

## Materials: Film Canister Rocket

**What to do in advance:** This demonstration is best done outside, in a tray, from either the ground or a table. You will need a film canister with a tight-fitting lid (ideally one where the lid fits inside the canister), a vitamin C tablet and water.

*As with all demonstrations, please try out beforehand and make your own risk assessment.*

**What to do with pupils:** Add a small quantity of water to the film canister (e.g. about a quarter full). Then add a Vitamin C tablet and quickly put the lid on tightly before turning the film canister upside down, placing on your tray and standing back.

### Questions to stimulate pupils' thinking:

- Why does the film canister separate from the lid and fly into the air?
- What is it which is pushing the film canister up into the air?
- What do you think is happening inside the film canister when the Vitamin C is added to the water?
- Do you think the film canister (instead of another container) is important to make this work? Why?
- If you were going to investigate this reaction what sorts of things could you change about it to see how that affected what happens?

### The science behind it

Vitamin C is an acid called Ascorbic Acid. There are other ingredients in the Vitamin C tablet which are alkaline. In the presence of water, the alkali ingredients react with the acid to form new substances, one of which is carbon dioxide gas. As a gas, the carbon dioxide wants to take up more space than is available inside the film canister. This increases the pressure on the inside of the film canister, causing canister to separate from the lid and fly into the air. The features of the film canister are important for this reaction to work well (and safely). You want a small container with a tight-fitting lid (so the pressure is enough for the rocket to really fly), that is pressed (rather than screwed) on so that it is possible for the container to separate from the lid as the pressure builds.

### Real world connection

This is also how real rockets work, although it is a different chemical reaction (burning or combustion) that is taking place. Combustion also produces a gas and it is the force of the gas escaping (just like the carbon dioxide eventually escaping from the film canister) which provides the upwards thrust for the rocket.

