



MELVILLE
SENIOR HIGH SCHOOL



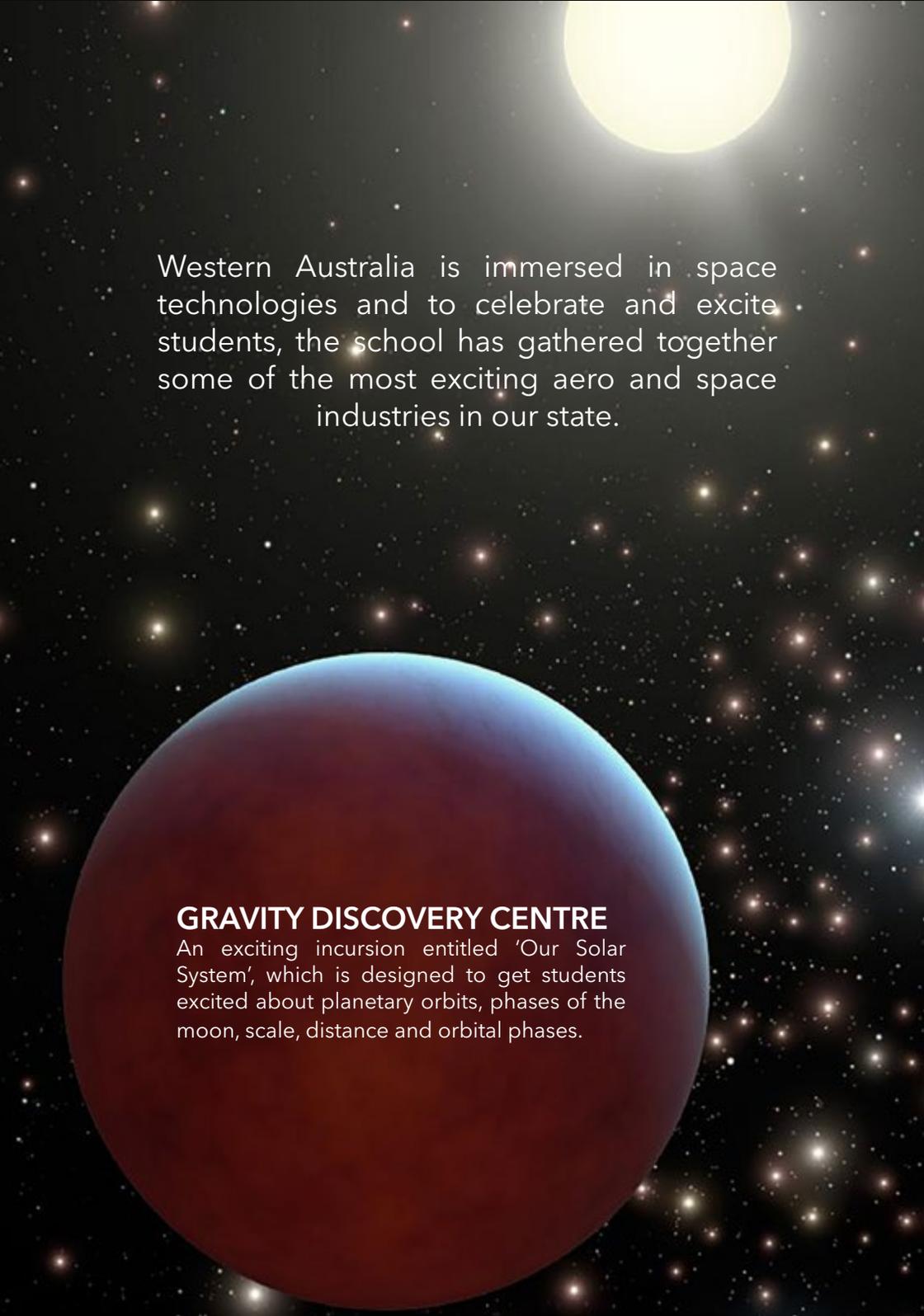
STEM BLAST

26 NOVEMBER 2021
MELVILLE SENIOR HIGH SCHOOL

OPEN TO THE PUBLIC 3-4PM
BRING THE FAMILY

Achieving excellence today and
building bright futures for tomorrow.

melville.wa.edu.au
Melville Senior High School
18 Potts St, Melville WA 6156



Western Australia is immersed in space technologies and to celebrate and excite students, the school has gathered together some of the most exciting aero and space industries in our state.

GRAVITY DISCOVERY CENTRE

An exciting incursion entitled 'Our Solar System', which is designed to get students excited about planetary orbits, phases of the moon, scale, distance and orbital phases.

STEM BLAST EXHIBITORS

SPACE & AERO-SPACE



ICRAR

The International Centre for Radio Astronomy Research

ICRAR is displaying a full-size antenna model of the SKA used in the Square Kilometre Array Telescope.

ICRAR was founded in September 2009 with the specific purpose of supporting Australia's bid to host the world's largest radio telescope and one of the largest scientific endeavours in history, the Square Kilometre Array (SKA). Since launching, ICRAR has played an integral role in the development of the SKA project and has grown into an internationally renowned, multi-disciplinary research centre for science, engineering and data-intensive astronomy.



SPACE & AERO-SPACE

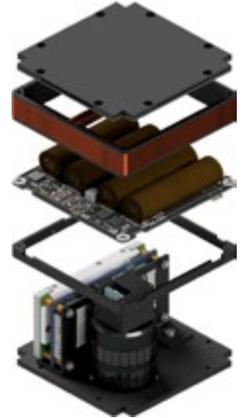
BINAR X

Curtin University

Introduce yourself to WA's first home grown satellite Binar!

The Binar (BIN-ah) Space Program (named for the Noongar word, 'fireball') from the Space Science and Technology Centre (SSTC) at Curtin University is building the next generation of Australian small spacecraft. The team is striving to advance our understanding of the solar system and to lower the barriers to space operations for other groups and institutions. We want to help build a future where WA spacecraft's are exploring the solar system, WA students are helping to build them, and graduates can find jobs in a thriving WA space industry.

Visit the Binar booth, and try your hand at constructing your own Binar-1 origami cube-sat, find out what satellites you will work on in your future career, and discover more about how Binar is revolutionising access to space.



Curtin University



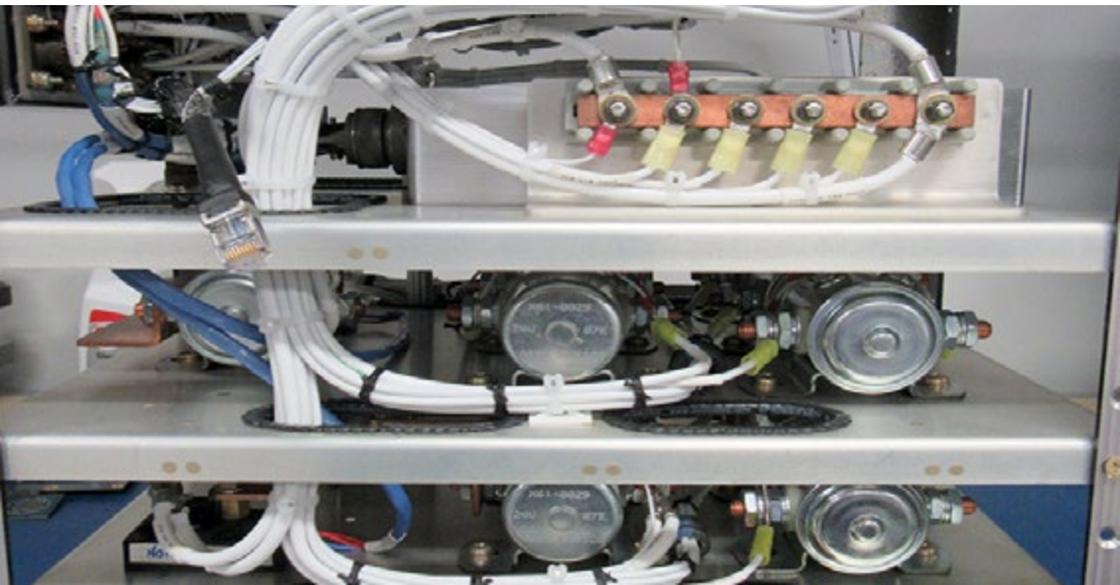
OMNI EXECUTIVE AEROSPACE



Omni Executive Aerospace has integrated and tested airborne sensor systems for various clients. Our display demonstrates how live video and other information can be transmitted to the ground with the use of modern radio systems.

Omni Executive Aerospace provides a comprehensive coast-to-coast aircraft capability for government and select commercial clients. Our capabilities include mechanical/electrical design and manufacture of Airborne Special Mission Equipment, as well as aircraft modification and maintenance, flight testing, operator training, flight operations and through-life support.

Also on display will be an example of the design and manufacturing processes required to produce approved aircraft components.



SPACE & AERO-SPACE



SURVEYING

Curtin University

Surveying is a highly specialised discipline within Engineering and Science and is a long-established profession, having played a crucial role in the development of Australia since settlement.

Surveyors use advanced technology and scientific principles to provide practical solutions and services to many areas of industry, such as land development, construction, mining and mapping. It includes modern techniques with total stations, levels, satellite positioning (GPS/GNSS), laser scanning and photogrammetry (drone surveying).

Surveying will give you the opportunity to work as a Cadastral (Land) Surveyor, Engineering Surveyor, Mine Surveyor and offers further career opportunities in many other related areas.



SCIENCE OUTREACH

Murdoch University



Murdoch University is excited to be at STEM Blast again for 2021. At the Murdoch University stall, we will have information about university, animal skulls to look at, touch and identify, a slime making station and maths games about odd numbers that will get you guessing. Come and talk to our student ambassadors about what it is like to study at University and ask them any questions you may have.



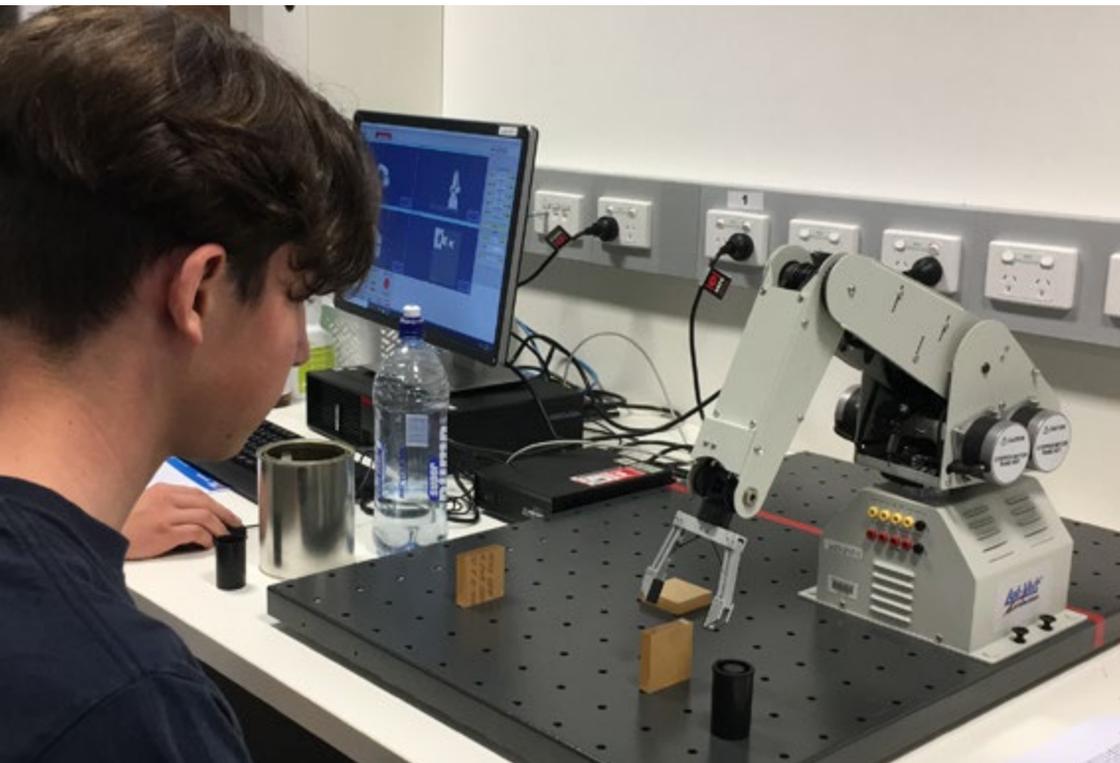
ROBOTICS

School of Engineering | Edith Cowan University



In this activity, students will explore the exciting world of robotics with a dynamic and user-friendly humanoid robot known as “JD”. JD can walk, talk, and even respond to voice commands. Cutting-edge technology gives students control to program behaviours, movements and customisation.

The built-in camera adds impressive vision learning and tracking of objects, faces, colours and more. Clip’n’Play Technology gives students the freedom to change the configuration and build something entirely new. This activity is open-ended and students are free to explore as much as they can about JD in the time available.



NUTRITION & DIETETICS

Curtin School of Population Health



Ever wondered how the food we eat supplies our bodies with the nutrients we need? Why do some foods taste sour? Or why do fruit and veggies go brown once they have been cut?

Discover the chemistry and biology within foods at Curtin University's Nutrition and Food Science stall. Curtin University student nutritionists will be running demonstrations of how enzymes help us digest carbohydrates, and cause the browning seen in fruits and vegetables.

Students at Melville SHS can get involved in hands-on activities to explore the polarity of oils and liquids, and determine the acidity of common foods. Information on the opportunities to study Nutrition with Curtin's School of Population Health will also be available.



POLYMER SNOW

Engineers Australia



It is never too early for you to start learning and thinking about studying engineering.

Have fun with a POLYMER SNOW EXPERIMENT at the Engineers Australia booth. Chemists' ability to engineer synthetic polymers to get the desired set of properties such as strength, density, heat resistance and electrical conductivity has expanded the many things that polymers can be used for. This is a quick experiment that students can take home, dry out and repeat to 'wow!' family and friends. When you are finished with it, you can mix it with the soil in your garden or in pot plants to help with water retention.

Is it cold like real snow? What is it used for? What is it made of? Is it a physical or chemical reaction taking place? What is engineering? Come and find out at the Engineers Australia booth.



ENGINEERS
AUSTRALIA



CHEMCENTRE Emergency Response Team



Join the ChemCentre station and play 'What's the hazard?', get your hands on some specialist Emergency Response equipment, check out the chemical spill model, meet one of the HAZMAT emergency responders and get a close-up look at what our specialist chemists do in a HAZMAT emergency.

A career in chemistry doesn't mean never leaving a laboratory - it can take you anywhere! The Emergency Response team are on call 24 hours a day, seven days a week ready to respond anywhere across the State.

Responding to HAZMAT emergencies is not all ChemCentre does. Analytical chemists make sure environments and workplaces are safe and protected, and forensic scientists help police solve crimes, keep us safe on the roads, help in the fight against illicit drugs and more!

Our researchers are at the forefront of innovation relating to food products and the challenges of future energy solutions! Come meet the team to find out more.





AUSTRALIAN DEFENCE FORCE Trade and STEM Mini-Expo display

The Defence Force offers a range of rewarding roles in a vast number of areas, including STEM. Working across the Navy, Army or Air Force, there are many benefits like continual training and development, opportunity to work with cutting-edge technologies, opportunities to travel, job security, a good work/life balance and of course memorable experiences with friendships that last a lifetime.

In regards to STEM, science qualifications can lead to specialist technician roles like maintaining weapons systems of a Navy frigate. Technology is a key part of the service and you could have a career in operations or maintenance. Engineering would allow individuals to work with leading-edge technology such as submarines, all-terrain armoured vehicles and unmanned aircraft systems. Maths would allow for a vast range of opportunities in the services like operating an artillery system. Whatever interests you, the Navy, Army or Air Force have the career for you.





BIOBARCODE AUSTRALIA

Interested in becoming Australia's first bio-coders? DNA is the most important coding language on earth and now you can work with REAL DNA from plants and animals to help identify, map, monitor and help to save precious biodiversity before it is gone. Try out the cool tools of biotechnology with real scientists and real equipment!

BioBarcode's exciting new venture, the "Australian Barcode for Life" Project uses genomic science and big data to identify, map and monitor our native plants and animals using cutting edge technology in your school grounds! Students learn how to use the same equipment as real scientists to extract DNA, make billions of copies of one 'barcode' gene and then match its identity in an online database - all based on that gene's DNA code. The awesome young scientists help you understand how biotechnology is playing such an important role in helping save our precious biodiversity, which is under threat due to climate change and habitat loss. Four students from Melville SHS were among the first to become Biobarcode's student ambassadors and presented at the 2021 Biodiversity Conference in 2021 at UWA.

BioBarcode
A U S T R A L I A



UWA AGRICULTURE AND ENVIRONMENT

Environmental monitoring and remote sensing



Want to know more about careers in Agriculture and Environment? See how we are using technology to train up our students for the jobs of tomorrow. UWA students are trained to solve the challenges of managing changing water resources, ecosystems and climate, decarbonising the economy and feeding the world using fewer inputs. The UWA School of Agriculture and Environment is the top-ranked university in Australia in this area. We partner with industry and are training the next generation of problem solvers to address the big questions.

Our graduates earn above average-salaries and are proving solutions across agriculture, agriculture technology, agriculture and resources economics, natural resource management, environmental policy, environmental science and geography. Find out more about the career options and future job opportunities in this growth area.



SPORTS SCIENCE

Physical Education - Edith Cowan University



In elite sport, understanding the science behind how to train people is the difference between winning and losing. In this field, we specialise in how to develop the best athletes, this can range from everyday people trying to get fit, all the way up to Olympic athletes vying for gold! At this booth, students will try out a few common exercise tests that get used in the industry.

The peak power test involves participants sitting on an exercise bike and completing 6 seconds of maximal exercise. This test is commonly used in many practical settings, including in many elite sporting organisations. The results tell us about an individual's short term power capacity which can translate to many actions such as sprinting, jumping, kicking and other similar actions. Complete the test to see how you measure up against the rest!!



EXERCISE & SPORTS SCIENCE

ECUWORLDREADY.COM.AU



TECHNOLOGIES

Melville SHS



Are you a budding MasterChef? Do you tinker in the workshop at home? Maybe you're already building your own computer or developing software?

Technologies students at Melville SHS are 21st Century learners who experience many learning opportunities to develop critical thinking, collaboration, communication and creativity. Students work individually and in teams to develop the fundamental skills of Design Thinking as they explore and create a wide range of projects. Through this diverse Learning Area, students experience:

- Computer Assisted Design (CAD)
- 3D printing and laser cutting
- Robotics, coding, virtual reality (VR) and cybersecurity
- Workshop equipment fundamentals and occupational safety and health (OSH)
- Practical skills in welding, bricklaying, concreting, paving, plumbing, carpentry and tiling
- Recipe planning, nutritional science and food preparation skills
- Handcrafting and sewing machine skills to create sustainable fashion projects and much more...

Designing and Making an Electric Vehicle (eV)

The eV Challenge club is run through the Design Technologies workshop. The school team constructs a small single-seat electric vehicle and participates in events at the Wanneroo raceway.





DRONES

Aviation Specialist Program

This course is an Approved Specialist Program offered at Melville SHS. Details for applications can be found on the school website.

Aviation students from Years 7 to 12 explore this specialist field with many activities throughout the years. Students have flying experience opportunities and flight training with flight-qualified teachers and instructors at Jandakot Airport. Students can achieve Solo, Area Solo and their Recreational Pilots' Licenses while participating in this program.

The Year 7s have been achieving great heights with their practical tasks which include flight training on the DJI Tello drones, building obstacle courses and coding the drones for flight. These are all on display as part of STEM Blast.

The Year 9s learn to fly the DJI Phantom 3 drones, and the Year 10s train to get their Remote Drone Pilot Licence (RePL) through the school.

'Come Fly with Me' runs as an exclusive course conducted by Melville SHS for interested primary school students. The course has been very popular with Years 5 and 6 students and includes a flight in a real aircraft, as well as flight training exercises on the school's flight simulators.





VIRTUAL REALITY (VR)

Melville SHS

We often imagine the future as far-off, only the stuff of dreams. Such that when the future does arrive on our doorstep, the surprise of new technologies often brings a smile to our faces. We have been pleasantly surprised with the small group of students which have gathered every lunchtime during Wednesday and Friday to explore the worlds, which have been made in virtual reality. From exploring the decrepit island of Isla Nublar in the ruins of Jurassic World to the Beat Saber competitions which test our agility and ability to swing our arms about. From surviving the pizzerias of Five Nights at Freddy's to the antics of pretending to work in Job Simulator. We have certainly had our fun in VR and look forward to exploring the real-world applications of this technology.

What excites me about introducing this to students, is that we will be maintaining an interest in VR and thus keeping STEM at the forefront of our minds. Furthermore, what's even more exciting is that innovation does not cease. There will certainly be more technologies regarding the field of VR to come in the future.

By Joshua Cabutaje - Year 11



HISTORY AND SOCIAL SCIENCES (HASS)

Melville SHS



Architecture, Volcanoes and Trench Warfare

The Melville SHS HASS Department proudly presents 'STEM through the ages', a showcase of the importance of STEM throughout Human history. At Melville SHS, STEM forms a critical component of the HASS curriculum, and there is a focus to develop well-rounded students equipped with the tools to face any challenges the 21st century holds. Enjoy the displays of selected works from the many STEM projects the diligent students undertook throughout the year. Ranging from the architecture of ancient Greece to trench warfare and everything in-between.

But wait there's more! Strap yourselves in as we uncover the science behind the destructive forces of volcanoes through a recreation of the Mount Vesuvius eruption. Watch in awe, as HASS put the 'blast' back in 'STEM Blast!' with a simulation of the Hindenburg disaster. Put your engineering skills to the test through a medieval catapult competition.

Can you claim the coveted first prize?



MATHEMATICS

Melville SHS



Shaping Maths

On this table are shapes for students to build. You need to build the shape from:

1. The correct number of squares
2. The correct number of triangles
3. And a laminated card (with the answers on the back)



Year 12 Specialist ATAR

Ms Leith's Year 12 Mathematics Specialist class has delved into the intriguing world of complex numbers. Through their investigation into the fractals produced by the Mandelbrot and Julia Sets they were able to produce the intricate and hypnotising images displayed.





Pascal's Triangle

Mathemagic!

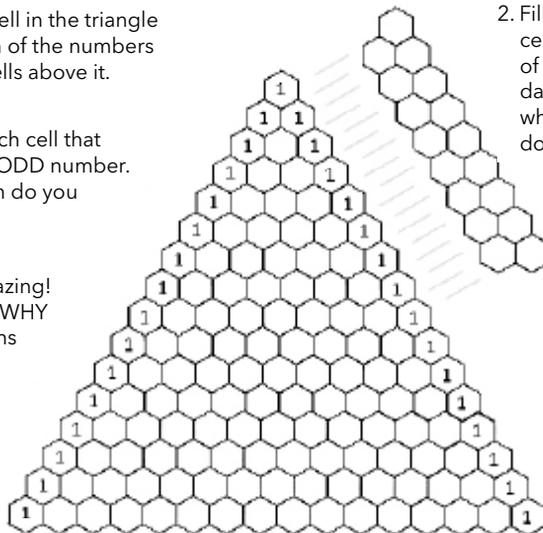
Here is an activity for you to take home.

Pascal's Triangle is a simple way to make a pattern that involves filling in the cells of a triangle by adding two numbers and putting the answer in the cell below. Just by repeating this simple process, a fascinating pattern emerges. It is a fun way to practice arithmetic. It's a good idea to work in pencil, because if you make a mistake early on, it will propagate all the way down!

When you have filled in all the cells, the next step is to colour in the cells that contain odd numbers. And - amazingly - the pattern that results is the Sierpinski Fractal Triangle. Furthermore, if you add up the diagonal rows as shown in the template, the result is the famous Fibonacci sequence. Mathemagic!

Pascal's Sierpinski Triangle

1. Fill in each cell in the triangle with the sum of the numbers in the two cells above it.
3. Colour in each cell that contains an ODD number. What pattern do you recognise?
4. Maths is amazing! Think about WHY these patterns emerge.



2. Fill in each of these cells with the sum of the cell on each diagonal line. What sequence do you recognise?

SCIENCE

Melville SHS



Forensic Face Reconstruction

As part of our General Human Biology Year 12 course, students are taught the principle of forensic facial reconstruction. Under guidance, students build the layers of muscles, connective tissue and skin over a human skull to reveal the facial features.

Robotics

Edison robots introduce students to robotics and basic coding. Year 7 Gifted and Talented students have been coding and making maze creations during class. They investigated the capabilities of the robots including drive commands, lighting, music and sounds, sending messages, wait commands, looping infrared and light sensors and start and stop commands.



ENGLISH Melville SHS



Future Problem Solving (FPS)

Over the past three years, Melville SHS students have participated in the national finals of the Future Problem Solving competition. The team were named national champions for the senior division, and have participated in the FPS International Competition in the USA via zoom, coming fifth in the world in 2020, and second in 2021.

From Years 9 to 12, students select from a range of topics and produce an original written scenario to a maximum of 1,500 words, in which one possible outcome of the future is developed through character and plot. The story is set at least 20 years in the future, as an imagined, logical, outcome of actions or events taking place in the world, and is written as though the future was the present.

Meet members of the winning team and hear how they solved the problem.



LANGUAGES

Melville SHS



In Italian, STEM thinking is used by students to build miniature Leaning Towers of Pisa by utilising engineering skills to create a structure that will lean the required angle to mirror the real monument. Students use problem-solving to create towers out of the resources provided by the teacher. In relation to the most important aspect of Italian culture, food, students use mathematics and measurements to create recipes. They use science thinking to follow the cooking procedure of their favourite Italian dishes and create their masterpieces in preparation for their class party.

In Chinese, STEM plays a large role in learning Chinese characters. Students are tasked with problem-solving to discover how to best construct the characters and then are tasked with counting the strokes to see the characters come to life. The integration of many mathematical games including Chinese Checkers, Mahjong and Chinese Chess encourages the students to employ problem-solving as well as mathematics to beat their opponent.

By exploring the engineering feat that is the Great Wall of China, students use STEM thinking to explore the creation of this wonder of the world and discover ways in which people could have built something so grand during this time. The presence of ICT in both areas of language study is increased by the use of many language games as well as students creating Minecraft worlds incorporating any element of the language they have learned.





ARTS

Graphic Design Media Specialist Program

The Arts Learning Area represents the highest application of all things STEM providing aesthetic expression, complex thinking (creative and critical), cultural relevance and career support. Making this integration explicit provides students with knowledge and skills sets that transfer seamlessly to their other areas of study and also lays a strong foundation for future life, study and vocation.

This integrated STEM approach provides a framework that students can use to navigate their learning journeys. Students start with a problem or challenge; consider examples, materials, methods; investigate options; and, finally, develop solutions that resolve the problem or challenge.

In the Visual Arts there are possibilities for students to apply STEM thinking, through creating Music Video clips in Media Arts to architectural models in graphic design media (GDM), self-portraits in Visual Art.

In the Performing Arts, it is demonstrated in the problem-solving processes students use to collaboratively explore and develop their ideas into performances in Dance, Drama and Music.

Arts students explore, respond to, compose and present their ideas in a rich variety of personal and career settings throughout their lives.



MELVILLE SHS HEALTH & PHYSICAL EDUCATION



Physical Education

Students are exposed to biomechanical and physiological principles through their participation in laboratory activities. Students complete practical based activities, using scientific methodology and technology (i.e. heart rate monitor, oximeters), to explore and investigate the different sport science concepts within the curriculum.

Students conduct fitness tests, analyse heart rate data and measure distances to collect data and then explain their findings related to the concepts of motion, force, velocity, angular momentum, segmental interaction, projectile motion, exercising in the heat and adaptations to training. Students are also exposed to the use of video technology in the analysis and improvement of sporting performance.

In the upper school Netball Certificate course, through a partnership with ECU, students have the opportunity to participate in several sport science activities, including VO2 max testing and strength and conditioning circuits, utilising state of the art equipment based in the Exercise and Health Science laboratory at their Joondalup campus.

Health Education

Students develop critical thinking and problem-solving skills through collaboration and social interaction. Students investigate, make recommendations, and design appropriate strategies to promote and advocate personal, social and community health and well-being through an inquiry process. Students also use critical thinking to challenge societal factors that negatively influence their own and others' health and well-being. In Year 7 Health, students follow an inquiry process to investigate the challenges young people face when going through puberty. The results of this inquiry are then used as the foundation for them to design their own puberty 'coping tool' using a creative design process.

In Senior School, students are exposed to a variety of global health issues and inequities. Students are challenged to think critically about these issues and develop creative strategies to improve health outcomes both locally and across the globe.



MELVILLE
SENIOR HIGH SCHOOL

Approved Specialist Programs

Aviation | Graphic Design Media | Netball

TESTING IN YEARS 5 AND 6

SEE DATES and APPLY ONLINE
at melville.wa.edu.au



AVIATION

- Two qualified teachers with industry experience, commercial pilot's licences and flight instructor qualifications
- Opportunity to gain drone licence
- A purpose-built Aviation Centre with two flight simulators
- Time spent at airports and in the skies
- The course caters for those seeking a career in aviation, science and engineering



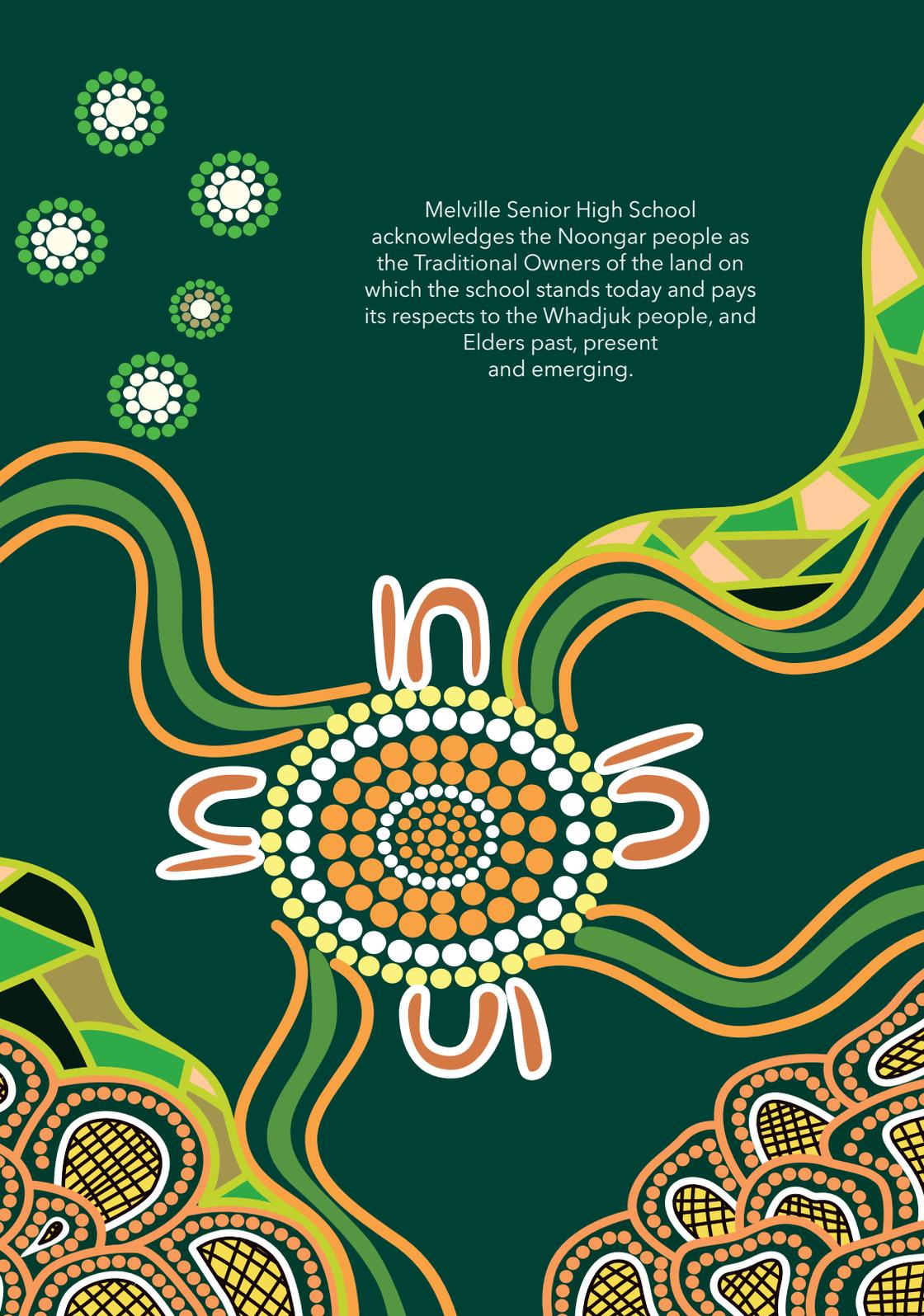
GRAPHIC DESIGN MEDIA

- Highly experienced teachers
- Purpose-built facilities
- The latest ICT software
- Projects aimed at increasing core skills as well as giving relevant industry experience
- Drawing for design, photography, print design, animation, film production, stage and costume design, 3D and spatial design and multimedia



NETBALL

- One of only four schools endorsed by Netball WA
- The opportunity to excel at the sport they love - for both boys and girls
- Committed teachers and coaches are former state and national level reps
- The players compete in local and international competitions
- Students come to understand the level of commitment required to achieve success



Melville Senior High School
acknowledges the Noongar people as
the Traditional Owners of the land on
which the school stands today and pays
its respects to the Whadjuk people, and
Elders past, present
and emerging.