



IS ROCKET SCIENCE EASIER THAN YOU THINK?

Audio slideshow transcript: Water bottle rocket

BEN FORD:

The water bottle rocket is a classic example of a rocket being powered through the air by fuel being pushed out of the rear. Launching this water rocket helps us get Newton's second law of motion, which makes large heavy rockets lift off and fly incredibly fast.

First of all, glue a paper cone onto the front and fins towards the back – not just for aesthetics but also to help make the rocket a little more aerodynamic.

Next, get the cork ready. You push the pump's needle adaptor straight through the cork making sure it goes all the way through. If you need to – trim it down a bit.

Finally, quarter fill the bottle with water.

Ok – we're almost ready to launch.

Now connect your pump and start pumping air into the rocket. Be careful – point the rocket well away from your face!

As we pump more and more air into the bottle, we're putting immense pressure on the water until that pressure gets so high it will push the cork right out of the bottle.

If the water mass accelerates like this, there is a force. Newton's second law of motion is summarised in one of the most famous equations – force is equal to mass times acceleration.

The water being pushed downwards is our action, so the bottle feels an equal thrust force upwards – the reaction.

Our upwards thrust has to overcome gravity. It also has to contend with air resistance. Our streamlined nose cone is crucial here to help reduce this drag.

Images courtesy of Getty Images.