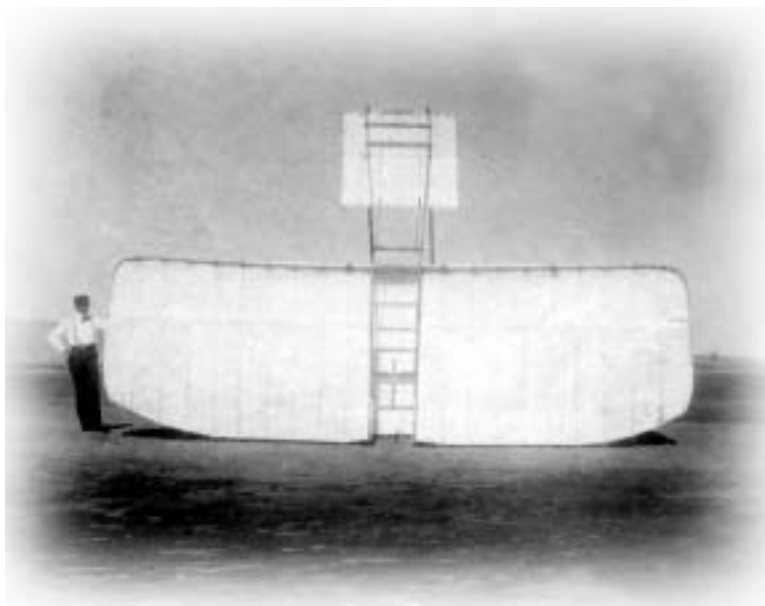


1901: The First Improvement

You are involved with various activities as secretary for the Cincinnati Scientific Society when a letter arrives in March from the cousin of Mr. Pierpont, the neighbor of the Wright Brothers. She has spoken with Katharine Wright, who told her that her brothers have constructed a new glider and intend to go to Kitty Hawk for testing much earlier than last year, leaving sometime in July. With anticipation, you arrange to return to the Lifesaving Station at Kill Devil Hills in late June to resume duties as a temporary lookout so you can observe the new trials.

The Wright Brothers arrive on July 10, 1901. This year, in order to be closer to their launch site at Kill Devil Hills, they move their camp about 4 miles south to the base of Big Hill. This puts them much closer to your station, and it's easier to observe their experiments.



The 1901 Glider.

The new glider is much bigger than the first. It still has two wings, but they are larger, each 7 by 22 feet. The total wing area is now 290 square feet, and the aircraft weight has doubled to 100 pounds. This would be the biggest glider ever flown! You have the opportunity to visit the brothers' camp a number of times to observe and assist with flights. Wilbur is the pilot on each trial. There are other visitors to the camp, and you are introduced to Mr. Octave Chanute and two assistants, who are there to observe as well as test a glider of their own.

The flights of the 1901 Glider are disappointing. Orville tells you that they had used the data from tables published by Otto Lilienthal to design the new wings, but the glider only produces about one-third of the expected lift. Could Lilienthal's data be wrong? Although

there are frequent glides of around 300 feet, you notice other problems as well. The front rudder doesn't seem to do much to control the up-and-down pitch of the glider, and when the wings are warped to turn, the craft sometimes settles backward and spins out of control. In one of these crashes, Wilbur suffers minor injuries. After that, they only fly the aircraft as a kite.

At the end of August, the brothers return to Dayton in disappointment. You stay on an additional week to compile your notes and then return to Cincinnati to report to the Scientific Society. You report that Wilbur has said that he believes that people will fly, but not in their lifetimes. After two summers of trials, the Wright Brothers are very discouraged.

Activity 7—Build a Model of the 1901 Glider

To make a model of the 1901 Glider for your report, follow the instructions beginning on page 48.



Activity 8—Forces on the 1901 Glider

The picture below shows the Wright Brothers at Kitty Hawk, NC, with their 1901 Glider being flown as a kite. It weighed 98 pounds and had a wingspan of 22 feet. The kite appears to be floating in the air, but it is actually being held motionless because the forces that are acting on it are “balanced.”



1. You know that wind is needed to fly a kite, so draw an arrow on the picture to show which way the wind would be pushing on the glider.
2. There are three other forces that are acting on the kite. One of these is the lift caused by the wind acting on the wings of the glider. Draw an arrow to show the direction that this force acts on the glider.
3. The third force acts on you and all other objects on Earth all the time. It is called _____. Draw an arrow to show the direction that this force acts on the glider.
4. Look at the men in the picture and see if you can determine the direction of the fourth force. Keep in mind that the glider is motionless, so the fourth force must act to balance out the other three forces. Draw an arrow to show the direction of the fourth force.
5. Do you see anything in the picture that shows that all the forces are canceling each other out? If yes, what is it?
6. If the speed of the wind increased, what would happen to the glider?



Activity 9—Questions on the 1901 Glider

The report of the summer of 1901's activities caused quite a stir in the Cincinnati Scientific Society. When you mailed sketches of the new craft back in July, many members had thought that the additional surface added to the wings would provide the lift needed. Clearly something was wrong.

1. Why do you think that the new glider with its larger wings failed to perform as expected?
2. If you were Wilbur or Orville Wright, what would you do at this point? Why would you do this?
3. To solve a problem, the Wright Brothers would only make a single change at a time. Why is this a scientific way to do an experiment?

Activity 10—Wrong Ideas

Advances in science are often hindered by making wrong assumptions, making assumptions based on incorrect information, or by not understanding information or data in the right context. The Wright Brothers thought the reason their 1901 Glider did not perform up to expectations was that Lilienthal's data, on which they had based their calculations, were wrong.

Choose one or more of the following ideas that were once accepted as correct in science. Find out who may have challenged these ideas and how our thinking changed as a result. Write down your answers.

1. The Earth is flat.
2. The Sun revolves around the Earth.
3. There are only four elements: earth, air, fire, and water.

