

The **BRAINWAVES** Club

Term 4 2021 | Einsteins | Years 3 and 4

Venue: Canberra Girls Grammar School – Junior School, Grey St Deakin

Term Fee: \$285.00

Engineering Is Everywhere!

Principles of design and engineering are found everywhere in the world around us. They're in the buildings we live in and the roads we travel on, in the planes and helicopters we use to fly through the air and the boats we use to float on the water. You see them when you switch on a light or when you watch a movie or even hear them when you listen to the radio. Can you explain how all these examples really work, though? This semester, the Da Vincis will build on their knowledge of engineering and the design process to model and explore them for real to draw their own conclusions and come up with their own explanations for how they work!

Meeting 5: Gorgeous Graphite Makes A Super Circuit

Focus: Electricity

We rely on electric circuits every day, in our homes, schools and places of work, in our portable gadgets and kitchens. Did you know that a pencil 'lead' is made of a graphite mix and is a conductor of electricity? Perfect! This afternoon, we're going to get busy building circuits... but we're about to find out that graphite is low in conductivity. Just how low can we go before it cuts out entirely? We'll get hands-on applying the scientific method to investigate factors that influence the success of the circuit; type of pencil (graphite-to-clay ratio), length of circuit, thickness of circuit just to name a few. Will your creation light up our lives or will we be left in the dark?

Meeting 6: Full of Hot Air

Focus: Thermodynamics

You've probably seen a hot air balloon floating high in the sky over Canberra, but have you ever wondered how it actually works? The basic principle behind hot air balloon physics is the use of hot air to create buoyancy, which generates lift. A hot air balloon, a lighter-than-air aircraft, consists of a large bag, called an envelope, with a gondola or wicker basket suspended underneath. A burner (with typical power of several megawatts) sits in the basket and is used to heat the air inside the envelope through a narrow opening. This afternoon, we'll construct our own models to explore this fascinating phenomenon further firsthand!

Meeting 7: Bridging the Gap

Focus: Structures and Forces

This meeting is all about bridges – in particular, the amazing feat of engineering known as a suspension bridge. But what's so special about them? Their towers, deck and supporting cables can span far wider rivers or chasms than other structures! Vertical suspender cables hang from the main horizontal cable and hold the weight of the deck. Leonardo Da Vinci was well known for his fascination with bridges – so it is no surprise that our Da Vincis will be spending an afternoon exploring them as well!

Meeting 8: A Cannon of Confetti

Focus: Energy Transformation

Yippee! Happy birthday! Congratulations! There simply is no better way to celebrate a special moment than with a shower of confetti – and today, to celebrate the end of the year, you'll engineer your own confetti launcher. A launcher changes stored (potential) energy into motion (kinetic) energy. The resulting force sends the confetti flying - but make sure you have a vacuum cleaner handy before getting a party off to such an explosive start!

What to bring

Members need to bring a well-stocked pencil case that includes scissors, glue and a small roll of sticky tape.

About the Club Leader – Suzana

Suzana is an experienced Mathematics and Science teacher (MSc Teaching Physics and Chemistry) with rich international experience working with gifted and talented students. She has designed and run Science clubs in The British School and American Embassy School in New Delhi, India, and worked with gifted and talented students in the fields of Physics in her home country, Serbia, where her students achieved significant results in state competitions. Suzana is well known for choosing appropriate and fun hands-on activities and getting her students to understand the scientific concepts involved.