understand that a propeller works the same way

a wing does: It pulls the craft forward in the same way wings lift it. They built the *Wright Flyer*: a **biplane** (two wings, one on top of the other) with a wooden frame covered in fabric. Its power came from a lightweight, twelve-horse engine cooled by water and powered by gasoline. The engine powered two propellers attached to the engine with chains. The pilot lay flat on the lower wing and twisted the wings to roll the aircraft right or left. It had a rudder to turn it right or left, and elevators to make it go up and down (or climb and dive).

The brothers took their *Flyer* to North Carolina. On December 17, 1903, in Kitty Hawk, North Carolina, Orville flew for twelve seconds, 120 feet in distance, at about ten feet off the ground. This was the first powered flight of a manned aircraft (an aircraft that was heavier than air and not floating on the air). That day, each brother made two successful flights; the longest was Wilbur's at 852 feet for fifty-nine seconds.

The brothers had many failures but did not give up. They paid for their own experiments with flying, and continued to work at their bicycle shop. They built another flyer, *Flyer 2*, with a sixteen-horsepower engine, but, like the first *Flyer*, it stalled when it turned, so they built *Flyer 3*. It flew for thirty-eight minutes on October 5, 1905. The Wright brothers' aircraft led to the first jet engines, built in England and Germany in the 1930s, and to the first successful helicopter in 1940.

Exercise:

1. Name three things the Wright brothers had to invent in order to make their aircraft work.

2. Describe how the Flyer worked.
