The 1901 Glider was the second unpowered aircraft built by the brothers. The aircraft was flown repeatedly at Kitty Hawk during 1901 as a piloted glider and as a kite. The Wright Brothers learned more about the fundamentals of aerodynamics using this aircraft, which they began building in 1900.

The 1901 aircraft was larger than the 1900 aircraft, but of the same basic design: it had two wings, no tail, and an elevator-stabilizer mounted in the front of the aircraft. The wingspan was increased from 17.5 to 22 feet, and the chord (front edge of the wing to the back edge) was changed from 5 to 7 feet, increasing the overall wing area from 165 to 290 square feet. The brothers wanted to provide more lift so they could pilot their glider in winds of less velocity. Without the pilot, the 1901 craft weighed about 100 pounds. The pilot would lie on the bottom wing and control the roll of the aircraft with a foot pedal. The pedal was connected to wires that pulled on the wing tips and warped (or twisted) the wing, producing unequal forces on the wings, which would roll the aircraft. On the 1901 aircraft, the pilot could also change the shape of the elevator to control the up or down position of the nose, or pitch, of the aircraft.

The aircraft was flown frequently up to 300 feet in a single glide, but did not perform as well as the brothers had expected. To improve the flying characteristics, they installed additional struts (structural pieces added to provide support and designed to resist pressure in the direction of their lengths) on the lower wing to alter the camber (or curve) of the aircraft wing. The photo to the right shows the aircraft immediately after landing, and you can see the additional struts between the wings at the center.

During their test flights the brothers encountered an effect known as “adverse yaw.” Sometimes when the wings were warped to produce roll, which should have resulted in a curving flight toward the lower wing, the increased drag on the upper wing twisting in the opposite direction caused the air speed to decrease, and the aircraft would turn into the ground.
While trying to solve these new problems, the Wrights gathered the first real usable and accurate aerodynamic data obtained by experimenting with a wind tunnel. These results would be applied to the 1902 aircraft, which would answer many questions raised by the 1901 aircraft (shown in the photos below) as the brothers progressed toward the successful 1903 Flyer.
Designed by
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Materials
- One or two clean Styrofoam meat trays, at least 9 inches (23 centimeters) by 11 inches (28 centimeters), preferably white
- 30 to 35 toothpicks
- Low-temperature glue gun
- Scissors
- Hobby knife, razor utility knife, or single-edge razor blade (adult help here)
- Cardboard or board to cut on
- Ultrafine-tip black marker
- Ruler
- Emery board
- Manila file folder
- Small plastic toy army soldiers, about 2 inches (5 centimeters) tall (optional)

General Instructions
- Use scissors to cut out all three templates on the heavy lines of the 1901 Glider template (found in the back of this book).
- Do all razor knife or razor blade cutting on the board or cardboard to protect your working surface.
- The finished model is for display only; it is not meant to fly.

Procedure
1. Carefully trace the wing and elevator shapes on the inside of the Styrofoam tray as shown. Be sure the front edges of the wings go about two-thirds of the way up the curved sides of the tray. Check the bottom of the tray and avoid any logo found there. You may need two trays. Cut out the wings and elevator with the hobby knife or scissors. Use the emery board to smooth the cut edges and sand off the pen lines.
2. Using the templates as a guide, mark the locations of the rib lines on the tops and bottoms of the wing and elevator sections with the ultrafine-tip black marker. Make two sets of marks, one on each edge. Connect the marks to make the rib lines. Make a rib template from a manila folder to draw the rib lines (so the end of the template can be bent to conform to the rounded shape of the Styrofoam).

3. Cut out the center of the lower wing (only of the lower wing) as shown by the dotted lines on the template. Cut two toothpicks in half and sharpen the cut ends of three of them. Dip the ends in glue and stick them in the cut edges to join the lower wing halves, leaving a .6-inch (1.5-centimeter) gap between the halves. (If the Styrofoam is thin, glue the toothpicks to the underside of the wing instead.)
4. Use the wing template and a sharp toothpick to mark the holes for the spars on the top surface of the lower wing and the bottom surface of the upper wing. Note that the front edges of the wings curve down. In this picture the upper wing in the background needs to be turned upside down.

5. Dip toothpicks in glue and insert them in the spar holes now marked in the lower wing. Try not to push them all the way through the wing. Be sure they are standing up as straight as possible. The upper wing in the foreground of this picture is upside down (the curved edge is curving up).

6. Now, with both the upper and lower wings upside down (the edges should be curving up at this point), insert the back row of spars into the underside of the top wing. Use the marked holes as a general guide, but keep the spars straight and evenly spaced. Put a little glue on each to keep them in place as shown in the picture. Now join the front spars to the top wing, remembering to keep them straight, and fasten them with dabs of glue. This takes some effort to get everything in the right place and is easier to do with two people.
7. To make a skid, join two toothpicks end to end and side by side so the overall length is 4.3 inches (11 centimeters). When the glue is dry, cut them to a length of 3.5 inches (9 centimeters) and then glue the cutoff end back on at a 90-degree angle as shown. Repeat the process for the second skid.

8. Turn the wing assembly upside down and glue the skids on either side of the opening in the lower wing. The skids should overlap the front and middle toothpicks that join the wing halves and should extend out beyond the front (curved edge) of the lower wing.

9. Turn the assembly back over so it is right side up, and cut two pieces of the right length to brace between the two skids. Glue one at the end and one at the middle. Cut two more pieces for upright support for the elevator and glue them sticking up at the middle cross brace. Make two braces to go from the upper wing to the elevator by joining two toothpicks end-to-end and trimming them to a length of 2.5 inches (6.5 centimeters).
10. Place glue on the ends of the four upright supports and push them into the elevator. Also put glue on both ends of the upper braces and push them first into the center of the top of the elevator along the rib lines, and then into the front edge of the upper wing, as shown. (If the Styrofoam is thin, glue the braces to the underside of the upper wing instead.)

11. (Optional) You can make the figures of Wilbur and Orville Wright by swapping and gluing parts of plastic army soldiers. To obtain the desired poses, arms and legs can be removed and some from other soldiers glued in their place. Guns and helmets should be trimmed away using a hobby knife and the figure arms and legs can be shaped, swapped, or repositioned to fit and glued on. Five-minute epoxy works best for this. The dark soldiers in the photograph are the original shapes and the light soldiers are the final shapes.

12. The original soldiers on the left were transformed into the figures of Wilbur and Orville Wright on the right.