

# Kites In Advancing Science Experiments

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Kites are one of the oldest and most versatile inventions in human history, tracing their origins to ancient China around 2000 years ago. Initially a simple toy or ceremonial object, the kite evolved to play significant roles in military, meteorological, and scientific fields. Early kites were used in military applications, as tools for signalling, measuring distances, and even lifting soldiers for reconnaissance missions. As kites spread across Asia to Japan, Korea, and later the Polynesian islands, their design and usage diversified. By the time kites reached Europe in the 13th century, thanks to explorers like Marco Polo, they were already being used in various cultural and religious ceremonies across the globe.

Although the original intent behind kites was not scientific, their natural ability to interact with the wind made them ideal for experiments in physics, aerodynamics, and even electricity. The following sections chronologically cover ten notable experiments that relied on kites, contributing to various fields of scientific inquiry.

## Kite-Based Military Experiments in Ancient China (200 BCE)

In ancient China, military strategists used kites for multiple purposes, particularly during the Han Dynasty. Kites were used to measure the distance between an army's position and enemy fortifications. Strategists would fly a kite over enemy walls, using the string's length to estimate distances for tunnelling or launching attacks. While this was not a conventional "scientific experiment," it marked one of the earliest instances of kites being used for practical problem-solving and data collection in warfare. This understanding of geometry, weight distribution, and wind patterns foreshadowed future scientific use.

## Polynesian Navigational Kites (1000s)

Kites played a central role in Polynesian navigation. In the Pacific Islands, particularly in Micronesia and Polynesia, seafarers used kites to understand wind patterns and guide their voyages. Though primarily used for religious ceremonies, these kites became key instruments in identifying ocean currents and wind directions that helped in navigation. This was one of the earliest applications of kites in studying wind behaviour, an area of research that would be vastly expanded in later centuries.

## Benjamin Franklin's Kite Experiment (1752)

The Renaissance period in Europe brought significant advancements in technology and science, and kites entered a new phase of experimentation. Two of the most famous early-modern scientific experiments involving kites took place during this period. Perhaps the most famous kite experiment of all time was conducted by Benjamin Franklin in 1752 to demonstrate the electrical nature of lightning. Franklin flew a kite during a thunderstorm, attaching a metal key to the string. When lightning struck, it travelled down the kite string and produced a spark at the key, proving that lightning was indeed electrical in nature. This pivotal experiment not only confirmed that lightning is electricity but also laid the groundwork for the development of lightning rods and the study of electricity in general.

This experiment was the foundation for modern electrical research and marked a key moment in the history of scientific discovery, as it used kites to extend human capacity to interact with and understand natural phenomena.

## Alexander Wilson and the study of atmospheric temperature (1749)

Before Franklin, Scottish scientist Alexander Wilson conducted an equally significant, though lesser-known, kite experiment in 1749 to study the temperature of the atmosphere. Wilson used a system of kites to carry thermometers to different altitudes, recording temperature changes as they ascended. His experiments provided crucial early data on how temperature decreases with altitude, a concept that later became fundamental to meteorology and the study of the Earth's atmosphere.

Wilson's experiments showcased the role of kites in atmospheric research and their potential to elevate instruments into previously unreachable areas.

## The Work of William A. Eddy (1891)

William A. Eddy, an American meteorologist, is best known for his development of the "Eddy Kite," a type of kite with a diamond shape that could remain stable without a tail. In 1891, Eddy used his kite design to take the first aerial photographs by attaching a camera to the kite string. His innovation provided an early method of collecting meteorological data and paved the way for modern aerial

photography and remote sensing technology.

Eddy's contributions to kite design and their application in meteorology and photography represented a major leap forward in how humans could observe and document the Earth's surface and atmosphere.

### **The experiments of Lawrence Hargrave (1893)**

Australian inventor Lawrence Hargrave advanced kite science further with his development of the box kite. In 1893, Hargrave used his box kites to lift instruments into the sky, collecting data on wind currents and atmospheric pressure. Hargrave's experiments directly contributed to the field of aviation, as his kites demonstrated the principles of lift and stability, which later informed the design of aircraft wings.

His box kite became a key tool in both scientific experiments and early aviation, offering insight into the forces of aerodynamics.

### **The Wright Brothers (1899-1902)**

The Wright brothers are famous for their role in the development of powered flight, but before they built airplanes, they conducted numerous experiments with kites. From 1899 to 1902, the Wright brothers used manned and unmanned kites to study the dynamics of flight, experimenting with wing shapes, control mechanisms, and balance. Their success with kites informed the design of their gliders and, eventually, their powered airplanes.

The kite experiments of the Wright brothers demonstrated the critical importance of understanding lift, drag, and control, all of which were necessary for developing functional aircraft.

### **Alexander Graham Bell's tetrahedral kites (1903-1910)**

While known for his work on the telephone, Alexander Graham Bell was also an avid experimenter with kites. Bell designed a series of tetrahedral kites from 1903 to 1910, which could lift heavy loads. His research in kite design focused on the principles of structure and stability, and he used kites to test theories related to flight.

Bell's tetrahedral kites contributed to the study of aerodynamics and influenced the development of early aviation technology.

### **Pollution studies (1960s-1970s)**

During the 1960s and 1970s, environmental scientists used kites to carry sensors that measured atmospheric pollutants. Kites offered a low-cost method for obtaining air samples at various altitudes, providing data on the concentration of pollutants like carbon monoxide, sulphur dioxide, and particulate matter. These experiments were crucial in the early efforts to study air quality and the effects of industrial pollution on the atmosphere.

### **Renewable energy research (2000s)**

In recent years, kites have become an integral part of renewable energy research. Kite-based wind turbines, such as those developed by companies like [Makani Power](#), use tethered kites to harness wind energy at high altitudes. These systems have the potential to generate more energy than traditional wind turbines, as wind speeds are stronger and more consistent at higher elevations.

Modern kite-based energy experiments are revolutionizing the field of renewable energy, offering a promising solution to the global energy crisis.

As technology continues to advance, the kite's role in scientific research is likely to evolve, but its fundamental ability to interact with the forces of wind and atmosphere ensures that it will remain a valuable tool for generations to come. The history of kites is not just a story of invention; it is a testament to human ingenuity and the desire to understand and harness the power of nature.