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Wright Brothers

A Dream to Fly

People have dreamed of flying for thousands of years. In fact, a famous Greek myth tells of two men, Icarus and his father Daedalus, who made themselves wings from wax and feathers. Using their homemade wings, they escaped from the island of Crete. But unfortunately, once Icarus began flying in the air, he wanted to go higher and higher. As he flew higher, the sun melted the wax in his wings and he fell to the ground and died. Daedalus did not try to fly so high, so he made a successful landing.

Discussion

Ask students to express their opinions about Icarus' method of flying. Why wouldn't it really work? Talk about the special strength and abilities birds have. Simply donning a pair of wings does not make a person able to fly. Compared to birds, our arm and shoulder muscles are not very strong and our bodies are much heavier for our size. Birds' bones are mostly hollow and filled with air. Also, birds' wings are not just feathers stuck together. They are intricately designed to be used in a variety of ways.

Balloons

As far back as 1488, men like artist Leonardo da Vinci tried to figure out a way for people to fly. Leonardo studied birds carefully to try to understand their flying techniques, but he obviously never really got it. He sketched a wooden flying machine with huge wings that he thought might work. It's a good thing he never tried it out because he most certainly would have been killed or injured. It would have weighed about 600 pounds!

Italian Francesco de Lana, a couple of hundred years later, designed a boat complete with sail and large balloons which he thought would fly. Apparently he never actually did more than make a drawing of his idea.

During the 1700s many flight enthusiasts began experimenting with balloons. Jacques and Joseph Montgolfier sent up a sheep, a duck and a chicken in a 35-foot wide bag of heated air. A couple of months later they sent up

another balloon, this time with two men in it. The balloon went 500 feet into the air and the flight lasted for almost half an hour.

During the 18th and 19th centuries, hot air balloons in the skies of Europe became almost a common sight. In 1785 Jean-Pierre Blanchard and John Jeffries attempted to cross the English channel in a balloon. The balloon began to lose height while they were still over the water. In an attempt to lighten the weight, the two men threw out everything they could, even their clothes! They finally landed safely in their underwear! In 1830 a woman riding in a balloon fell out, but was saved by her billowing skirt which acted as a parachute! By the end of the 19th century, balloon racing was a popular sport.

Balloon Experiments

Provide balloons of various sizes for students to blow up. Also provide other materials such as string, cardboard, tape, paper, glue and craft sticks. Let students experiment with floating balloons on their own and with items attached to them.

Also provide some helium-filled balloons. Let students experiment with them, comparing them with the balloons they blew up.

Ask students what the dangers of balloon flight would be. Discuss the popularity of hot air balloon flying today. If there is a hot air balloon center in your area, see if you can schedule a field trip there for your class so students can see a balloon for themselves.



Wright Brothers

Gliders

Flying in balloons was popular, but people wanted to be able to control the direction they flew instead of just going where the wind took them. In 1804 Sir George Cayley, an engineer, designed a glider with wings that did not move but a tail that did for steering. (These features are still used in airplanes today.) In 1849 a ten-year-old boy nervously flew one of Cayley's gliders and a few years later a successful flight was made by one of Cayley's employees. In 1891, German engineer Otto Lilienthal made a successful flight in his hang glider. He continued to make flights for five years until he was killed in a crash in 1896. In his glider, the pilot did not sit down, but hung from straps, his feet dangling. Of course, Cayley's and Lilienthal's gliders did not have engines, so, like the balloons, they had to go where the wind took them.

Paper Gliders

Give students paper and challenge them to make airplanes. Show them how a paper clip on the plane's nose will help give it stability. When the airplanes are done, have students line up at a pre-determined line and launch their planes to see whose design will fly the farthest.

Discuss the winning plane and let students try to figure out what features enabled it to fly farther.

Kites

In 1894, Lawrence Hargrave made the first box kite, a big one. Of course, kites had been around for 3000 years, invented by the Chinese. But Hargrave's box kite was different. It was more stable and had better lift than flat kites, enough to lift Hargrave 16 feet off the ground! Sir George Cayley experimented with kites for years before he built his gliders. Even Alexander Graham Bell, inventor of the telephone, tried making kites big enough to lift a person.

Go Fly a Kite

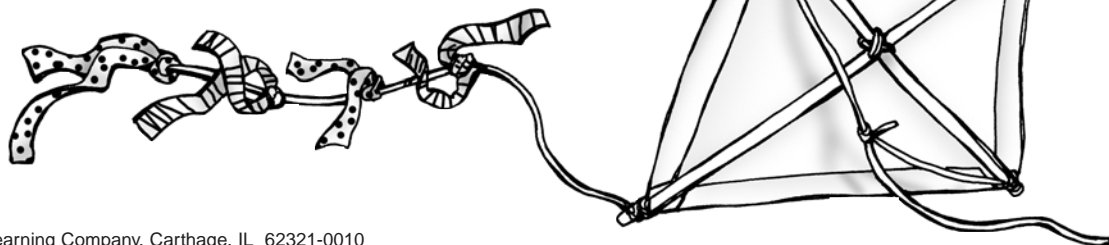
Bring kites to class for students to fly on a breezy day, or let them make their own. You'll need to provide paper (newspaper will work, but sturdier butcher paper is better), two thin dowel rods or balsa wood sticks, a ball of string, glue and cloth strips for a tail.

Directions

1. Tie the two sticks together to form a "T" with the center of the shorter stick about one-third of the way down the longer stick.
2. Make a diamond-shaped frame by attaching string to all four ends of the sticks.
3. Lay the frame on the paper and cut around it, making the paper pattern about 1" to 2" bigger than the frame.
4. Fold the edges of the paper over the kite frame and glue them down. Wait for the glue to dry.
5. Tie both ends of a piece of string to the ends of the short stick on the back of the kite. Tie the end of the ball of string to the middle of this string.
6. Tie a piece of string, about twice as long as the kite, to the bottom of the kite for a tail. Attach strips of cloth to the tail, not too close together.
7. Take the kite outside in an area with no trees or wires. Stand with the wind blowing at your back. Have someone hold the kite, then toss it into the air as you walk away from it. You may need to run if the wind isn't blowing very hard.
8. If the kite starts to come down, gently pull on the string until it starts to climb again.

Discussion

How big would a kite have to be to lift a person off the ground? Would that be a good way to fly? Why or why not?



Wright Brothers

Two Industrious Boys

While men around the world were experimenting with the fascination of flight, two young boys in Dayton, Ohio, were experimenting with a variety of ideas. Wilbur, born into the Wright family on April 16, 1867, in Indiana, and Orville, born in Dayton on August 19, 1871, had a fairly ordinary childhood. Their father was a minister who became a bishop and their mother was a creative homemaker who could fix almost anything. She created her own clothing and once made a sled for her two sons. There were two older brothers—Reuchlin and Lorin—and a younger sister—Katherine. Wilbur and Orville took after their mother and were happiest when creating something. Both boys were good students, but Orville often got into trouble for misbehaving at school. In fact, he was suspended from school at the end of sixth grade, but was finally allowed to go back to school to enter seventh grade.

Wilbur and Orville were both curious and inventive. At one time Orville made kites and sold them. Wilbur invented a machine for folding newspapers and made money folding a local church magazine every week.

Wilbur loved to read and was a sports enthusiast. He was considered to be the best gymnast in Dayton. At age 12 Wilbur and Orville, age eight, started their own business selling used items to a nearby junkyard. They built a wagon from old tricycles and a wagon bed to haul the materials to the junkyard. Their mother told them to be sure and put axle grease on all the working parts to make the wagon work smoothly. When Orville became interested in home printing, he built his own printing press and began printing handbills for Dayton storekeepers. It was quite a successful summer business.

The Wright brothers' first interest in the mysteries of flight was brought about by a gift from their father. When Orville was seven or eight years old, their dad brought home a Chinese Flying Top. It was a propeller



on a spindle and when Mr. Wright pulled on the tightly wound string, the propeller whirled into the air. Children in Europe had been playing with them since the early 1400s, but the Wright brothers had never seen anything so exciting! They examined it carefully until they understood how it worked, then they played with it until it broke. But that didn't end their fun. They simply made another flying top and then another one,

making several different styles. Wilbur made bigger ones until they were too heavy to fly.

Make a Flying Top

Copy the circles from page 9 on tagboard (or a manila file folder), one for each student. You'll also need to provide pencils, scissors, plastic sewing machine bobbins (which can be bought in packages of four for less than a dollar), glue and string.

Directions

1. Cut out the circle.
2. Carefully cut along the 16 lines to the center circle. (An adult helper can do this with a utility knife for younger students.)
3. Use a sharp pencil to poke a small hole in the center of the circle.
4. Glue the plastic bobbin to the middle of the underside of the circle. Wait for the glue to dry.
5. Twist the 16 sections slightly to make them stand up a bit like blades (all the same direction).
6. Wind a 36" piece of string tightly around the bobbin in a clockwise direction.
7. Set the bobbin lightly on the pointed end of a pencil with the point coming through the small hole in the center of the circle.
8. To launch the top, pull the string with a quick, hard jerk.
9. Let students make changes and adjustments in the circle pattern to make the top fly higher and farther.