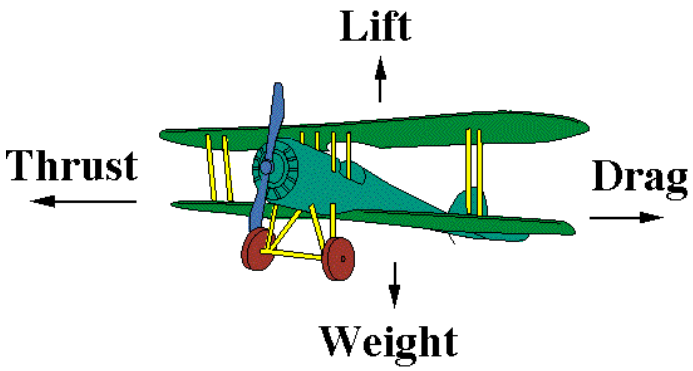
Flying Rings - Fact sheet and Extension Ideas

How did it work?

When you throw the glider, it seems to fly remarkably well considering it looks nothing like a plane. However, just like a conventional looking plane (small and made of paper or large and carrying people), the flying rings are still subject to the four forces of flight : Thrust, Lift, Gravity and Drag.



To keep the glider aloft, the force of gravity must be overcome for as long as possible. This is done by getting lift. The lift is created by the glider moving forwards through the air, so the small amount of lift made by the design is only created whilst there is thrust. There is no motor on this glider, so once it is released, it can only slow down, and in doing so, decrease the lift (or gradually give in to gravity).

The gliders are fairly aerodynamic, which means they minimise the amount of drag or air resistance that slows them down, in other words they “slice through the air”.

Does weight make a difference?

The easiest way to answer the question is to try it out, but there are two factors at play. The lighter gliders will be able to glide on the air for longer, because they will fall slower than a heavier glider. However, a heavier glider may be easier to throw and give more thrust, which will likely result in a greater distance covered, even if it is in the air for slightly less time

History

It is quite remarkable to think that powered flight has only been around for a little over 100 years. And in that time many designs have been tried, some proved more successful than others. The plane pictured is the AD-1, developed by NASA in the 1970's. The large wing on top actually swivels around as the plane flies, enabling it to become more sleek at higher speeds, reducing drag and increasing performance. It never did make it to production, but was flown successfully many times in testing.

Indigenous connection

The boomerang is probably the best known flying object from Australian Indigenous culture. It is somewhat iconic these days, and variations are often sold for recreation. They were commonly used for hunting, although could be thrown for sport too. Basically, they are a single curved aerofoil or wing, that when thrown and spinning can generate lift. There are more principles of physics at work than just lift however, as the spinning motion also causes the boomerang to twist gradually from almost upright when thrown, to almost flat during flight.

Extension ideas

Have students experiment with different designs, namely adding more rings than just the two, or even adding some weight in the form of a paper clip or two in different spots. Perhaps a longer ring glider will fly better too. Is there a better design, or is simpler the way to go?