

The **BRAINWAVES** Club

Term 1 2021: TechnoKids – Years 3 and 4

Venue: Brighton Grammar School

Term Fee: \$285.00

Build, Investigate and Explore!

Scientists and engineers typically construct models to explore a particular phenomenon that they are experimenting with. These models allow scientists to visualise and understand their ideas, and they can eventually lead to scientific and technological advancement. This term the TechnoKids will explore forces and movement, space and gravity, as well as design sustainability, planning and trouble shooting. Members will design, build, and program using the engineering design process as well as engaging in several open-ended challenges. They will use standard LEGO bricks, programmable LEGO bricks, and other materials to complete these design challenges. The meetings will start with activities focusing on stability in design and then move to other topics, such as gearing, weight distribution, momentum, motors and programming.

Meeting 1: Dueling Robots Mini Design Project
Focus: Robotics and programming

In this meeting, robots will compete in a head-to-head battle to prevent the others from escaping a match arena. Members will create a robot that has a touch sensor integrated into its design and program their robot to turn right or left when the touch sensor is activated. Before your robot goes into battle you will need to test and troubleshoot your program and robot design. Then you will put your design to the test as your robot competes against others. The first robot to escape the arena wins. Will yours be victorious?

Meeting 2: Code Wars - The Epic Win
Focus: Coding : Scratch

Help! Planet Earth is under attack! Inspired by Star Wars: Clone Wars, today you will create a game in Scratch with the objective being to save the world. You will create an army of Darth Vader's droids which will be operated by artificial intelligence that you code. The player objective will be to take on the persona of Luke Skywalker, come to the rescue and beat the droids – a feat you will learn to make so tricky that once accomplished it can be classified as a 'truly epic' win!

Meeting 3: How To Train Your Dragon
Focus: Programming : Scratch

In this meeting we will explore the science of flight with a focus on wing design and how to motorise the flutter of two wings. In the first stage we will create a Lego gear train then attach a string and lever mechanism that will activate poles to oscillate backwards and forward. We will also program the motor to spin using the program Scratch. Then we will attach the wings to the poles simulating the flapping of wings. The TechnoKids will analyse the transmission of energy throughout the mechanism and identify how to switch movement with levers and a pulley.

Meeting 4: Rube Goldberg Machine
Focus: Engineering

Rube Goldberg was an American inventor and cartoonist who was famous for drawing pictures of complex machines that performed simple tasks in very round-about ways. This meeting we will explore the concept of force and create a 'Marble Machine'. First, we will create a staircase by organising a series of pistons from smallest to largest. Next, we will look at the motor and the part that camshafts have to play. To move the marble up some steps, we will use a cam gear and pistons. Then once it gets to the top it will roll to one side, fall down a slide and then the process will start again. Sound like fun? It sure is!

What to Bring:

Club members need to bring a well-stocked pencil case, an A4 display folder and a USB.

Journal: An important responsibility of scientists and engineers is to document what they do. The TechnoKids will be asked at each meeting to record their designs, important facts/concepts and then write a reflection.

About the Club Leader: Carla Maxwell

Carla is an Art, Design Technology and Robotics teacher who has completed a Masters of Information Technology in Education (by Research) at the University of Melbourne. She has also accomplished a Bachelor of a Teaching and Bachelor of Fine Art. This has allowed her to develop a unique perspective on teaching in a creative and integrated manner. Carla continues to plan activities for students that are fun, hands-on and experience based, taking into account aspects of mathematical and scientific principles.