The BRAINWAVES Club

Term 4 2021 |Neutrinos| Years 5 and 6
Venue: Forest Hill Secondary College
Term Fee: $285

Meeting 1: **Whizz! Pop! Bang!**
Focus: **Chemistry/Combustion**

Gunpowder was the first chemical explosive developed by humans. But what does this explosive black powder have to do with the search for immortality, or with scaring away evil spirits? Join us as we go in search of the origins of gunpowder and look at its many and varied uses over the centuries. We will also run a few scientific tests of our own to determine some of the essential properties of gunpowder, including the prerequisites for both good combustion and explosive combustion. Finally, we'll try adding a little colour to our burn as we explore how fireworks are made.

Meeting 2: **Feel the Beat**
Focus: **Vibrations**

Everyone is familiar with the concept of hearing sound, but did you know that you can feel it too? This is because sound is actually a vibrating wave that can travel through most materials. In this session we will take a look at what some of these waves look like, learn what frequency and wavelength actually mean, and see how the speed of sound changes as it passes through different solids, liquids and gases. We'll use some sonic vibrations to make dancing slime, feel sound in tuning forks and balloons, and make our own paper bangers and weird whirring widgets to take home. Guaranteed to be noisy and possibly a little messy.

Meeting 3: **Under Pressure**
Focus : **Electric Energy**

Did you know that a sheet of A4 paper resting on a table top has over ½ a tonne of air pressing down on it? This amazing downwards force is created by air pressure. In this session we will have a look at what air pressure is, what causes it, and just how strong it actually is. We'll also explore how air pressure is related to flying, learn a bit about Bernoulli's principle, and make some of our very own (hopefully identified) flying objects. Finally, we'll see if we can't make use of a bit of this pressure to break some things, squash some things, and force a few objects into tiny openings.

Meeting 4: Exploding Kinetic Art
Focus : Cryogenics

Elastic bands and springs store potential energy when they are stretched or extended. They have the potential to release energy and do work when they let go and bounce back to their original shape. In this session we will explore other ways to store elastic potential energy and how we can maximise the transfer of this stored energy into kinetic energy. In our final session we will work like problem solving engineers to make cobra weave stick bombs (and many more designs) to explore the potential of elastic energy.
Warning: Starting the first few sticks of the weave can be VERY frustrating.
Remember: If you fail at first, don't give up. Take another look at the problem like a true engineer and try again.

About the club leader: Simon Matheson
Simon is a physicist by training and has been involved in education one way or another for most of his life; first as a student, then as a secondary school science and maths teacher, and most recently as a developer and presenter of science outreach programs with CSIRO Education. Simon's enthusiasm for science education is grounded in the belief that all citizens of the modern world need a firm grasp of the principles upon which science (and, by extension, the world around us) are built.

What to bring
Each week please bring a well-stocked pencil case (including scissors, good textas and coloured pencils, pens and/or writing pencils, sticky tape or a glue stick) and an A4 notebook.