



# STEM Horizons

## for High Achievers

Year 9

### 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”.



Image: Ryan McVay. Copyright: © Photodisc.

## 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 9 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](mailto:dlshe0@eq.edu.au)

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

State winner

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Awards for Excellence in Schools



## Activity 1

# Moreton Bay Environmental Education Centre: The Mud is Alive

Microscopic benthic organisms are a vital link in the Moreton Bay ecosystem between mud and open water organisms.

Benthic grabs uncover the wonders of the seafloor as students engage in The Mud is Alive Program on beautiful Moreton Bay – Quandamooka.

The Centre's vessel *Inspiration* will be the classroom where students conduct benthic grabs and examine the data recorded by the Baited Remote Underwater Video (BRUV) on Moreton Bay.



### About Moreton Bay Environmental Education Centre

The centre is a Department of Education (DoE) facility located in Manly and 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.

## Activity 2

# Griffith University: Campus Scene Investigators

After discovering a mock murder scene, students will be appointed honorary "Campus Scene Investigators" for the day.

Scientific officers from the Queensland Police Service conduct a hands on examination with the students, collecting evidence using the same techniques employed in real life crime scenes.

Scientific skills are applied across a number of important forensic fields to process the physical evidence found at the scene. With the help of Griffith University experts, the evidence is then tested and analysed in University laboratories to determine the facts of the case.

Students conclude the day with a presentation of their findings.



### 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 Toohy Forest.

## Activity 3

# Griffith University: Soil Science + Analytical Chemistry



Students will undertake two laboratory activities which will require them to assume the role of an environmental scientist and analytical chemist.

One laboratory scenario will require students to investigate a number of soil and water samples – both of which are essential resources to the Australian environment and agricultural economy. A range of tests will be undertaken to determine soil and water quality and the resulting human applications as governed by environmental guidelines.

The second scenario requires students to enter the realm of analytical chemistry as it applies to food and pharmaceutical products. Students will examine some everyday products to determine their chemical composition and various concentrations, as well as comparative effectiveness between brands (e.g. sunscreens).

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## Activity 4

# Brisbane Urban Environmental Education Centre: Energy Transformations

This workshop will look at the different forms of energy and some of the processes (energy transformations) that are used to generate electricity, light and heat, for example, electromagnetic induction, electrochemical and photo chemical reactions and thermo-electric converters, solar thermal devices.



Students will also explore the environmental impacts of the different processes and investigate the energy efficiency of different types of electric lighting.

### 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.

