

Rocket Launch 2

Launch your own hand built rocket again, but make it go further in version 2. With pressure from a pump and a 'reaction force' dumping the heavy water. Watch and record its flight.

Use as a basis to discuss space and launching rockets to the space station. Multiple variables can be investigated on launching the rocket through changing the angle, amount of water, length of rocket and fit of the cork. Maths can be added measuring angle, mass and distance and time taken to give speed (speed = distance / time).

Make the Rocket:

1. Find either an old bike tube valve, just cutting out the valve (maybe ask at a cycle shop) or a football pump needle to pump up balls. Insert the valve or pump needle through a cork. If using a valve cut a hole through the cork first. Make sure that any air can travel all the way through the cork.
2. Create a launch pad to hold the bottle at an angle upwards. A garden fork handle works with the spikes pushed into the ground at a low angle.
3. Fill the 2l plastic bottle with about 500ml of water or quarter full. Seal the bottle with the cork and make sure it is a tight fit.
4. Put the bottle in the holder and attach the pump to the valve or needle. Pump away until you have lift off!

As you pump you should see air bubbles going through the water and into the bottle. When the pressure is too great the cork will come out and bottle will fly into the air. Make sure water isn't leaking and air is entering the bottle or that the launch pad isn't holding the rocket back.

Try different amounts of water and see how the flight changes. Can you change the shape of the bottle to improve the flight?

Notes:

The water and air leaving the bottle upon flight creates a reaction force, similar to real rockets through Newton's law of motion. The water is heavy so with it moving out slowly and results in the light bottle moving upwards quickly.

The pressure is built, or energy stored increased, during pumping until the friction keeping the cork in is overcome.

Enjoyment and Appetite for Learning

*Adapt and change related to situations
Describe their experiences and use them to inspire other aspects of life.*

Time:
20 min+

Space:
Any Outdoor Space

Equipment:
2l empty Plastic Bottle,
Bike Tube Valve or Ball
Pump Needle, Bike Pump

