



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 through a range of enriching and challenging learning opportunities.

Students engaged with the GTF project are collectively known as the Global Tropics Future 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 that incorporates emerging sciences and current global STEM problems.

Queensland Virtual STEM Academy (North Queensland)

Thuringowa State High School is a delivery site of the Queensland Virtual STEM Academy (QVSA) online courses. Using an innovative, real time, virtual platform, students connect with other students from across Queensland and STEM professionals to solve current global STEM problems while developing their 21st century skills. QVSA courses take three forms: Skill Builders, Grand Challenges and Challenge Your Thinking sessions.

A Skill Builder focusses on a specific learning approach or skill that is core to navigating and exploring the fields of STEM (for example Scientific Inquiry, Entrepreneurial Thinking).

Grand challenges are ambitious but achievable goals that harness science, technology and innovation to solve important national or global problems. The key outcome of a Grand Challenge is to develop connections for students between their understanding and the real world.

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



Queensland
Government



Course Overview - Round 2, 2021

All Round 2 programs are 9 weeks in duration and are scheduled for one 70min lesson per week.

The 10 week program is split across the holidays (4 weeks at the end of term two and 5 weeks at the beginning of term three).

Grand Challenge programs are suited to Young Scholars who have completed a Skills Builder program, however new students are also welcome to enrol in Grand Challenges.

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

Course Details

Course	Lesson Time	Course Dates	Course Context
Skill Builder Arduino Microcontrollers (Years 6 – 9)	Monday (8.45 – 9.50am)	Start: 31 May End: 9 August	Electronic devices have become a necessity of living in the 21 st 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.
Grand Challenge Let it Grow (Years 5 – 9)	Monday (9.50 – 11.00am)	Start: 31 May End: 9 August	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.
Skill Builder iSee Licence and Tropex (Years 5 – 6)	Monday (11.40am – 12.50pm)	Start: 31 May End: 9 August	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). Students will also progress through the design thinking process to solve the issue of obesity in Australian adults and children.
Grand Challenge Mining Advancements (Years 5 – 9)	Tuesday (8.45 – 9.50am)	Start: 1 June End: 10 August	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.

Course	Lesson Time	Course Dates	Course Context
Grand Challenge Don't Make a Sound (Years 5 – 9)	Tuesday (9.50 – 11am)	Start: 1 June End: 10 August	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 Arduino Microcontrollers (Years 6 – 9)	Tuesday (1.20 – 2.30pm)	Start: 1 June End: 10 August	Electronic devices have become a necessity of living in the 21 st 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.
Skill Builder iSee Licence and Indigenous Seasons (Years 5 – 6)	Wednesday (1.20 – 2.30pm)	Start: 2 June End: 11 August	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.
Grand Challenge Cybersecurity (Years 5 – 9)	Thursday (8.45 – 9.50am)	Start: 3 June End: 12 August	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.
Skill Builder iSee Licence and Indigenous Seasons (Years 5 – 6)	Thursday (11.40am – 12.50pm)	Start: 3 June End: 12 August	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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Skill Builder iSee Licence and Computational Thinking (Years 5 – 6)	Thursday (1.20 – 2.30pm)	Start: 3 June End: 12 August	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 (Years 5 – 9)	Friday (9 – 10am)	Start: 4 June End: 13 August	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.
Grand Challenge Sense the World (Years 5 – 9)	Friday (9.50 – 11am)	Start: 4 June End: 13 August	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.
Grand Challenge Off The Grid (Years 5 – 9)	Friday (11.40 – 12.50pm)	Start: 4 June End: 13 August	We must move towards greater sustainability by reducing the impact of three issues: 1) fossil fuel depletion, 2) climate change due to CO ₂ emissions and 3) the increasing costs of energy and water. Students collaborate with experts from the local building industry, Townsville City Council and James Cook University to innovate solutions for sustainable housing in the Tropics. They explore sustainable design to increase the efficiency of buildings and reduce impacts on human health and the environment.

Course	Lesson Time	Course Dates	Course Context
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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: 16th June to 1st September, 1 lesson per week. Dates are different to QVSA (NQ) courses because of school holiday differences between jurisdictions.

<p>Grand Challenge Disaster Resilience for a Changing Climate (Years 5 – 9)</p>	<p>Wednesday (9.30 – 10.30am)</p>	<p>Start: 9 June End: 25 August</p>	<p>Resilience is a characteristic used to describe North Queenslanders, however, with climate extremes predicted to increase, how can we prepare for the future? Through collaboration with Townsville City Council, Red Cross, Qld Reconstruction Authority, Qld Fire and Emergency Services and James Cook University, students recognise and understand hazards and risks in the NQ/FNQ regions and develop resilience/community engagement strategies for staying safe, seeking help and helping others.</p>
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* Grand Challenge courses are subject to change

