

# The **BRAINWAVES** Club

**Term 2 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.

**24 April**

**Meeting 5: Spin Art**  
**Focus: Gear Ratios**

In this open-ended design challenge, TechnoKids will design and build a Lego Robotics object that will spin in some manner to create an artwork with markers, crayons, paint, or other art supplies. To understand the engineering design process, we will explore various combinations of gear ratios and the types of patterns they create. Once the basic spin art machine has been created, TechnoKids will be able to modify the existing design.

**8 May**

**Meeting 6: Amusement Park Ride**  
**Focus: Physics**

Have you ever wondered about the science behind amusement parks and why we love it when the rides are really scary? What happens to our bodies and what occurs within the machinery itself when we ride a roller coaster or a gravitron? In this meeting, we'll study the physics of falling, floating, turning, centrifugal force, gears and other mechanisms and machines. You will design, make and program a Ferris wheel. First you will need to design your ride, and then choose whether to use Robolab or the Lego NXT software to program it.

**22 May**

**Meeting 7: Robotic Arm**  
**Focus: Engineering**

To learn how the end effectors for the robotic arms used on the Space Shuttle and the International Space Station work, TechnoKids will design and construct a grapple fixture that will enable the end effector to pick up an object. The TechnoKids will explore and describe the relationship between beams and axles, use problem solving skills and visual cues to judge appropriate construction, run a pre-existing program and modify it for their desired effect.

**5 June**

**Meeting 8:**

**Line Follower**

**Focus:**

**Robotics / Programming**

A robot at the International Space Station needs to deliver a rock sample to a lab on the second floor. In this meeting we will learn to program using light sensors and loops. We will build our robot with Lego but first, we will plan our design and think about the steps required to create the program. To develop problem-solving skills, TechnoKids will have to answer the following questions: How can the light sensor help you detect the line? What should happen when the robot senses the line? What about when the light sensor detects the floor again? What is a loop? How will a loop be helpful in your program?

**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.