

SCIENCE ACTIVITY

Wind Tunnel Experiments

In the fall and winter of 1901, the Wright Brothers built a wind tunnel to test their wing designs. A wind tunnel is basically a long, narrow box. At one end, a fan creates a steady and straight stream of air that can be controlled. Inside the box the Wrights placed scientific instruments of their own design to measure the effects of the moving air on model wing shapes. The instruments were so sensitive, that a person walking around their bicycle shop could disturb their results. This is especially amazing when you consider that these instruments were built out of old spoke wires and hack saw blades. What was brilliant about the wind tunnel was the discovery that small wing shapes in the wind tunnel act just like the full-sized wings out on the dunes at Kitty Hawk.

The Wrights made and tested about two hundred of these airfoils (wings). The airfoils were just miniature wings or models. It was a very repetitive and meticulous process. But it paid off in results. These tests gave the Wrights solid data that no one else at the time had available. With the results, the Wrights determined that flatter wings were more efficient. But they discovered something even more important. They learned that long slender wings provided greater lift than short, square wings. This comparison of the width and length of aircraft wings is known as the aspect ratio. The Wrights were the first to test different aspect ratios in their wind tunnel to find out which shapes were the most efficient.

Click below to experiment with the Wright Brothers' wind tunnel, created as an interactive exercise by NASA, to test wing shape, aspect ratio and camber of several wings.

Wind Tunnel experiments:

<http://www.grc.nasa.gov/WWW/Wright/airplane/tunnlint.html>