IS ROCKET SCIENCE EASIER THAN YOU THINK?

Audio slideshow transcript: Matchstick rocket

BEN FORD:

Hiya – my name is Ben Ford. I love physics and I love space. I'm going to show you how to build some of your own tiny rockets.

Of course, building real rockets is much more complex, but it doesn't matter how big or small the rocket is – the first thing you have to do is overcome gravity and actually get the thing to lift off.

A simple match will be the body of our rocket and the match head will be the fuel. We're going to need another match to ignite the fuel.

Wrap the top third of the match tightly with a small piece of tin foil. The tin foil and the head create the rocket propulsion system, where the fuel will be ignited.

Insert the point of a safety pin or needle to the base of the foil just where the stick comes out. Tug the foil a little bit away from the stick. This hole we have created is our rocket's exhaust.

Now the rocket is ready – small but mighty.

Bend the outside bit of a paperclip out and then the inner bit up to make a nifty little launch pad. We're ready for countdown.

Place the matchstick rocket on your launch pad, tin foil side up, and very importantly go outside for this please!

Heat the tin foil with a second match. When the match head under the foil reaches ignition temperature, gas molecules are released, which you'll see as the smoke. The hot gas molecules move fast looking for a place to escape.

The only place the gas can exit is through the small hole in the bottom – the exhaust. This movement of gas creates a force. The rocket launches thanks to Newton's third law of motion – every action has an equal and opposite reaction.

Our rocket flies because of the thrust, so that's the mass of the smoke and gas which escapes multiplied by how much it accelerates.

This works because of Newton's second law of motion – it's pretty vital for rocket science.

Images courtesy of NASA.