



Thuringowa State High School
James Cook University
Global Tropics Future Project



Global Tropics Future Project

The Global Tropics Future (GTF) project is a unique partnership between the Department of Education (DoE) and James Cook University (JCU), with the vision and drive to achieve improvements in education outcomes and workforce participation in Tropical and North Queensland.

Thuringowa State High School leads the collaboration with James Cook University and aims to boost engagement in Science, Technology, Engineering and Mathematics (STEM) for Years 5 to 9 students. The project enables like-minded students to connect, collaborate and explore their STEM interest and passion.

Students engaged with the GTF project are collectively known as the GTF Young Scholars. With the goal of developing 21st century skills (problem solving, inquiry, critical thinking, creativity and collaboration), the Young Scholars build their STEM portfolio through a blended model of delivery via virtual and face to face learning.

Queensland Virtual STEM Academy at North Queensland

Round 3 Course Information

The Queensland Virtual STEM Academy (QVSA) is one component of the Global Tropics Future Project. It is an initiative of Advancing education: An action plan for Education in Queensland, focused on engaging and challenging students from Years 5 to 9. As a network of schools across the state, the QVSA delivers innovative digital learning opportunities focused on current, real world STEM challenges and research that enrich and enhance students learning.

The Queensland Virtual STEM Academy at North Queensland (QVSA@NQ) is a partnership between the Department of Education, Thuringowa State High School and James Cook University. Through the online courses delivered, like-minded students connect, collaborate and explore their STEM interest and passion with researchers, government and industry.

Grand Challenges represent ambitious but achievable goals that harness science, technology and innovation to solve important national or global problems. The key outcome of a Grand Challenge course is to develop connections for students between their understanding and the real-world problems and deepen their understanding of how STEM is used to solve them. Courses culminate with students generating STEM based solutions to these 21st Century problems.

A Skill Builder focuses on developing deep curriculum understanding, enhanced skills or specific approach or skill that is core to navigating and exploring the fields of STEM (for example, Scientific Inquiry).

The **Challenge Your Thinking** sessions provide opportunities to engage and interact with researchers and industry leaders from across the globe to explore answers to current STEM questions.

For further information, contact:

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Course Overview - Round 3, 2021

All Round 3 programs are 10 weeks in duration and are scheduled for one 60 minute lesson (+ 5min logging in time) per week.

The 10 week program is split across the holidays (4 weeks at the end of term three and 6 weeks at the beginning of term four).

The Arduino Skill Builder is suited to Young Scholars who have completed other QVSA courses and are proficient in using the virtual platform, iSee.

The Sense the World Grand Challenge is suited to Young Scholars who have completed the Arduino Skill Builder.

Timetable at a glance

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|------------------------|--|---|---|--|---|
| 8.45 – 9.50am | GC – Sense the World (Years 5 – 9) <i>Arduino experience essential</i> | | | GC – Hydro Innovation (Years 5 – 6) | SB – iSee Licence and Computational Thinking (Years 5 – 6) |
| 8.55 – 10.00am | | | | | GC – Kiss the Ground (Years 6 – 9) |
| 9.25 – 10.30am | | | GC – Mining Advancements (Years 7 – 9) ANZSEA | | |
| 9.55 – 11.00am | SB – iSee Licence and Indigenous Seasons (Years 5 – 9) | GC – Let it Grow (Years 5 – 9) | | | SB – iSee Licence and Indigenous Seasons (Years 5 – 9) |
| 11.45 – 12.50pm | SB – Arduino Microcontrollers (Years 5 – 9) | | | | GC – Biosecurity (Years 5 – 9) |
| 1.25 – 2.30pm | | GC – Cyberattack Chaos (Years 6 – 9) | GC – Biomedical Engineering (Years 5 – 9) | GC – Don't Make a Sound (Years 5 – 7) | |

Course Details

| Course | Lesson Time Course Dates | STEM Focus Area | Course Context |
|--|--|-----------------|---|
| Grand Challenge Sense the World <i>(Years 5 – 9)</i> | Monday 8.45 – 9.50am Start: 23 August End: 8 November | Technology | Rapid developments in technology and automation mean that sensors are now part of virtually every aspect of life in the modern world. Arduino microprocessors are an open-source and inexpensive platform for developing sensor-based circuits and Internet of Things devices that can provide outputs/feedback in real-time via computer, mobile device or a connected digital screen. In this Grand Challenge, students draw on their previous skills developed in the Arduino skill builder. They research and adapt/modify Arduino projects from online sources and use physical sensors and Arduino components to construct, code and present a solution with real-world applications. Students collaborate with James Cook University scientists to deconstruct and problem-solve their code and circuit-based components of their innovations. |

| Course | Lesson Time Course Dates | STEM Focus Area | Course Context |
|--|--|--------------------------------------|---|
| Skill Builder iSee Licence and Indigenous Seasons <i>(Years 5 – 9)</i> | Monday 9.55 – 11am Start: 23 August End: 8 November | Science Technology | <p>Students build their ability and fluency in using the iSee virtual platform. They will collaboratively access and gain experience in using a number of other software platforms (Tinkercad, Class Notebook and Padlet).</p> <p>An introduction to Aboriginal seasonal calendar and the differences between the seasons in different parts of Australia. Students look at the weather and what seasonal food is available to an Aboriginal community during the year. Students are challenged to create their own seasonal calendar of their community, thinking of changes in weather and lifestyle during the year in their local area.</p> |
| Skill Builder Arduino Micro- controllers <i>(Years 5 – 9)</i> | Monday 11.45 – 12.50pm Start: 23 August End: 8 November | Technology | <p>Electronic devices have become a necessity of living in the 21st century and they are always evolving to suit our busy lifestyles with increasing demands on technology. In this course, students learn about the purpose of microcontrollers and how electronic circuits can be created in order to interact with users and the environment. They program an Arduino microcontroller and build and create electronic circuits. Arduino kits will be supplied.</p> |
| Grand Challenge Let it Grow <i>(Years 5 – 9)</i> | Tuesday 9.55 – 11.00am Start: 24 August End: 9 November | Science Maths | <p>Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. Queensland covers a total area of over 1.7 million square kilometres, a total of 88.4 percent is used for agriculture and 85.9 percent is occupied by grazing. From this \$4.7 billion is made from the farming of crops, cereals, grains, fibre and sugar cane. The success of this industry is greatly determined by climate, water availability, soil type and proximity to markets. In this Let it Grow Grand Challenge, students investigate the best condition for successful germination of plants. They investigate either water availability, temperature (ambient and soil temperature), seed validity, planting depth and soil salinity.</p> |
| Grand Challenge Cyberattack Chaos <i>(Years 6 – 9)</i> | Tuesday 1.25 – 2.30pm Start: 24 August End: 9 November | Science Technology Engineering | <p>Technological advancements have enabled our cities to enhance quality of services, to reduce costs and resource use and to engage more effectively with its citizens. Through the acceleration of digital capabilities, smart cities have been created. Cyberattacks occur in cities all around the world. It is difficult to imagine the impact of a cyberattack on a city with intelligent transportation networks and traffic flow systems. Students adopt a digital security mindset as they investigate the impact of cyberattacks on smart cities and how to protect them from digital infiltration and disruption. They design a safe smart city that minimises the risk of cyberattack and builds the cyber-resilience of our cities.</p> |
| Grand Challenge Biomedical Engineering <i>(Years 5 – 9)</i> | Wednesday 1.25 – 2.30pm Start: 25 August End: 10 November | Science Technology Engineering | <p>From implantable medical devices such as pacemakers and artificial hips, to more futuristic technologies such as stem cell engineering and 3D printing of biological organs, biomedical engineering is the application of the principles and problem-solving techniques of engineering to biology and medicine. Biomedical engineers solve challenging human health issues, including those related to our aging population. Students innovate a healthcare solution for elderly people living alone and focus on mobility, monitoring and medication.</p> |

| Course | Lesson Time Course Dates | STEM Focus Area | Course Context |
|---|---|---------------------------------|--|
| Grand Challenge Hydro Innovation <i>(Years 5 – 6)</i> | Thursday 8.45 – 9.50am Start: 26 August End: 11 November | Science Engineering | How can we ensure there is suitable access to water for our growing world population? Students explore technologies used to improve water access for human consumption. Students will innovate solutions to provide people with access to clean, drinkable water, wherever they live. |
| Grand Challenge Don't Make a Sound <i>(Years 5 – 7)</i> | Thursday 1.25 – 2.30pm Start: 26 August End: 11 November | Science Engineering Maths | The number of people living in urban areas worldwide is increasing. In the years 2000 and 2020 46.6 percent and 56 percent, respectively of the world's population live in urban environments. By the year 2050 it is estimated that 68 percent of the world's population will be living in urban areas. With approximately 1.5 million people moving each week, the pressure on resources continues to increase and will drive the need to improve infrastructure, especially housing. With people, now typically spending up to 90 percent of time indoors the impact of external noise is a concern on maintaining a healthy lifestyle. Students investigate the best insulations that could be used in future houses to minimise noise in urban environments. |
| Skill Builder iSee Licence and Computational Thinking <i>(Years 5 – 6)</i> | Friday 8.45 – 9.50am Start: 27 August End: 12 November | Technology Maths | Students build their ability and fluency in using the iSee virtual platform. They will collaboratively access and gain experience in using a number of other software platforms (Tinkercad, Class Notebook and Padlet). This skill builder also allows learners to progress through computational thinking model to develop their thinking skills and solving skills like a computer scientist. Students will become true digital natives as they decompose problems, recognize patterns, use abstraction to understand and solve problems and understand how to design algorithms. |
| Grand Challenge Kiss the Ground <i>(Years 6 – 9)</i> | Friday 9 – 10am Start: 27 August End: 12 November | Science Maths | Soil, and the plant-microbe symbiotic relationship that makes it grow, is the essential to life on land. Of all the food that we eat, 95% is produced from the soil! Without healthy soil, we have dust, desert and lack of water. The problem? We're running out of topsoil. This is resulting in a decrease in the land's ecosystem function and carrying capacity for life is diminishing. Students explore principles and practices of regenerative agriculture that can be used to bring the land back to life, allowing it to function at its highest capacity again. In partnership with the University of New England, students will consider the principles of design thinking and use scientific inquiry to develop solutions that will improve soil health and farming methods. |
| Skill Builder iSee Licence and Indigenous Seasons <i>(Years 5 – 9)</i> | Friday 9.55 – 11am Start: 27 August End: 12 November | Science Technology | Students build their ability and fluency in using the iSee virtual platform. They will collaboratively access and gain experience in using a number of other software platforms (Tinkercad, Class Notebook and Padlet). An introduction to Aboriginal seasonal calendar and the differences between the seasons in different parts of Australia. Students look at the weather and what seasonal food is available to an Aboriginal community during the year. Students are challenged to create their own seasonal calendar of their community, thinking of changes in weather and lifestyle during the year in their local area. |

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| Grand Challenge Biosecurity <i>(Years 5 – 9)</i> | Friday 11.45 – 12.50pm Start: 27 August End: 12 November | Science Technology Engineering | Biosecurity in Australia plays a critical role in reducing risk and ensuring our country remains free from the world's most severe pests and diseases. Through collaboration with James Cook University's College of Public Health, Medical and Veterinary Sciences, students will innovate methods of reducing our biosecurity risk to agriculture, environment and native flora and fauna. |

ANZSEA course (Australia New Zealand STEM Education Alliance).

Enrolments needed for 5 Queensland students to collaborate with students from NSW, NT and NZ.

Delivery dates: 8th September to 24th November, 1 lesson per week. Dates are different to QVSA (NQ) courses because of school holiday differences between jurisdictions.

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| Grand Challenge Mining Advancement <i>(Years 5 – 9)</i> | Wednesday 9.30 – 10.30am Start: 25 August End: 8 November | Science Technology Engineering | As the world population increases at an exponential rate, there is a growing global demand for resources and energy products. Major mining companies operate with a zero harm policy that ensures health and safety of workers, environmentally responsible actions and ensuring regions benefit economically. Students collaborate with mining industry experts to explore safety, impact on FIFO workers, environmental impacts and mining equipment technology. |
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* Grand Challenge courses are subject to change

To secure student places, please nominate for Round 3 and return to Wendy Bode via email (GTF@thuringowashs.eq.edu.au) or phone 07 47 538 899 for more information.

Preferred course day and time:

| Student Name | Student MIS ID (eg wbode1) | 2021 Year Level | Gender | Indigenous | Subject Strengths | Comments/Endorsements |
|--------------|-------------------------------|-----------------|--------|------------|-------------------|-----------------------|
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