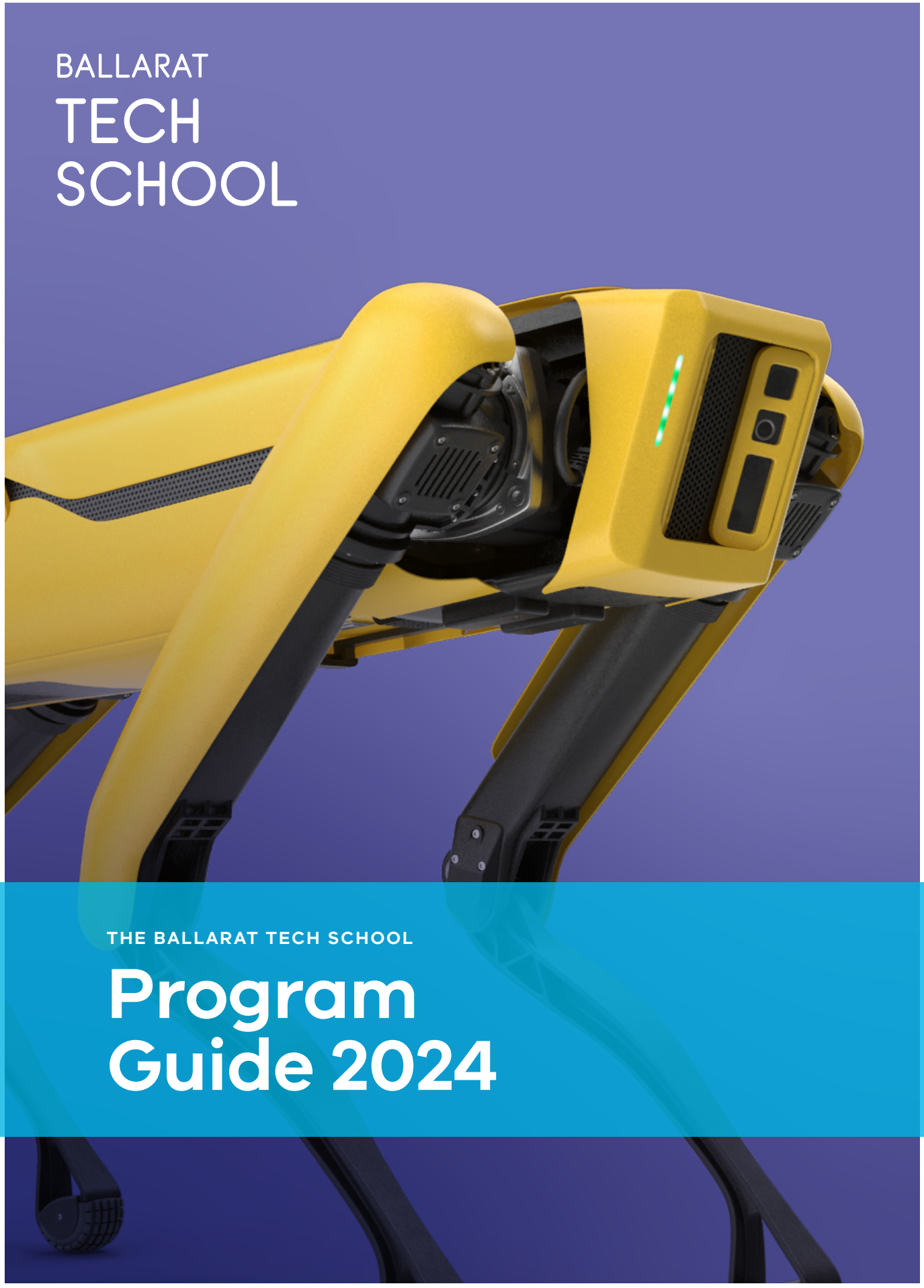
BALLARAT
TECH
SCHOOL



THE BALLARAT TECH SCHOOL

Program Guide 2024

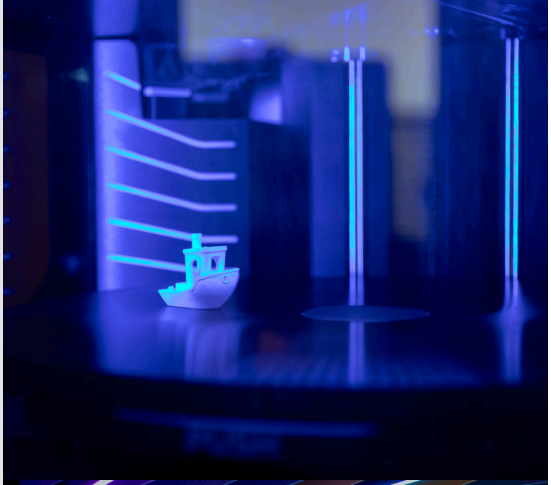
Federation University

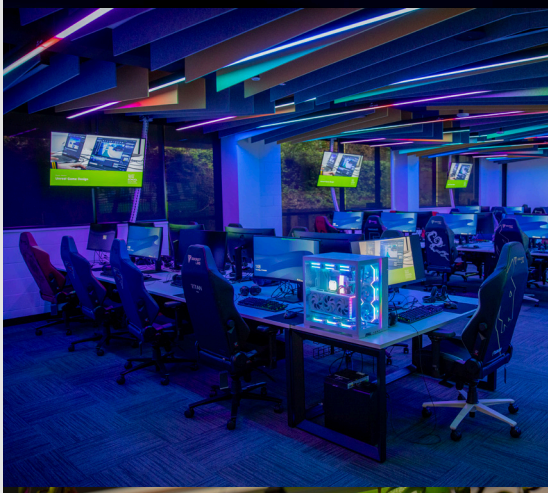
THE EDUCATION STATE

VICTORIA State Government | Education and Training

Our vision is to inspire young people to connect to their future through curiosity, discovery and innovation in STEM.

Our Mission is to bring education, industry and community together in an immersive environment, driven by hands-on STEM exploration. We use design thinking and future skills to transform learning, challenging students to solve real world problems and preparing them for the future of work.



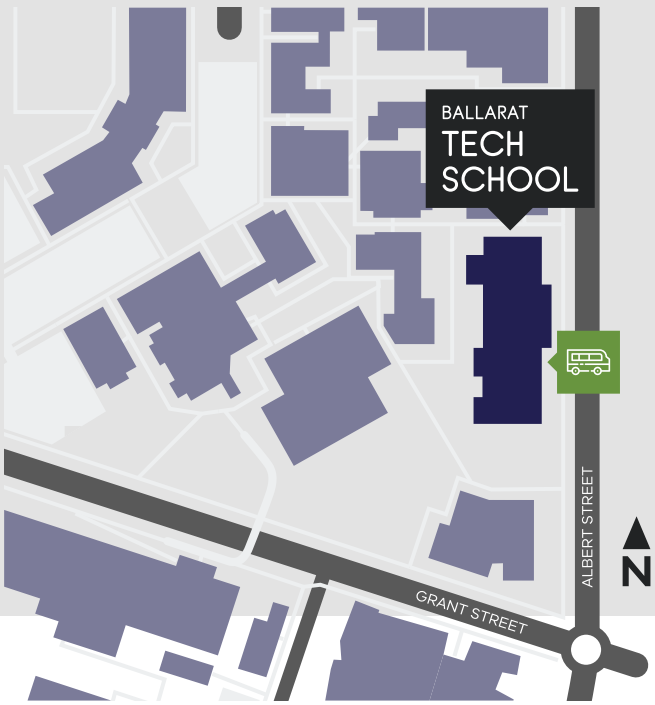


GET IN TOUCH

03 5327 8080
ballarattechschool@federation.edu.au
www.ballarattechschool.vic.edu.au

ADDRESS

136 Albert Street, Ballarat Central VIC 3350



About Us

Ballarat Tech School is designed to engage, inspire and prepare students for lifelong learning in a changing, highly STEM focused world.

Through partnerships and collaboration our programs equip students with transferable STEM skills, and build capability and confidence in teachers, linking both to emerging and future industry pathways.

Through support and funding from Federation TAFE / University and the Department of Education, we provide free, curriculum linked, local industry focused learning programs to secondary schools in the Ballarat Region.

Our dedicated staff are a mix of education and industry professionals who share a genuine passion for STEM, collaborating with teachers and industry to co-design and deliver programs that bring classroom learning and the future world of work closer together.

Our state of the art facilities are also available for hire to community groups and industry. In 2024 we are excited to deliver on a new strategic plan and program experiences for our community.

Damon Minotti, Associate Director

STRATEGIC PROGRAMMING

Through our strategic planning process, we have identified a number of priority and emerging focus areas for education and industry that our programs either currently address or will be designed to focus on over the next 3 years.

These include, but are not limited to:

Technical Skills:

- Scientific Inquiry
- Prototyping
- Design
- Computer Science
- Hardware Systems
- Software Systems

Personal Skills:

- Critical Thinking
- Creativity (Innovation)
- Problem Solving
- Collaboration
- Communication
- Systems Thinking

Industry Sectors:

- Clean Economy/Renewable Energy
- Digital Economy
- Cyber Security & AI
- Manufacturing
- Agritech

Program Offerings

Our 2024 program guide has been structured to reflect the complexity of programs and their suitability to different stages of learning. It also showcases other specialist STEM learning opportunities that are available to both students and teachers outside normal program delivery.

Each program page will have specific information listed at the top along with a general description, expected student outcomes, curriculum and capabilities foci, STEM / Tech related knowledge and skill points, and possible program pathways. Year levels listed are recommendations based on content, but can be negotiated by contacting us to discuss.

Some programs have pre-work that needs to be completed to ensure booking and delivery proceeds. Each program has a QR code that links to its own page on our website providing more detailed information and a book now button which will allow you to book a program and time slot online, subject to availability and confirmation from us.

We encourage teachers to consider their choice of program(s) and learning opportunities, not only in the context of their own classroom curriculum, but also what may be possible for themselves and their students in the future with well developed STEM related skills.

GO WIDE (YEARS 7-9)

These programs are designed to cover a broad range of curricula and student capabilities, inspiring curiosity in STEM skills and emerging technologies for all students. Go Wide programs are suitable for whole year level bookings, providing an accessible offering to every partner school student at least once a year, every year, from years 7 - 9.

GO DEEP (YEARS 9-11)

These programs and opportunities offer skill extensions and pathways for engaged students. They have a targeted future focus, introduce real world challenges and are best suited to elective style classes that can embed the learning at school. Specialist opt in opportunities are designed for students who want to learn more through repeat visits and industry exposure.

TEACHER PROFESSIONAL LEARNING

Free, and available for teachers across a variety of content, pedagogy and technology areas, professional learning sessions will be regularly available each term and promoted through our eNews. Sessions can also be undertaken within onsite core program delivery and teachers are encouraged to reach out to co-design experiences that address specific skill or knowledge needs.

GO CAREER (VCE & VCE VM)

These programs have a post schooling pathways focus that targets VCE, VCE VM & VET requirements for further study and/or work readiness. They utilise our resources to improve student assessment and link to local and future industry pathways and opportunities.

TECH SCHOOL AT YOUR SCHOOL

We understand that attending the Tech School is not always possible for a variety of reasons, so we have designed a range of options that can bring some of the Tech School programs, equipment and expertise to your school instead. These programs are designed for regional Non-Partner schools but can also be accessed by Partner Schools.

Our Programs

PROGRAM	DURATION	MAX STUDENTS	PAGE
GO WIDE PROGRAMS (YEAR 7-9)			
STEM in Action (Year 7 Cohort)	1 Day	75	7
STEM Undercover (Year 8 Cohort)	1 Day	75	8
STEM Showdown (Year 9 Cohort)	1 Day	50	9
Laser Cutting with Cardboard	1 Day	26	10
A Question of Science	2 Hours	26	11
GO DEEP PROGRAMS (YEAR 9-11)			
Automation	1 Day	26	13
Humanoid Robots	1 Day	24	14
Robot Missions	1 Day	26	15
Bushfood Chocolate	1 Day	24	16
Prototyping Projects	1 Day	26	17
Soil Science	1 Day (Pre-work)	26	18
PC Builder	1 Day	26	19
3D Modelling	1 Day	28	20
Game Maker	1 Day	28	21
GO DEEP SPECIAL OPPORTUNITIES (YEAR 9-11)			
Industry Design Challenge	2 Days	50	23
Girls in STEM	8 Days (2 Days/Term)	60	24
Boys in STEM	8 Days (2 Days/Term)	60	25
Peter Doherty Science Award			26
Get into Games	1 Day	100	27
GO CAREER PROGRAMS (VCE & VCE VM)			
Game of Drones (Systems Engineering)	1 Day	24	29
Perceptual Distortion (Psychology)	2 Hours	26	30
Augmented Consciousness (Psychology)	2 Hours	26	31
Molecular Genetics of Disease (Biology)	2.5 Hours	24	32
Photosynethesis & Respiration (Biology)	3 Hours/1 Day	24	33
Transformation & Gene Regulation (Biology)	1 Day	24	34
Special Projects (VCE VM)	1 Day	25	35
Work Experience (Year 10)	5 Days		36
TEACHER PROFESSIONAL LEARNING			37
TECH SCHOOL AT YOUR SCHOOL			38

*Most Tech School programs can be tailored to Applied Learning requirements including VCE Vocational Major.

Go Wide

GO WIDE PROGRAMS (YEARS 7-9)

These programs are designed to cover a broad range of curricula and student capabilities, inspiring curiosity in STEM skills and emerging technologies in all students.

Go Wide programs are suitable for whole year level bookings, providing an accessible offering to every partner school student at least once a year, every year, from years 7 - 9.

From these experiences, students may identify one or more "Go Deep" skill enhancing programs that they can opt into to build on their knowledge and interest in STEM.

STEM in Action

1 Day | 75 Max Students | Year 7

Students explore a variety of STEM concepts and activities as they move through three, one hour rotations. The day is framed by a contextual discussion of STEM skills, their importance to our future, and a demonstration of emerging technology.

This program is a perfect introduction to the programs, facilities and teaching style of the Ballarat Tech School. With short sessions and great variety, this crowd pleaser will engage your whole Year 7 cohort and open their eyes to future learning opportunities.

Session rotations include but are not limited to Virtual Reality experiences; programming VEX robots to automate simple tasks; evading danger using STEM skills in a Martian themed escape room; exploring the impact of perceptions and senses in relation to food choices.

"The program was engaging and allowed me to think about what the future could potentially look like. It also allowed me to take part in new hands-on experiences."

Students will:

- Become familiar with the Tech School spaces and teaching styles
- Develop an awareness of STEM concepts and their importance for future pathways
- Explore different technologies and STEM related skills

Curriculum Focus & Capabilities:

- Science
- Design & Technologies
- Humanities
- Mathematics
- Critical & Creative Thinking
- Personal & Social
- Ethical

Technical & Personal Skills:

Virtual Reality, robotics, computer science, software systems, coding, scientific inquiry, problem solving, collaboration, communication

POSSIBLE PATHWAYS

STEM IN ACTION → STEM Undercover → STEM Showdown

For more information scan the QR code.

STEM Undercover

1 Day | 75 Max Students | Year 8

Students arrive at the Tech School, only to hear about a baffling mystery that has the local community stumped. Although the scenario is fictitious, students will need to learn and apply real-life skills in cybersecurity, Virtual Reality (VR) and forensics to help them solve this "who done it" mystery.

Armed only with limited knowledge of the details of the case, students break into groups to complete three rotations of activities based in cyber security, virtual reality and forensics. They will need to think creatively like perpetrators and critically like detectives to examine evidence, find clues and try to piece together how it all happened.

In their teams, they will need to try and put together a water-tight case to present to the Chief Inspector before their time runs out!

Students will:

- Improve their knowledge of cyber security
- Be exposed to applications of VR in the real world
- Develop an understanding of how forensics use the scientific method

Curriculum Focus & Capabilities:

- Technologies
- Mathematics
- Science
- Critical & Creative Thinking
- Personal & Social
- Ethical

Technical & Personal Skills:

Scientific inquiry, computer science, collaboration, problem solving, virtual reality, communication, cyber-security

"The experience that the students gain is extremely valuable and is hard to deliver in the main stream setting. The problem solving and team building activities can really help shape a positive classroom culture."

POSSIBLE PATHWAYS

STEM in Action | **STEM UNDERCOVER** | STEM Showdown

For more information scan the QR code.

STEM Showdown

1 Day | 50 Max Students | Year 9

Students compete in teams, facing off in a variety of quick paced challenges that engage them in hands-on activities to showcase the real world power of Science, Technology, Engineering and Mathematics knowledge and skills.

Gather your classes, don your thinking caps, and unleash your inner STEM as small teams compete to collect points in gamified challenges across the day, culminating in a unique STEM Showdown! Challenge activities will vary depending on available resources, but are designed to cater for the differing levels and learning styles that exist in a Year 9 cohort.

This program exposes students to practical STEM applications and develops personal and social skills through collaboration, communication, and critical & creative thinking.

Students will:

- Collaborate in small teams
- Communicate to achieve a common goal
- Demonstrate critical and creative thinking
- Apply STEM knowledge and skills to problem solve

Curriculum Focus & Capabilities:

- Science
- Technologies
- Mathematics
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Computer science, scientific inquiry, software systems, Engineering & Mathematics principles, problem solving, collaboration, communication

"Our students really engage with programs held outside of school that further develop their STEM understanding and communication skills, working within teams."

POSSIBLE PATHWAYS

STEM Undercover → **STEM SHOWDOWN** → Prototyping Projects

For more information scan the QR code.

Laser Cutting with Cardboard

1 Day | 26 Max Students | Years 7-9

In this hands-on experience, students will explore the world of prototyping using laser cutters and cardboard. Through a series of engaging activities, they'll learn the step-by-step process of designing, cutting, assembling and testing physical models and prototypes.

This program fosters creativity, problem solving, and innovation, empowering students to bring their ideas to life. Join us as we dive into the exciting journey of rapid prototyping and discover the endless possibilities it offers. Get ready to unleash your imagination and transform ideas into reality!

The morning session of this program will help to skill up all students in the use of the laser cutters and accompanying software, whilst the remainder of the day is largely tailored to each individual school's project.

Student will:

- Utilise the Design Thinking process
- Learn how and why to prototype
- Develop laser cutting software and hardware skills
- Apply mathematics and engineering principles

Curriculum Focus & Capabilities:

- Design Technology
- Humanities
- Science
- Mathematics
- Critical & Creative Thinking

Technical & Personal Skills:

Prototyping, design, computer science, hardware & software systems, problem solving, collaboration, communication

Program Variation:

To maximise this program, please let us know aims and outcomes of the projects / ideas your students will work on in the afternoon so we can foster their creativity and empower them to bring their ideas to life.

POSSIBLE PATHWAYS

LASER CUTTING WITH CARDBOARD → Prototyping Projects → Special Projects

For more information scan the QR code.

A Question of Science

2 Hours | 26 Max Students | Years 8-9

Do your students struggle to ask and develop meaningful and answerable scientific questions? Can they devise a fair test, carry out their investigation and then communicate their findings?

This program is specifically designed to help students develop their Scientific Inquiry skills, beginning with the art of asking "good" questions, as we seek to engage and empower curiosity in Science.

Students will build their questioning and observation capacity through experiential learning, undertaking practical activities that implement the steps of the scientific method in a meaningful and relatable way.

Student will:

- Learn how to develop a scientific question
- Complete an investigation to test their question
- Make assessments about the quality of their data
- Consider ways to communicate what they have learned

Curriculum Focus & Capabilities:

- Science
- Mathematics
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Scientific inquiry, laboratory safety, design, problem solving, communication, collaboration

Program Pathways:

Skills and knowledge developed in this program will help support engaged and inspired students to enter the Peter Doherty Science Award (Go Deep Special Opportunity - page 26).

POSSIBLE PATHWAYS

A QUESTION OF SCIENCE → Peter Doherty Science Award → VCE Biology

For more information scan the QR code.

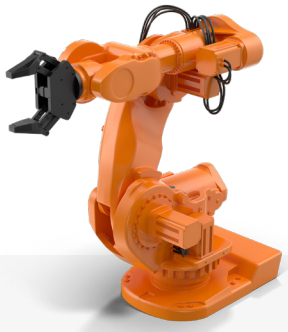
Go Deep

GO DEEP PROGRAMS (YEARS 9-11)

These programs and opportunities offer skill extensions and pathways for engaged students.

They have a targeted future focus, introduce real world challenges and are best suited to elective style classes that can embed the learning at school. Go Deep programs have the most scope to be adapted to your classroom structure and can be supported with pre and post visit resources.

While these programs are one day in duration, there will be opportunities for students who wish to extend their knowledge and skills to opt in and return to the Tech School for specialist days, or access our online courses to undertake more complex learning.



Automation

1 Day | 26 Max Students | Years 9-10

The process of automation has changed how we do business in today's world and it continues to reshape the skills and jobs that will be required in priority industry sectors, such as manufacturing, into the future.

In this two-part program, students begin the day working in pairs to assemble a simple machine designed to automate a task, then learn to program it to complete that task. They get time to experiment with their code to understand how it effects the machine's motors and sensors, and see how changes they can make result in more efficient operation.

In the afternoon students focus on larger scale systems, working in teams to automate production in a virtual chocolate factory. This session involves gamified learning using the program 'Factorio', applying collaboration and problem solving skills to negotiate a balance between several competing production demands to generate the most income for their factory.

Students will:

- Learn to program motors and sensors
- Be exposed to simple machine components
- Explore the possibilities of automating whole systems

Curriculum Focus & Capabilities:

- Science
- Digital Technologies
- Mathematics
- Critical & Creative Thinking
- Ethical

Technical & Personal Skills:

Computer science, hardware & software systems, coding, problem solving, collaboration, communication, systems thinking

"The Tech School offers the potential to show students real world applications for things that in the classroom otherwise remain theoretical."

POSSIBLE PATHWAYS

STEM in Action → **AUTOMATION** → Game of Drones

For more information scan the QR code.

Humanoid Robots

1 Day | 24 Max Students | Years 9-10

Humanoid robots have yet to take over the world as many have predicted (in both fiction and non-fiction), but they are becoming more prevalent in certain industries and offer unique solutions in many areas.

Working in pairs, students will learn to program a NAO robot to speak and listen, constructing branching conversations and building an understanding of how to shape interactions between robots and humans.

Throughout the sessions, students will discuss topics related to emergent and future technologies including advanced robotics and artificial intelligence, and explore the way AI can be used to process speech to text. In the second half of the day, students work to build their empathy, considering the needs of someone other than themselves who has a physical ailment or impairment, and design a program that humanoid robots can run to assist this person.

Students will:

- Learn coding pathways and flow
- Understand different types and applications of AI
- Empathise and design to help others

Curriculum Focus & Capabilities:

- Digital Technologies
- Economics & Business
- Health & Physical Education
- Critical & Creative Thinking
- Personal & Social
- Ethical

Technical & Personal Skills:

Robotics, computer science, coding, artificial intelligence, software systems, problem solving, collaboration, communication

Program Variation:

Students wishing to go deeper into coding skills and applications with robots will have the chance to opt in to a second extension day.

Our NAO Robots also have a limited number of second language programs. Speak to us if you would like to try coding these with your language class(es).

POSSIBLE PATHWAYS

STEM in Action → **HUMANOID ROBOTS** → Humanoid Robots Day 2

For more information scan the QR code.

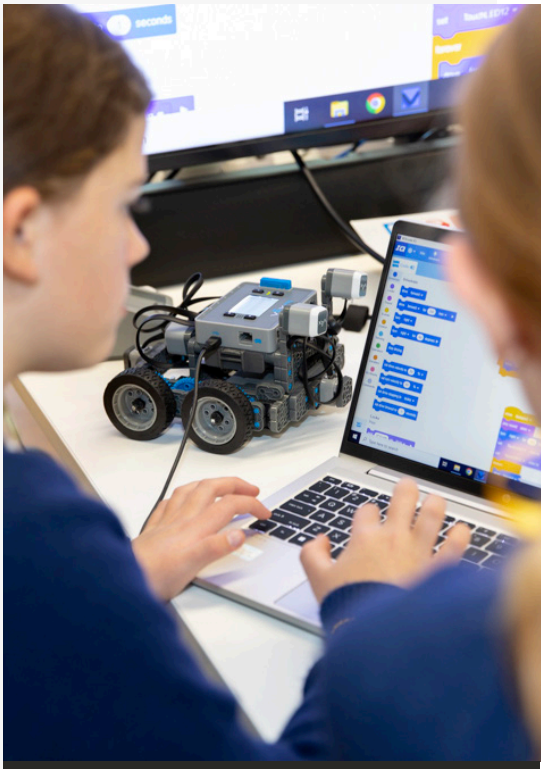
Robot Missions

1 Day | 24 Max Students | Years 9-11

Search and retrieval operations are one of the many industry applications for ground and aerial robotics. Similar processes are used in different environments, from commercial warehouse stocking and delivery packing, to search and rescue in hazardous terrain.

In this one day program, students work in pairs to assemble their VEX IQ robot and explore sensors to replicate a known real world example (e.g. robotic vacuum). As the day develops, increasingly complex programming is introduced so students can devise and execute their own search and retrieval mission.

In the last session, students design a custom built add-on for their VEX and hone their flying and coding skills before showcasing their mission attempt to the class.



Students will:

- Construct a basic VEX IQ robot
- Add and code attachments including lights and sensors
- Gain experience in different applications and software
- Execute a retrieval scenario linking a Tello Drone with a VEX IQ

Curriculum Focus & Capabilities:

- Design and Technologies
- Digital Technologies
- Mathematics
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Robotics, coding, computer science, hardware and software systems, prototyping, problem solving, collaboration, communication, systems thinking

Program Variation:

This program can be delivered on site as part of the Tech School at Your School offerings. A large indoor space with power is required to charge and fly the Tello Drones safely.

POSSIBLE PATHWAYS

STEM in Action → **ROBOT MISSIONS** → Game of Drones

For more information scan the QR code.

Bushfood Chocolate

1 Day | 24 Max Students | Years 9-10

The combination of Australian Bushfoods and Chocolate represents an enticing entry into the realm of unique flavors and innovative product development.

This program introduces students to the processes behind product development, innovation and packaging, while simultaneously celebrating Australia's thousands of years of rich culinary heritage.

The opportunity for exploration of indigenous ingredients and exotic essences (such as Lemon Myrtle, Pepper Berry and Wattleseed) paired with the allure of chocolate makes this remarkable sensory experience one of our most popular and enduring programs. Creativity and collaboration are on full display as students design, make and taste their own and others' unique products using multiple different approaches.

I really enjoyed learning about the different factors in advertising and exploring different flavours. It was easy to follow and flowed really well.

Students will:

- Work in teams to design and create
- Experiment with senses and flavours
- Create their own chocolate product through prototyping
- Showcase the outcomes of their prototypes

Curriculum Focus & Capabilities:

- Science
- Technologies
- Critical & Creative Thinking
- Intercultural & Cultural
- Personal & Social
- Ethical

Technical & Personal Skills:

Prototyping, design, software systems, collaboration, communication

POSSIBLE PATHWAYS

STEM in Action → **BUSHFOOD CHOCOLATE** → Industry Design Challenge

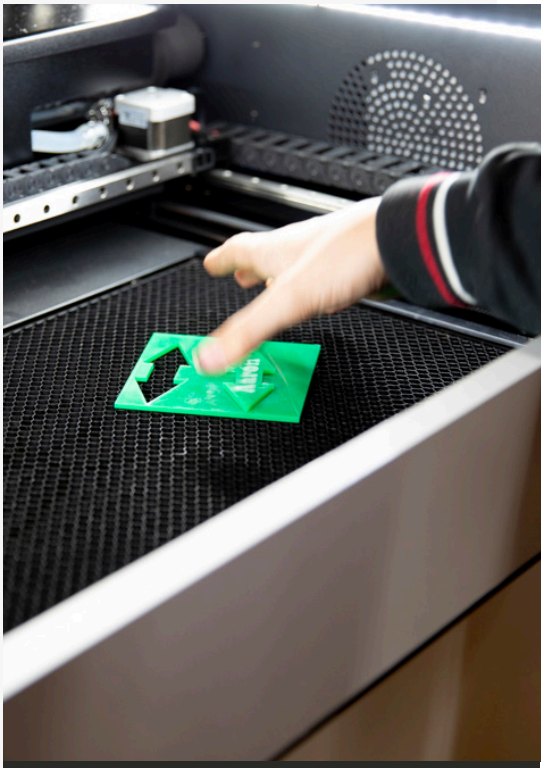
For more information scan the QR code.

Prototyping Projects

1 Day | 26 Max Students | Years 9-11

Rapid prototyping is a critical innovation skill in many of today's industries where businesses need to pivot quickly to design or improve products. In this exciting extension of Laser Cutting with Cardboard, students will continue to refine and develop their skills and understanding of the prototyping process.

This program is designed to give teachers the opportunity to co-design the inclusion of rapid prototyping in their classroom projects, tailoring the type and focus of the day to their specific classroom needs and outcomes. Technology could include laser cutters, 3D printers and scanners, vacuum formers and more. The program aims to help students to apply Design Thinking processes and employ the most appropriate tech in support of meaningful project-based learning to enhance their final products and outcomes.



Students will:

- Implement Design Thinking
- Enhance their problem solving skills
- Improve their knowledge of the prototyping process

Curriculum Focus & Capabilities:

- Design Technology
- Humanities
- Science & Mathematics
- Critical & Creative Thinking

Technical & Personal Skills:

Prototyping, design, computer science, hardware and software systems, problem solving, collaboration

Program Variation:

Speak to us about your idea before booking so we can co-design the structure, tech and delivery of your project to maximise student outcomes.

POSSIBLE PATHWAYS

Laser Cutting with Cardboard → **PROTOTYPING PROJECTS** → Industry Design Challenge

For more information scan the QR code.

Soil Science

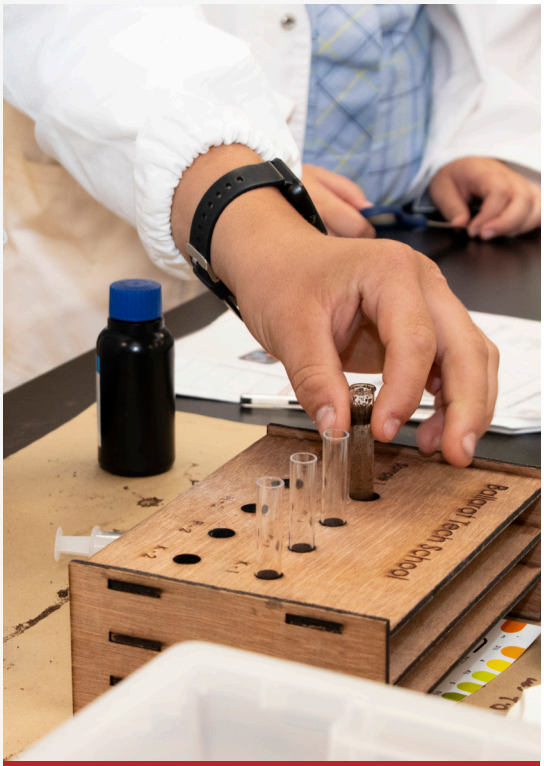
1 Day | 26 Max Students | Years 9-11, VCE | Requisite Learning

As the global population and demand for food continues to grow and sustainability of our ecosystems and lifestyles remain the hottest of topics, our agriculture and horticulture industries must continue to evolve and innovate.

Understanding our soils and how to maximise them for production without depleting them as a resource, is critical to the future of these industries. In this program students will develop and apply that understanding in a hands-on way.

They will select and sample a test site related to a class investigation or project, process the soil and prepare it for analysis. Using a range of techniques, they will assess the health of the soil and identify any necessary corrective actions that will improve productivity and optimise growing conditions.

Students will get a future opportunity to re-test their soil and check to see if the corrective actions they implemented had the intended effect.



Students will:

- Use microscopes to study their soil biology
- Carry out a number of physical and chemical tests
- Analyse and interpret their results
- Apply their learning to complete corrective actions

Curriculum Focus & Capabilities:

- Science
- Humanities
- Agriculture/Horticulture
- VCE VM
- Critical & Creative Thinking

Technical & Personal Skills:

Scientific inquiry, problem solving, collaboration, systems thinking

Requisite Learning:

There are pre-visit steps (supported by Tech School staff) required to be completed before the onsite program day can proceed.

Please check the program webpage and speak to us before booking.

POSSIBLE PATHWAYS

A Question of Science → **SOIL SCIENCE** → VCE Biology

For more information scan the QR code.

PC Builder

1 Day | 26 Max Students | Years 9-11

The personal computer is perhaps the most common and essential tool of almost any home or workplace in today's society. We design, communicate and play on them daily, but how many of us actually understand how they work? Could your house, classroom or business survive without one?

In this program, students will learn about the different components of a computer, the job of each one and why they are needed to run certain programs by building their own PC from scratch! Beginning with a seemingly random set of computer parts, students will step through the process of assembling their PC, from component identification and assembly order to cable management and troubleshooting.

After installing an operating system and running the PC to check the success of their build, the final part of the day involves students disassembling their PC. By returning it back to its basic state of components, they can revisit critical learning and discuss how they might upgrade parts to improve performance.

Supported by:

Plus Gaming

Students will:

- Learn about computer hardware and software
- Practice assembling and disassembling a desktop computer
- Learn to troubleshoot PC builds and common mistakes

Curriculum Focus & Capabilities:

- Digital Technologies
- Mathematics
- Critical & Creative Thinking

Technical & Personal Skills:

Computer science, hardware and software systems, problem solving, collaboration, systems thinking

POSSIBLE PATHWAYS

Game Maker → Get into Games → **PC BUILDER**

For more information scan the QR code.

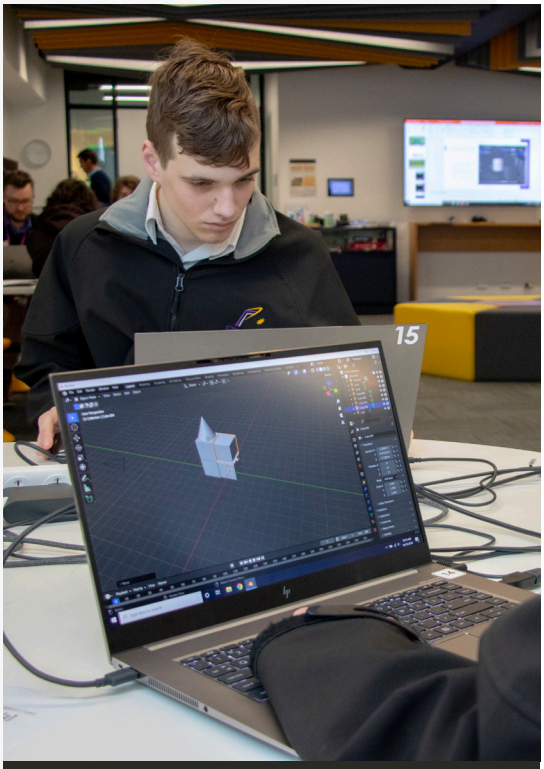
3D Modelling

1 Day | 28 Max Students | Years 9-11

3D Modelling (the process of using advanced software to generate detailed 3D models) is having an ever increasing impact on our lives. Engineers, Architects, Filmmakers, Game Designers, Healthcare Workers, Scientists and Industrial Manufacturers are but a few of the professionals using 3D modelling to increase the speed and accuracy of their work, reduce costly design errors and visualise new innovations.

In this program, students will learn to manipulate 3D objects and their meshes in Blender, a free 3D modelling software. Through a combination of direct instruction, self paced learning with video tutorials, and experimental play, students can choose their style of learning as they develop skills with the software.

Students can use their models to create 3D prints, assets for game engines, animated schematics, and more. In the afternoon, students look at camera work in Blender, creating 2D images or videos from their 3D scenes, introducing the path towards photorealism.



Students will:

- Learn and practice 3D modelling & rendering
- Discover Blender 3D possibilities
- Produce a 2D video prototype of a 3D asset

Curriculum Focus & Capabilities:

- Design & Technologies
- The Arts
- Mathematics
- Critical & Creative Thinking

Technical & Personal Skills:

Prototyping, design, computer science, software systems, collaboration

Program Variation:

Also available as a self paced online course through our web portal or as a Tech School at Your School offering if you have access to install Blender on your devices.

POSSIBLE PATHWAYS

PC Builder | **3D MODELLING** | Game Maker

For more information scan the QR code.

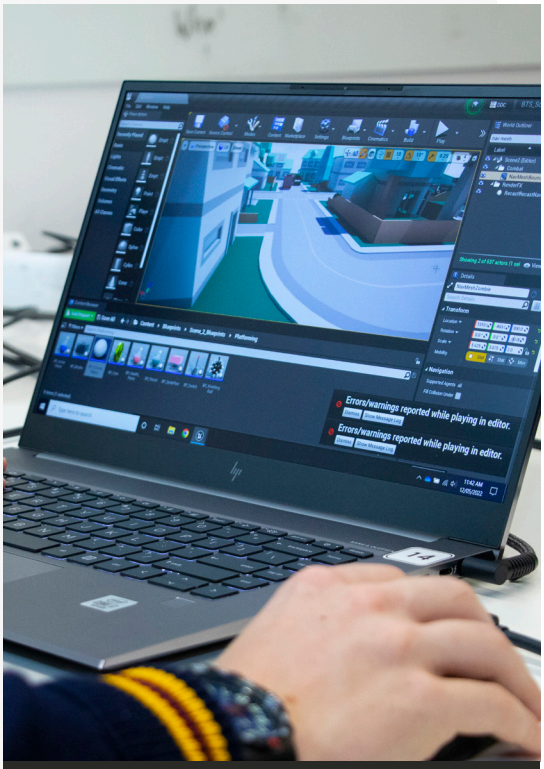
Game Maker

1 Day | 28 Max Students | Years 9-11

First showcased by Epic Games in 1998, Unreal Engine has become the "world's most successful videogame engine". Apart from creating blockbuster games like Fortnite, it is now also used as a 3D graphic design platform in other industries for the development of immersive content, including VR and high production entertainment such as the TV series "The Mandalorian".

In this program, students learn the basic controls to manipulate objects in scenes, utilising in-engine video tutorials that allow them to learn at their own pace. After grasping the basics, students can choose to explore the areas of the game engine that most take their interest, such as the physics system, platforming, and character creation.

In the afternoon session, students map out a scene for their players using more traditional methods, then try to bring it to life with assets in Unreal Engine.



Students will:

- Learn different elements of Unreal Engine
- Develop an understanding of game engines
- Create their own game scene

Curriculum Focus & Capabilities:

- Design & Technologies
- The Arts
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Prototyping, design, computer science, software systems, collaboration, systems thinking

Program Variation:

Also available as a self paced online course through our web portal or as a Tech School at Your School offering if you have access to install Unreal Engine on your devices.

POSSIBLE PATHWAYS

Get into Games | **GAME MAKER** | 3D Modelling

For more information scan the QR code.

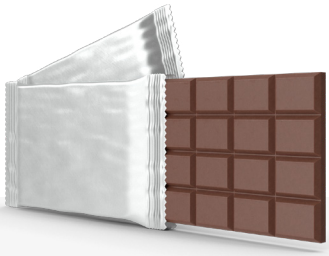
Go Deep

GO DEEP (YEARS 9-11) SPECIAL OPPORTUNITIES

These programs and opportunities offer skill extensions and pathways for engaged students at set dates, times and formats.

Specialist opt in opportunities are designed for students who want to learn more through regular and repeat visits and industry exposure. Registration for these events can be coordinated through schools or individually by students themselves.

Industry Design Challenge



2 Day* | 50 Max Students | Years 9-11

During this two day program students from multiple schools will work in small design teams to plan, prototype and showcase a chocolate product of their creation.

Using knowledge gained from the day one workshops and skill up sessions, students will lean on team members strengths to help set goals and achieve outcomes in a challenging environment. The design program emulates time and resource pressures associated in similar industry environments, with students given the flexibility to choose where best to spend their time and resources to reach their product goal.

Industry representatives are invited to the second day to support the students in their showcase development and assist in judging products and outcomes. Finalists are chosen and prizes are awarded to teams.

**This program runs on set dates and caters for limited students per school.*

Supported by:

MARS WRIGLEY

Students will:

- Work in a small team applying creative STEM skills
- Design, prototype and taste test a chocolate product
- Create a short pitch reel in a recording studio
- Develop skills using design and production technology
- Present a product in a showcase for industry judging
- Compete for an industry related prize!

Curriculum Focus & Capabilities:

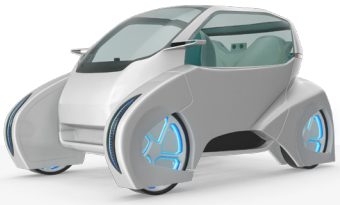
- The Arts
- Design & Technologies
- Mathematics
- Business & Economics
- Critical & Creative Thinking

Technical & Personal Skills:

Prototyping, design, computer science, software systems, problem solving, collaboration, communication, systems thinking

For more information scan the QR code.

Girls in STEM



8 Days | 60 Max Students | Years 8-9

The Girls in STEM program is centred around "you can't be what you can't see" and provides young women with access to mentors, experiences and skill development in a focused and supported environment for two days per term across the year.

Utililising the Design Thinking model, the program is linked to local industry and presents students with opportunities to engage with:

- STEM related industries (site visits)
- Skill development with industry
- Real world problem solving
- Study and career pathways
- Networking and connections

The learning that occurs, career pathways mapped and the networks made across schools over the 8 days is supplemented by industry knowledge and mentors. Schools can nominate girls and gender diverse students in Years 8 & 9 with an interest in STEM based subjects who would benefit from deeper learning and engagement with like minded students from other schools, exploring STEM opportunities together.

The Girls in STEM program is all about meeting new people and joining our ideas. I am confident to do things now I would never have done before.

Students will:

- Discover local industries
- Enhance interpersonal skills with different peers
- Exercise judgement & critical thinking in varied situations
- Learn about, and with, advanced technologies
- Refine their communication skills

Curriculum Focus & Capabilities:

- Science
- Technologies
- Engineering
- Mathematics
- Arts & Humanities
- Business & Economics
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Each term will have a different tech & skill focus while developing personal capabilities

For more information scan the QR code.

Boys in STEM

8 Days | 60 Max Students | Years 8-9

The Boys in STEM program is focused on providing young men with a similar opportunity to our highly successful and well established Girls in STEM program. Running for two days per term throughout the year, it will enable students to explore the world of STEM through hands on activities and connections with local industries.

Students will engage in a series of real-world design and creative challenges, building connections and confidence within a supportive environment that provides the chance to meet and work with like-minded peers and STEM professionals. The program will:

- Engage with STEM industries, including site visits
- Develop STEM skills with industry
- Discover pathways in study and careers
- Build a collaborative network of peers and mentors

The deep learning that occurs, pathways mapped, and the networks made across schools over 8 days is supported by local industry and mentor professionals. Schools can nominate boys and gender diverse students with an interest in STEM based subjects who would benefit from integrated hands-on learning and building connections with students from other schools.

"It is a great opportunity for students to access technology and programs that aren't usually available at school."

Students will:

- Discover local industries
- Enhance interpersonal skills with different peers
- Exercise judgement & critical thinking in varied situations
- Learn about, and with, advanced technologies
- Refine their communication skills

Curriculum Focus & Capabilities:

- Science
- Technologies
- Engineering
- Mathematics
- Arts & Humanities
- Business & Economics
- Critical & Creative Thinking
- Personal & Social

Technical & Personal Skills:

Each term will have a different tech & skill focus while developing personal capabilities

For more information scan the QR code.

Peter Doherty Science Award

Timing Negotiable | Unlimited Students | Years 7-10

The Peter Doherty Science Award was established in 2009 as a joint initiative of the Committee for Ballarat and Australian Nobel Prize laureate Professor Peter Doherty.

Open to students in Year 7 to Year 10 in the Ballarat Region, the annual award encourages:

- Scientific thought and activity, inspiring students to investigate everyday issues by undertaking experimental research using the scientific method.
- Scientific communication, requiring students to present their findings in scientific poster format and for finalists, at an in person presentation event.

The Award offers three prizes with a combined value of over $2,000 and is structured to enable students to participate as part of their school curriculum, or to enter independently with their peers.

First prize is awarded to the team of students judged to have produced the best evidence based scientific investigation, with prizes for highly commended and communication awards.

Students will:

- Demonstrate the application of the Scientific Method
- Develop written and verbal communication skills
- Enhance their Science Inquiry skills

Curriculum Focus & Capabilities:

- Science
- Humanities
- Mathematics
- English
- Critical & Creative Thinking

Technical & Personal Skills:

Scientific inquiry, prototyping, design, problem solving, collaboration, communication

Supported by:

vitrafy

committee for ballarat
thinking ahead

For more information scan the QR code.

Get into Games

2 Day* | 200* Max Students | Years 9-11

Get into Games (GIG) is scheduled to return to the Ballarat Tech School in 2024 with new panelists, new workshops and a new format.

Supported by the City of Ballarat since 2008, GiG is for students who want to learn more about possible career pathways within and surrounding the gaming industry locally, nationally and internationally.

Students will be treated to an expert panel who will model industry collaboration processes before students form teams to take on a game development challenge of their own. Our experts will provide mentoring and technical, design and prototyping skill up sessions to help bring each team's game concept to life and then join the end of day showcase to hear students present their ideas.

The program is replicated over two days, with different schools attending each day.

**This program runs on set dates and caters for limited students per school per day.*

Students will:

- Witness real industry experts model collaboration
- Discover the breadth of career pathways
- Work in teams to develop elements of a game concept
- Be mentored by industry professionals
- Develop transferable industry skills

Curriculum Focus & Capabilities:

- Digital Technologies
- Mathematics
- Social & Personal
- Critical & Creative Thinking

Technical & Personal Skills:

Prototyping, design, computer science, hardware and software systems, collaboration, communication, systems thinking

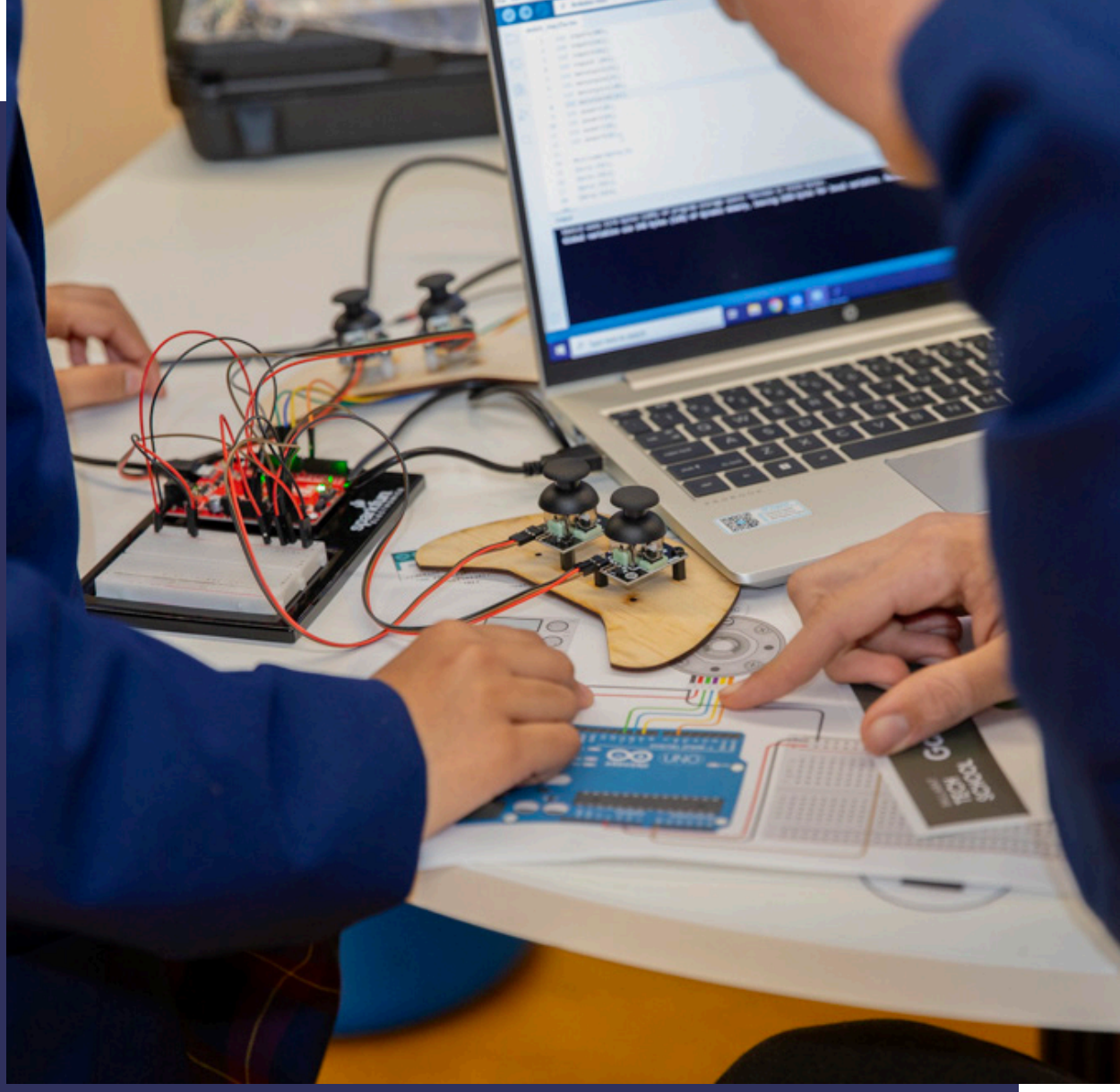
Supported by:

CITY OF BALLARAT

Highlands llen

For more information scan the QR code.

Go Career



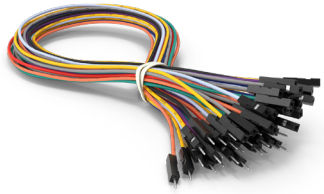
GO CAREER PROGRAMS (VCE & VCE VM)

These programs have a post schooling pathways focus that targets VCE, VCE VM & VET requirements for further study and/or work readiness. They utilise our resources to improve student assessment and link to local and future industry pathways and opportunities.

Some of our VCE programs that are designed to meet specific Unit and Learning Outcomes can fit with most schools subject timetabling, however others require a longer time in order to meet the desired goals.

Work Experience and Professional Learning provide opportunities for students and teachers to invest in skills and knowledge to power their future careers.

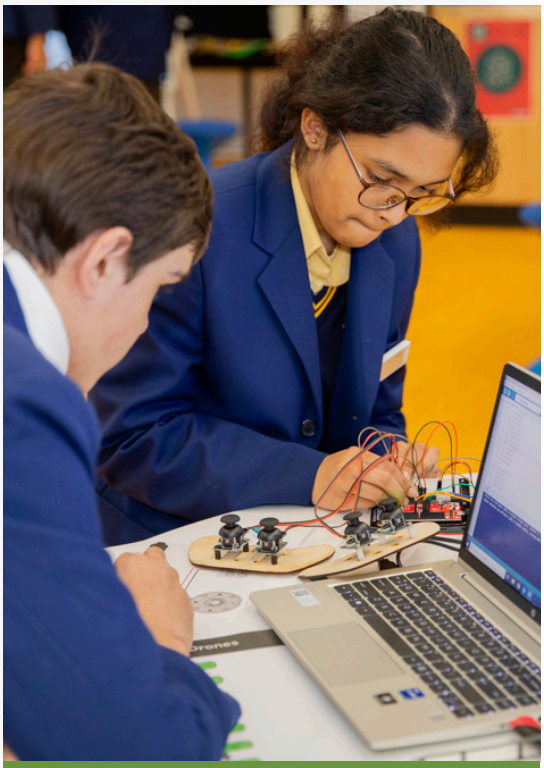
Game of Drones Systems Engineering



1 Day | 24 Max Students | VCE

In the Game of Drones, you win when you fly! Drones are currently used in a large variety of industries as well as for recreational purposes. From inspecting wind turbines or agricultural crops to Defence Force racing teams, there are many careers on offer for drone pilots.

Game of Drones gives students hands on experience learning to code, test and fly drones whilst discussing what the future of drones may look like. As sessions include wiring a model drone to an Arduino, testing a custom made rig with a focus on writing, editing and testing flight code, the program lends itself to students currently studying subjects such as Systems Engineering who will have a basic understanding of electrical circuits. The day culminates in a "Top Gun" flying challenge to see who can earn their "wings".



Students will:

- Understand the components of a drone
- Develop an understanding of a basic electronic circuit and how it functions to control electric motors
- Create a successful drone prototype test rig
- Automate a drone flight to complete a set mission
- Learn to use and code an Arduino microcontroller

Curriculum Focus:

- Unit 2 (AoS1): Electrotechnological systems design
- Unit 2 (AoS2): Producing and evaluating electrotechnological systems

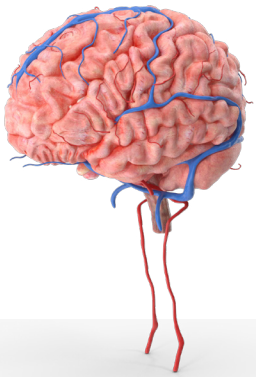
Technical & Personal Skills:

Prototyping, computer science, hardware and software systems, problem solving, collaboration, systems thinking

"The program was very enjoyable and beneficial, teaching us about electronic components but also being a lot of fun."

For more information scan the QR code.

Perceptual Distortion Psychology



2 Hours | 26 Max Students | VCE | Requisite Learning

Can you trust your senses? Can your perception of reality be altered? In this program we look at how your nervous system can be affected by perception and how sensory information can be distorted.

The first session of this program exposes students to different environmental experiences, moving from calming meditation to an exhilarating virtual reality rollercoaster. Students are able to apply their understanding of research methods in an interactive way while generating primary investigation data (heart rate) for analysis.

In the second session students will explore sensory perception systems and participate in activities that can demonstrate distortion of those systems, particularly taste.

Students will:

- Examine the influence of biological, psychological & social factors on visual perception & gustatory perception
- Discover the fallibility of perception through sensory exposure
- Identify experimental variables & how they are measured
- Systematically generate, collect, record and summarise primary qualitative and quantitative data

Curriculum Focus:

- Unit 2 (AoS2): What influences a persons perception of the world?
- Unit 2 (AoS3): How do scientific investigations develop understanding of influences on perception and behaviour?

Technical & Personal Skills:

Scientific inquiry, design, software systems, collaboration, communication, critical & creative thinking

Requisite Learning:

Some knowledge and pre-learning is required to understand this program content. Related pre and post visit activities can be accessed through our webportal.

For more information scan the QR code.

Augmented Consciousness Psychology

2 Hours | 26 Max Students | VCE | Requisite Learning

Consciousness can be thought of as operating on a continuum, and altered states can occur naturally (e.g. sleep, daydreaming) or be induced (e.g. alcohol, anesthesia). Measuring these states usually involves methods like Electroencephalography (EEG) and speed and accuracy assessments.

Both sleep deprivation and alcohol-induced states impact cognitive, emotional, and behavioral functions. A full night's sleep deprivation (24 hours) is akin to a BAC of 0.1, while a BAC of 0.05 corresponds to 17 hours of partial sleep deprivation within 24 hours.

In this program, students use beer goggles and drowsy goggles to simulate altered consciousness states. This allows them to compare the effects of sleep deprivation and alcohol induced states, deducing emotional and cognitive changes. Activities offer an engaging and enjoyable way to generate primary data for subsequent analysis and evaluation.

Students will:

- Review the nature of consciousness
- Compare the effects of alcohol induced & sleep deprived states and generate data for analysis & evaluation
- Discuss the affective, cognitive & behavioural effects of sleep deprivation
- Apply research methodologies & identify extraneous variables

Curriculum Focus:

- Unit 4 (AoS1) How does sleep affect mental processes and behaviour?
- Unit 4 (AoS3) How is scientific inquiry used to investigate mental processes and psychological functioning?

Technical & Personal Skills:

Scientific inquiry, design, problem solving, collaboration, communication, critical & creative thinking, key science skills

Requisite Learning:

Pre visit learning includes an understanding of consciousness and sleep across the lifespan. It's uselful to have introduced key science skills including; hypothesis, independent & dependent variables, controlled variables, extraneous variables.

For more information scan the QR code.

Molecular Genetics of Disease Biology

2.5 Hours | 24 Max Students | VCE

Following the extraordinary discovery of the double-helical structure of DNA and the subsequent completion of comprehensive sequencing of the human genome, the importance of genetics and the associated career opportunities continue to grow.

In this program students will use gel electrophoresis, together with a family's medical history, to diagnose a monogenetic or "single-gene" disorder and practice providing valuable genetic counselling.

While the gels are running, the students will be either led by a scientist on a tour of the Fiona Elsey Cancer Research Institute (FECRI), with a focus on the real world applications of gel electrophoresis in their research, or learn some gamified Mendelian principles.

Students will:

- Undertake laboratory work in small teams
- Apply an understanding of genetics to a real-life scenario
- Analyse the outcome of genetic testing
- Tour a modern research laboratory
- Learn about the safe use of laboratory technology

Curriculum Focus:

- Unit 2 (AoS1): How is inheritance explained?
- Unit 3 (AoS1): What is the role of nucleic acids and proteins in maintaining life?
- Unit 4 (AoS3): How is scientific inquiry used to investigate cellular processes and/or biological change?

Technical & Personal Skills:

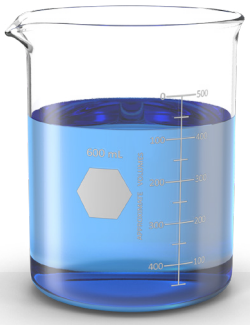
Scientific inquiry, key science skills, problem solving, collaboration, communication

Supported by:

FIONA ELSEY CANCER RESEARCH INSTITUTE
fighting cancer through research

For more information scan the QR code.

Photosynthesis & Respiration Biology



3 Hours / 1 Day | 24 Max Students | VCE

As our climate continues to change and our planet tries to adapt to industrialisation and human endeavour, understanding the basic processes of life on earth will be critical in both trying to protect the home we have and the knowledge and skills required to potentially find a new one.

In this program, students get hands-on experience as they investigate the processes of photosynthesis and respiration in response to a range of environmental conditions.

To do this, students will employ an experimental apparatus consisting of yeast/algal cells immobilised in an algal gel, enabling CO_2 production/consumption to be measured. The results are then recorded in a spreadsheet to help them process and analyse their data for potential use in a SAC.

Students will:

- Undertake laboratory work in a small team
- Measure cellular processes
- Apply an understanding of the biochemical processes of photosynthesis and respiration
- Conduct meaningful analysis of experimental results

Curriculum Focus:

- Unit 3 (AoS2): How are biochemical pathways regulated?
- Unit 4 (AoS3): How is scientific inquiry used to investigate cellular processes and/or biological change?

Technical & Personal Skills:

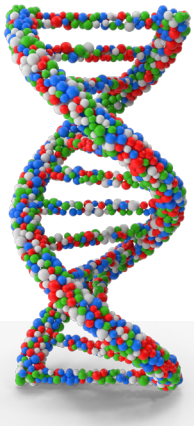
Scientific inquiry, key science skills, problem solving, collaboration, communication

Program Variation:

This program can be offered at a Year 10 level as a Go Deep option. Students would prepare yeast alginate spheres and then perform a cellular respiration experiment. They would not do the Photosynthesis experiment.

For more information scan the QR code.

Transformation & Gene Regulation Biology



1 Day | 24 Max Students | VCE

Students will get hands-on experience in modern molecular biology techniques. They will work with a plasmid containing the heterologous gene encoding green fluorescent protein (GFP) under the control of the arabinose operon.

This program enables students to investigate the process of bacterial transformation as they introduce the GFP containing plasmid into *E. coli* and select for its presence using an antibiotic. They will also investigate gene regulation in bacteria as they induce expression of GFP by way of the inclusion of arabinose in the growth medium and fluorescence by excitation under UV light.

Students will set up and run a controlled scientific experiment that clearly demonstrates the relationship between independent and dependent variables and have the chance to tour the Fiona Elsey Cancer Research Institute (FECRI) to see real world applications.

Students will:

- Undertake laboratory work to perform a genetic transformation
- Apply an understanding of gene regulation to control expression of a fluorescent protein
- Analyse and interpret experimental results
- Tour a modern research laboratory

Supported by:

FIONA ELSEY CANCER RESEARCH INSTITUTE
fighting cancer through research

Curriculum Focus:

- Unit 3 (AoS1): What is the role of nucleic acids and proteins in maintaining life?
- Unit 4 (AoS3): How is scientific inquiry used to investigate cellular processes and/or biological change?

Technical & Personal Skills:

Scientific inquiry, key science skills, problem solving, collaboration, communication

For more information scan the QR code.

Special Projects

1 Day | 25 Max Students | VCE & VCE VM

With changes to VCE and the introduction of the Vocational Major stream, many schools are still grappling with student outcomes and cross curricular learning.

Fortunately, the Tech School is here to help you co-create highly engaging and meaningful experiences for your students that hit the key components of the VM curriculum, and make direct links to the work students are completing at school.

With the huge diversity of resources available at the Tech School, we are putting the call out to VM teachers to get in touch and discuss how programs can be made to fit any aspect of the VM curriculum, from Literacy & Numeracy to Work Related Skills.

We have already had several partner schools complete various VM projects with us, so we can't wait to hear your ideas. Contact us today to see what we can we achieve together!

"Staff here had an amazing ability to be open and flexible to create something new based on my ideas. They worked as a team to support the idea & brought it to life."

Students will:

- Engage in project-based learning
- Apply classroom knowledge to real world scenarios
- Gain valuable problem solving and critical & creative thinking skills.

Curriculum Focus:

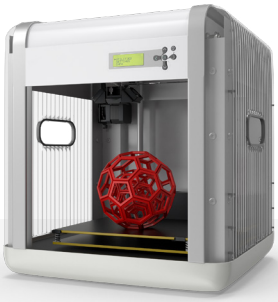
- VCE-VM Numeracy
- VCE-VM Literacy
- VCE-VM Work Related Skills
- VCE-VM Personal Development Skills

Technical & Personal Skills:

Will vary depending on the type of project variation

For more information scan the QR code.

Work Experience



5 Days | Year 10 | Requisite Learning

Get ready to learn, grow, and have a blast. It's sure to be a week to remember!

Work experience at the Ballarat Tech School aims to provide students with an engaging and structured introduction to working life in a STEM learning environment.

Within our state of the art facility, students will have extensive access to all things STEM related and experience first hand how staff with diverse skill sets collaborate to create meaningful and engaging learning programs.

Students will have the opportunity to work with educators, technicians and administrators so we encourage students to think deeply about what they want to achieve from their week with us to maximise the experience and equip themselves well for the future world of work.

Students will:

- Gain insight into full time working life
- Be exposed to different roles and skill sets in a workplace
- Engage with several physical and digital technologies
- Assist with STEM Learning programs
- Develop valuable professional communication skills

Curriculum Focus & Capabilities:

- Critical & Creative Thinking
- Personal & Social
- Communication Skills

Technical & Personal Skills:

Students will have an opportunity to work across most priority and emerging technical and personal skills

Requisite Learning:

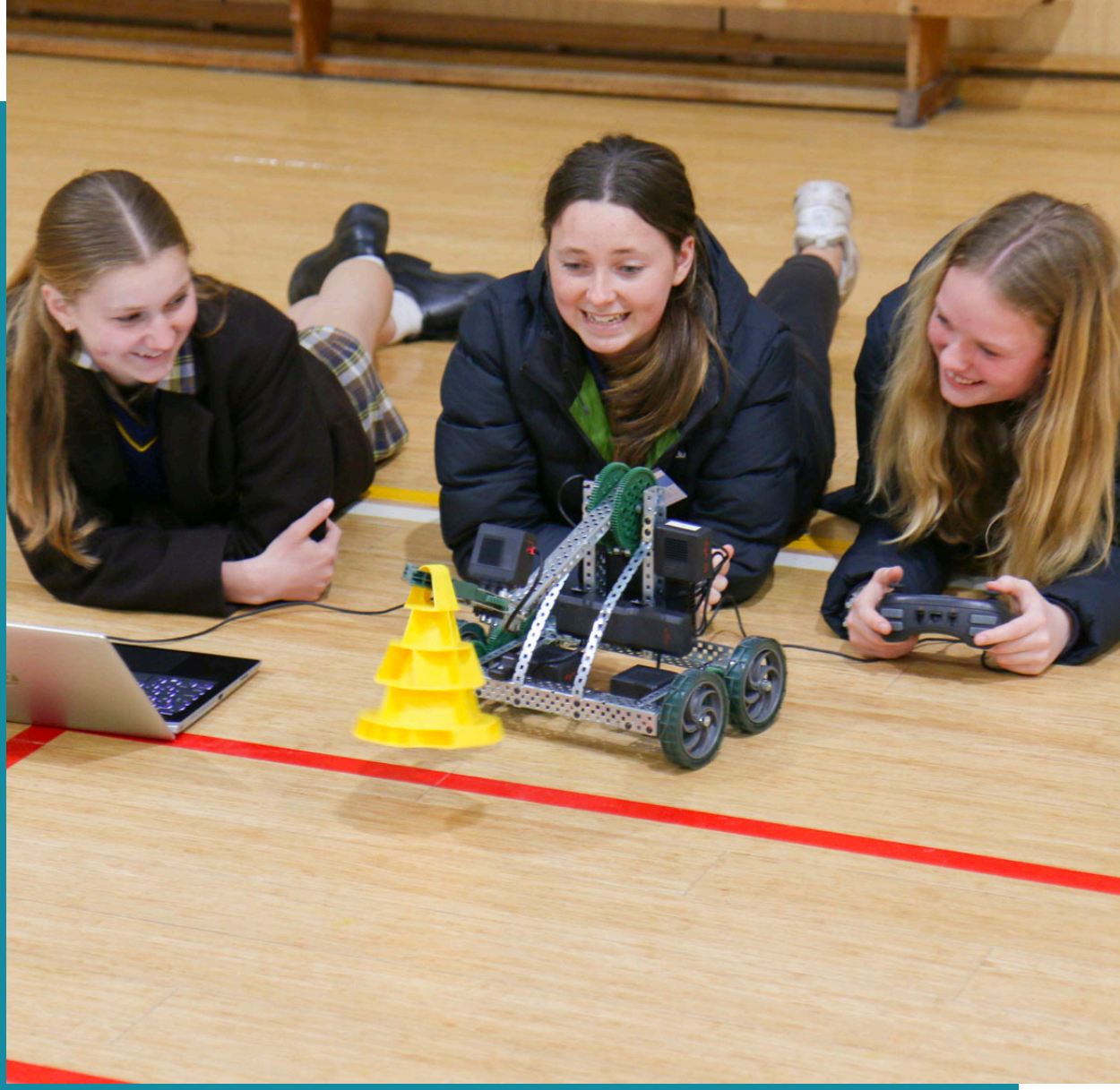
All students interested in Tech School Work Experience will need to successfully complete the application and interview process, details of which can be found on our website.

For more information scan the QR code.

TEACHER
PROFESSIONAL LEARNING

Available for teachers across a variety of content, pedagogy and technology areas, professional learning sessions will be regularly available and promoted through our eNews.

Sessions can also be undertaken within onsite core program delivery and teachers are encouraged to reach out to co-design programs that address their specific skill or knowledge needs.



TECH SCHOOL
AT YOUR SCHOOL

We understand that attending the Tech School is not always possible, so we have designed a range of options that can bring some of the Tech School programs, equipment and expertise to your school instead.

Some examples include our Equipment Loan Program for Makeblock laser cutters or STELR Housing kits or hybrid program delivery where some elements are delivered at your school or virtually and the rest at the Tech School.

Strategic Objectives

Strategic Plan 2023-2026

Objective 1: Increased student participation in STEM Subjects

Strategies:

- **Go Wide (Years 7 - 9)**
  Inspire and engage all students
- **Go Deep (Years 9 - 11)**
  Skill extensions and pathways for engaged students
- **Go Career (Years 10 - 12)**
  Post school pathways focus

Objective 2: Quality school engagement with leadership & teachers

Strategies:

- **Programs are connected and immersive**
  Provide quality for all stakeholders
- **Schools committed to coordinated collaboration**
  Amplified voice in program co-design
- **Expand offsite programs**
  Develop Remote & Virtual Initiative

Objective 3: Accelerate understanding of technology

Strategies:

- **Develop skills roadmap**
  Future focused
- **Tech supports skills pathways**

Objective 4: Increased Host and Industry collaboration

Strategies:

- **Programs link to host pathways**
- **Engage with local industry tech**
- **Programs have industry links and real-world challenges**

Objective 5: Promote holistic community engagement

Strategies:

- **Increase awareness of, and active participation in, STEM opportunties for young people**

BALLARAT

TECH SCHOOL

GET IN TOUCH

03 5327 8080

ballarattechschool@federation.edu.au

www.ballarattechschool.vic.edu.au

Federation University

THE EDUCATION STATE

VICTORIA State Government | Education and Training