

Dynamics and Statics

The Magnus effect with plastic cups

Background

The lift generated by a spinning ball or cylinder is called the Magnus effect.

You will need...

- ✓ Two plastic cups
- ✓ a wooden kebab skewer (or stick)
- ✓ duct tape and
- ✓ a strong elastic band.

Follow these steps

1. Cut the wooden skewer to a suitable length as shown.
2. Glue it to the base of one of the cups.
3. Tape the cups together as shown (with the stick along the diameter).
4. Loop the elastic band around one end of the stick.
5. Clasp the stick between your thumb and index finger. With the stick vertical, use your other hand to stretch the elastic band horizontally. A very slight forward tilt of the stick can work well. Release the stick.



So what happened?

The cups travelled more or less horizontally and due to the “backspin” imparted when launched, they seemed to float as they travelled. The Magnus effect is at work, whereby the upper-side of the cup is rotating in harmony with the air through which it passes whereas the under-side of the cup is clashing with the air through which it passes. This gives rise to a certain amount of uplift which accounts for the perception that they are floating through the air.

What next?

Try it with different types of cup and different shaped objects