



# national science week

9-17 August 2025



## Pop Rockets

Ready... set... blast-off! Use chemistry to make a rocket fly!

### Safety

Safety glasses/goggles and rubber/vinyl gloves are recommended with all chemical experiments and demonstrations.

### What you need

- A teaspoon
- Bicarbonate of soda (also called bicarb soda and sodium bicarbonate)
- A plastic cup
- Water
- One or more film canisters (readily ordered online) or other plastic fizzy tablet container with a similar style lid. The lid needs to fit on very tightly. White film canisters often have a better seal than black ones.
- Vinegar
- Outdoor space

### What to do

- 1) Find a space outdoors to set up and launch your pop rockets. Gather your materials and make sure your launch pad is flat and clear (remember to look up for objects you might hit above you).
- 2) Place 1 teaspoon of bicarbonate of soda in the plastic cup.
- 3) Add a few drops of water and mix to form a thick paste.
- 4) Put some of the paste inside the lid of the film canister and pack it in tightly.
- 5) Pour vinegar into the canister, filling it about one third full.
- 6) Quickly and carefully hold the canister in one hand away from your body and use the other hand to put the lid on. Make sure it seals.
- 7) Quickly place the canister upside down on level ground.
- 8) Step back.
- 9) Do not be tempted to go closer to the rocket if it does not immediately launch.  
\*If the rocket does not launch in five minutes ask an adult to carefully approach and pick up the canister, aiming it away from the body and carefully open the lid. Then check the seal and try again.

**Questions to ask**

1. How high did the rocket fly? (Can you make a bigger rocket?)
2. Where did the energy come from to make the rocket move?
3. Can you do the experiment without vinegar and bicarb?

**What's happening?**

Mixing bicarbonate of soda and vinegar causes a chemical reaction called an acid–base reaction. The bicarbonate of soda is the base, and the vinegar is the acid. When acids react with bases, they make water, a salt (*not* the kind that you put on your hot chips!) and carbon dioxide gas (also written by its chemical formula  $\text{CO}_2$ ). The gas expands quickly and puts pressure on the lid of the film canister.

As the reaction progresses, more carbon dioxide gas is released. The film canister has a fixed volume, so pressure builds up inside until the lid isn't strong enough to hold the gas inside the canister. When the canister bursts open, the gas is pushing in all directions – up and down and to the sides. The lid is pushed down onto the ground and the canister is pushed up by the gas, making it fly into the air!

**Extension activity**

If you have the time and resources, try this activity using a fizzy tablet such as Berocca or Alka-Seltzer. Fill the canister one-half with water then drop one-half of a tablet inside the canister, push the lid down quickly, place the canister on the ground and stand back. Can you make the rocket go even higher? Try it again with a whole tablet or different amounts of water.

**Did you know?**

Researchers are trying to find different fuels to launch rockets which are cheaper than conventional rocket fuels. In 2020, researchers at the Massachusetts Institute of Technology (MIT) tested rockets using beeswax as fuel.