STEM Horizons
for High Achievers

Year 6

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What is STEM?

STEM is an acronym for **Science, Technology, Engineering** and **Mathematics** practice and education.

Why STEM?

In the move towards a knowledge-based economy, a workforce of scientifically and technologically literate people is key.

In 2011-12, approximately 10.5% of the Australian workforce were directly employed in STEM-related occupations while 75% of the fastest growing occupations require STEM skills and knowledge.

"A renewed national focus on STEM is critical to ensuring that young Australians are equipped with the necessary STEM skills and knowledge that they will need to succeed".

State winner
Showcase Awards for Excellence in Schools
Showcase2017 Awards for Excellence in Schools
Queensland Government

STEM Horizons

Our passion is to provide extraordinary STEM experiences for students through a diverse range of unique opportunities. The STEM Horizons program for high achieving Year 6 students is the perfect opportunity to further enhance their knowledge and extend science learning beyond the classroom.

During the course of a school semester, students will complete 4 days of specialist activities at a range of locations including Griffith University and the waters of Moreton Bay. Activities are designed to be 'hands on' and provide opportunities to actively engage in higher order thinking and problem solving. Links to authentic 'real world' science further enhance engagement and connection with possible future careers.

Students will be working in small groups alongside peers from other schools with similar demonstrated interests and abilities in STEM subjects.

Schools are able to nominate identified students through an online registration process. For further information, please contact Darren Shepherd on 0414 597 209 or email dlshe0@eq.edu.au

Details of individual activities are provided in the pages that follow.

Activity 1

Science on the GO!:
Engineering Challenges

Do you have one of those inquisitive minds who is always interested in how things work and why?

If so, this day is definitely for you! The Griffith University Science on the GO! team will take students on a whirl wind tour of engineering disciplines, including civil, mechanical, electrical and software engineering. Students will undertake a variety of activities that will require them to apply new knowledge and skills to provide solutions to engineering challenges. During the day, students will work alongside University staff and students who have an in-depth knowledge of their chosen STEM fields.

About Science on the GO!

Science on the GO! is the premiere STEM outreach facilitator of Griffith University which proudly aims to provide dynamic and engaging science shows, events, and teaching resources for the benefit of both teachers and students. The Science on the GO! team is uniquely placed to provide access to Griffith University's innovative STEM facilities, resources and expertise.

Activity 2

Brisbane Urban Environmental Education Centre:
Rediscovering Dinosaurs

What were the physical characteristics of some of the dinosaurs? Were they suited to their environment? Why did they become extinct?

These and many other questions will be the focus of a scientific investigation that focuses on the Jurassic period. Scale replica models of dinosaurs and dinosaur remains will be used by students to enable them to determine the main families of dinosaurs, including those found in prehistoric Australia.

Students will then explore some of the factors which led to the disappearance of the dinosaurs and look at the implications of what has been discovered on the survival of species today. Students will also try to identify a dinosaur from skeletal remains and construct a representation of the life-sized creature.

About Brisbane Urban Environmental Education Centre

Brisbane Urban EEC is a Department of Education (DoE) facility located within the Newmarket State School Campus. The Centre focuses on urban environmental investigations – urban environments, urban planning and lifestyles, and sustainability – with the main curriculum links to the subject areas of Science, Geography, History and Media Arts.

Most centre programs involve field investigations in the inner and central city areas of Brisbane, or classroom activities at the centre at Newmarket.

Activity 3

Griffith University:
Robots Shaping Our Future Lives

They're already here – driving cars, vacuuming carpets, feeding hospital patients – and autonomous robots will be in our offices and homes within the next decade.

This technology focused workshop will introduce students to reactive software architecture and help them to understand how reactive robotics are helping to revolutionise the future of human environments. Students will be initiated into the language of programming before applying their new skills to develop NXT finite-state machines that use sensors to respond to an external stimulus.

Once these foundation skills have been mastered, students will progress to use graphical tools to organise on-board software that control the implementation of behaviour in more complex Aldebaran Nao Humanoid Robots. The activity will be led by Professor Vlad Estivill-Castro and Dr Andrew Rock whose expertise includes machine learning, pattern analysis and computational geometry and algorithms.

About Griffith University

Since opening its doors in 1975, Griffith University has grown to become Australia's ninth largest higher education provider, offering more than 300 degrees to in excess of 43,000 students from 131 countries. More specifically, the Nathan Campus is nestled among the natural backdrop of Toohey Forest.

Activity 4

Moreton Bay Environmental Education Centre:
Micro and Macro

If you are fascinated by the mysteries of the deep, then the Micro and Macro program on the waters of Moreton Bay – Quandamooka – is an absolute must.

The centre's vessel *Inspiration* will be the classroom for a day of scientific investigation and wonder.

Students will conduct plankton trawls to uncover the microscopic world that is the basis of all marine food chains and engage in underwater research via the Baited Remote Underwater Videos (BRUVs). Identification and classification of marine creatures will form the investigation of the links between the micro and the macro organisms of Moreton Bay. Unique experiences are assured as students work alongside scientists and post graduate students from the University of Queensland.

About Moreton Bay Environmental Education Centre

The centre is a Department of Education (DoE) facility located in Manly and is 'Inspiring Champions for the Bay' which is achieved through the provision of unique education experiences. The centre's 12 metre catamaran *Inspiration* enables students to experience the bay and venture to nearby surrounding islands to engage in authentic learning journeys using state-of-the-art scientific equipment.

Moreton Bay is recognised as wetlands of international significance under the Ramsar Wetland Convention. The centre is a Department of Education (DoE) facility located in Manly and is pleased to offer this range of experiences to students.

Notes