

## Could you explain to me how a glider flies?

A passenger is walking up to the glider and asks you a question: how does a glider fly? I have no experience with airplanes, could you explain it to me simply?

The glider (with us in it) has a certain amount of weight. Moving forward, air flowing with sufficient speed over the wings generates enough force (called Lift) to overcome the weight of the glider to get to a height to where going downhill; it will then generate the forward speed by going downhill. The Wright Brothers discovered that to generate sufficient lift to carry the weight of the airplane you needed at least 30 miles an hour. The glider must be moved ahead, through the air, more than 40 miles an hour. The Towplane, with a tow rope attached, generates the thrust to move the glider forward. Once the glider is towed to a sufficient altitude it is always coming downhill through the air (just like a kids wagon or a bicycle on a hill), (this is called Sink Rate). Interesting enough, if you double the speed you quadruple the amount of lift the wings generate.

Once at sufficient height, to generate sufficient speed to keep flying, the glider must be pitched (tilted) nose down, just like you're going downhill on a steeper hill. The more tilted down, the more speed. The stick is moved forward to pitch the glider more nose down, increasing speed, stick back to lessen pitch and slowing.

To get the towplane moving, there is a certain amount of resistance that must be overcome, this is called Drag. The engine and propeller generate the force to move it forward, this is called Thrust. The same is true of the glider.

As the air moves over the surface of the glider, drag is generated. To counter this resistance, Thrust is generated by tilting the glider nose down, generating enough speed to equal the Drag. More nose down Pitch, more Speed, and more Drag. Once all the forces are equal, the glider settles on a constant speed and sink rate.

### **So... How Does a Glider stay up? Thermals**

Rising Air is going up faster than the glider is going downhill.