HOW GLIDERS STAY IN THE AIR. This was taken from Newton's Apple.

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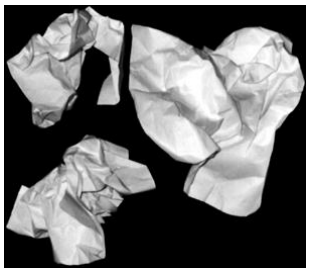
Flying a sailplane is probably the closest thing any human will come to feeling like a bird. Powered only by gravity and air currents, these gliders move silently through the sky, often for hours at a time. Because they have no engines, gliders or sailplanes can be thought of as pure flying vehicles, staying aloft by balancing the forces of gravity, lift, drag, and thrust.

As you might suspect, if you want to stay airborne for a long time, the most important force to conquer is gravity. Lift, the force that directly opposes gravity, comes from the force of the air on the underside of the wing. In wings, lift is controlled by three factors: surface area, shape, and angle of attack.

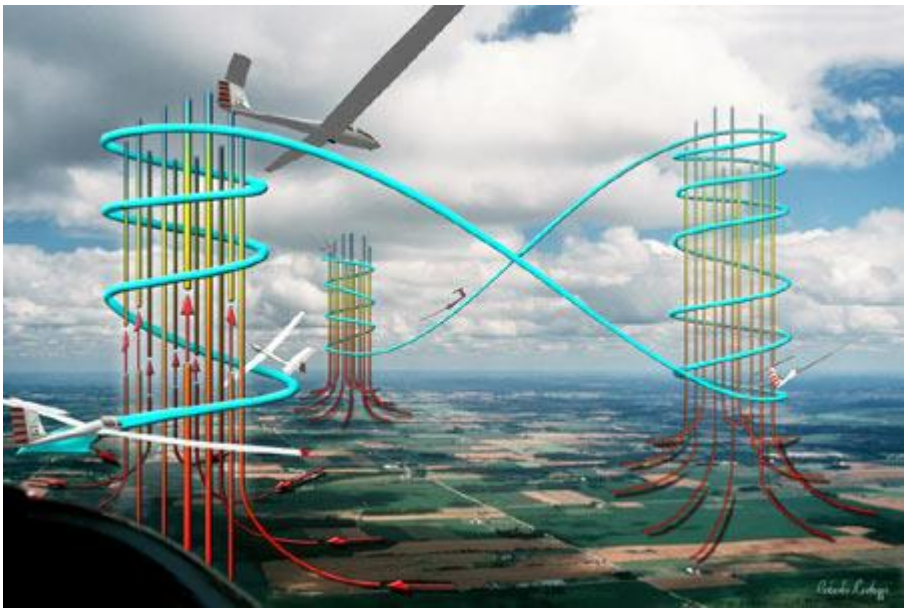


To see how surface area works, roll a piece of paper into a ball. Drop it and the paper falls. Spread the paper out and drop it, and it will float. The greater the surface area, the greater the amount of air pushing up on the wing.

The shape of the wing works because of something called Bernoulli's principle. Most wings are curved on the top and flat on the bottom. As the wing pushes through the air, the air on top of the wing must move a little faster than the air on the bottom. This creates slightly lower pressure on the top, which allows the greater air pressure beneath the wing to push the plane up.

The angle of attack is the orientation of the wing as it faces into the wind. Increasing the angle of attack means increasing the amount of air hitting directly on the bottom, which gives the wing more lift. Of course, if you make the angle of attack too big, the wing will blow backwards, and the plane will come crashing down!

In a sense, a sailplane is very similar to a roller coaster. Both are towed up high and released. They begin to fall and the force of gravity gets them going. Unlike a roller coaster, which continuously loses height, a sailplane can also gain elevation by riding rising currents of air. Known as thermals, these localized updrafts are caused by air being heated by the warm ground below.



When the sun shines down on a sandy beach, for example, the sand heats up faster than the water. As the air in contact with the sand begins to heat up, it expands and rises. This differential heating is what causes thermals and when a glider hits one, it can fly for hours at a time.