SECONDARY LEVEL

The Power of Pressure

In keeping with the theme of Science Week 2014, here are some activities to demonstrate the "power" of air pressure.

SCIENCE WEEK
9-16 NOVEMBER 2014

THE POWER OF SCIENCE

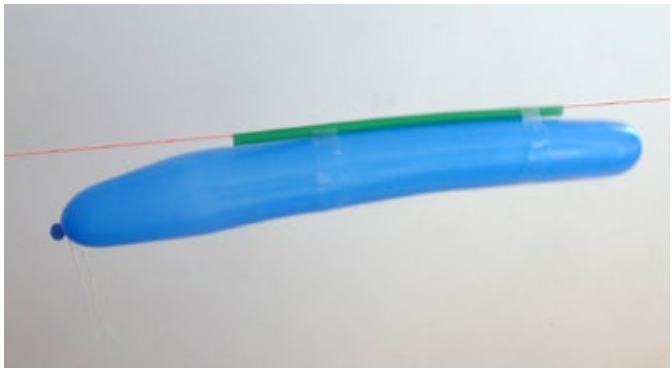
THE BALLOON ROCKET

YOU WILL NEED

A selection of balloons, balloon pump (optional), drinking straw (non-bendy type), sticky tape, wool or string, tape measure or metre stick (optional), mass balance (optional), a cooperative group!

BASIC INSTRUCTIONS

Feel free to experiment!



1. Inflate the balloon - close it with a temporary tie, or hold it tightly closed until "launch".
2. Thread the wool or string through the straw to make the "track".
3. Tape the straw to side of the balloon as shown.
4. Stretch the string out so it is taut.
5. Move the balloon along to one end of the track, then release the temporary tie.
6. Measure the distance travelled, or the time taken to travel 1m.
7. It may take several attempts to perfect a good rocket.

INVESTIGATE

- Which shape of balloon works best? (we used modelling balloons here, and we suspect they are a little too thin)
- Which is a better measure of a good rocket - distance travelled or time taken to travel? Is there another test you could use?
- How much air is optimum in the balloon?
- Is the length of the straw important?
- Will and incline affect the distance travelled?
- Can you achieve a vertical rocket launch?
- Can you make a "twin engine" rocket with two balloons – does it double the velocity or distance?
- Does the material in the track affect the result - friction between a paper straw and a wool track versus friction between a plastic straw and a fishing line track might differ greatly - why not try some variations and see what happens?
- Challenge your friends - whose team can design the best rocket?

THE BALLOON ROCKET CONTINUED

WHAT IS HAPPENING?

This is an example of air pressure causing a force called thrust. Thrust means forward motion. As you adjust the variables in your rocket, you increase or decrease thrust.

In the real world, the thrust for space rockets is created by the energy in the rocket fuel.

EXPLORE MORE...

If you are a DIY person on a budget, the instructions at Instructables are clear (although they use inches, and the spellings are strange) enough to follow, to make a mini potato launcher:
http://www.instructables.com/id/Air-Powered-Potato-Rocket-Launcher-and-Ammunition/

If there is a budget, very dramatic potato launching rocket can be purchased online or from lab suppliers.