

The **BRAINWAVES** Club



Term 2 2021: Einsteins – Years 3 and 4

Venue: Canberra Girls Grammar School, Grey Street, DEAKIN

Term Fee: \$285

Meeting 5: Science of Ancient Toys

Focus: Physics/Friction

Did you know that toys are ancient? However, most modern toys don't look much like the toys used by children hundreds of years ago because we live in an era of electrical technology and mass production. You may be surprised to learn that the children of years ago liked to play with tops, dolls, balls, whistles and flying objects. Nowadays we tend to overlook the pleasure and challenges of hand-made toys for the convenience of shop bought. In today's session, we'll investigate and construct ancient toys that use friction in a controllable and useful way and discover that the all-mighty force of friction can be a loyal ally when employed cleverly!

Meeting 6: Electromagnetic Train

Focus: Physics/ Electrical Energy/ Electromagnetism

If you have a scientific mind you may already know all about how batteries work! If you love playing around with wire and batteries, you may even have built circuits with solar cells! But do you know how most of our electricity is generated? It's made using the interaction between magnetic and electrical fields. Electricity and magnetism are linked in a way that scientists do not completely understand - each can create the other. If you wrap a copper wire into coils and run an electrical current through it, you will create a magnetic field. If you rotate a permanent magnet (as opposed to an item that has been magnetised) inside a coil of copper wire, you can create an electrical current. Interestingly, the train we will build today will run in one direction only - we will try to answer why!

Meeting 7: Paddle Boat

Focus: Engineering/ Physics

In today's meeting we are going to engineer a 'rotor-propelled' paddle boat that is driven by the elastic energy stored in a rubber band and we'll learn how this energy is converted into kinetic energy. As the elastic energy in the rubber band is released, the rotor or paddle of the boat is turned, setting the boat in motion. How far will it go? How fast will it go? Does it matter which type of rubber band you use? Design, build, test and evolve your paddle boat while exploring simple machines, friction, elasticity and as well as some maths.

Meeting 8: Let's squeeze some air!

Focus: Engineering/ Pneumatics

Pneumatic systems use the energy stored in compressed air to do work. By controlling the release of the air to pneumatic cylinders, we can turn that energy into movement. In fact, pneumatic systems could be described as 'force multipliers' that allow easy and accurate control of machinery. To understand the advantages and reasons for using these systems in engineering applications we are going to make a simple pneumatic machine and discover how it works and why pneumatic systems are so commonly used.

What to Bring

For every session, members will need a notebook and a well-stocked pencil case that includes writing materials, textas, scissors, sticky tape and a glue stick.

About the club leader: Suzana Djakovic

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.