JCU Professional Development Workshop, Bebegu Yumba campus, Douglas Townsville

Friday, 25th November 2022

8.15am **Registration - The Science Place**

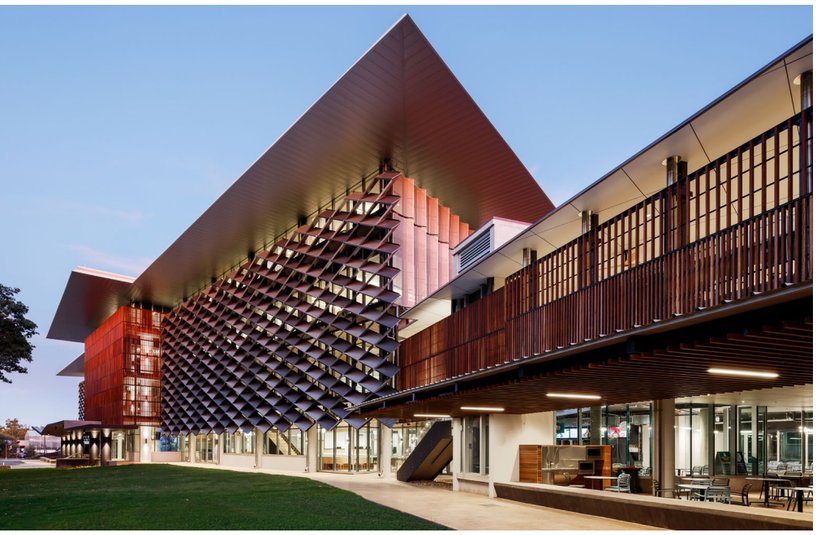
9.00am - 10.30am **Session 1**
Choose from one of the four workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Biology: Describing Biodiversity: Measures of species diversity Unit 3, Topic 1 in the QCAA (2019) senior biology syllabus examines methods used by scientists for "describing biodiversity". This workshop explores the specific subject matter from this Unit and Topic including measures of species diversity, species richness and species evenness. The workshop presenters will explain approaches commonly used by scientists to measure species diversity, including the Simpson's Diversity Index, specifically. In this workshop, you will analyse data using Microsoft Excel to calculate species richness (S) and Simpson's diversity index (D), so as to support teaching and learning associated with the Mandatory Practical for Topic 1.	**Environmental and Social Impacts: designing a better future** This session is designed as an engaging hands-on experience that directly integrates knowledge and understanding from numerous scientific disciplines in a holistic, applied real-world context. Reflecting an environmental and social impact assessment approach (ESIA), experts from the fields of geology, environmental sciences, earth sciences, ecology, and planning, will show how their research and data collectively contributes to planning and decision making. Using a local case study site, you will investigate relevant landscape characteristics, risk and natural hazards profiles, local ecosystems, GIS mapping and human/environmental interactions to plan and propose a safe and sustainable community development, complete with relevant infrastructure. This simple replicable exercise is a great way to demonstrate the invaluable role of science and geography in both informing and shaping the world around us.	**Exploring Design and Systems Thinking by doing a Project** In this fun hands-on session, teachers will be guided through a design project that incorporates Design and Systems Thinking and a number of related General Capabilities. Teachers will be given the opportunity to apply their knowledge and skills as they work through a design problem. As we will be utilising Project-based Learning pedagogy, all participants are likely to have to struggle their way out of the Learning Pit (Nottingham, 2017) while investigating and responding to an authentic, engaging, and complex question, problem, or challenge (PBLworks, 2021). The Design Process will be modelled and the assessment opportunities the activity presents will be discussed. Process over product will be emphasised.

10.30 - 11.00am Morning Tea

FREE EVENT

Please note attendance numbers will be limited by the venue capacity.



To register, visit:
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11.00am – 12.30pm **Session 2**
Choose from one of the four workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Chemistry: lets gel Gel electrophoresis is a technique used for separating proteins and nucleic acids. Proteins can carry a positive or negative charge and can therefore migrate under an applied electric field. When loaded in a gel, small molecules will move faster than large ones thus allowing separation based on their size. In this session the steps required to load, run and analyse proteins using gel electrophoresis will be explored.	**A photon checks in to a hotel...** The sometimes-wave-like and sometime-particle-like behaviour of light is one of the most puzzling, yet pivotal, concepts in both classical and modern physics. In this workshop, participants will take part in a series of simple, connected, and inexpensive demonstrations inspired by famous experiments in early quantum physics. For example, the photoelectric effect exploits the particle nature of light, while optical spectroscopy using diffraction gratings relies on the wave nature of light. Together, these can be used to determine the value of Planck's constant in the classroom, while serving as an excellent introduction to fundamental concepts in quantum physics. The workshop will link with the General Senior Syllabus on the topics of Quantum Theory, Waves, and Electrical Circuits.	**Opportunities to integrate numeracy into the Secondary HASS Curriculum (Geography)** In our presentation, we will offer up a reading of the ACARA Australian Geography Curriculum against the Numeracy General Capability, as a way of supporting teachers as they begin to plan for and think about the links between numeracy and geographic thinking. Specifically, we aim to focus on helping teachers make sense of how numeracy is framed in version nine of the Australian curriculum, and how to identify opportunities to link the components of the numeracy learning continuum to the Geography Content Descriptions and Elaborations. To illustrate the applications of this reading in the classroom, we will develop some examples of mappings, activities and/or accompanying resources to highlight possible ways of interpreting the Geography curriculum through a numeracy-focused lens. The broader goal is to support secondary teachers as they continue to think about how to integrate numeracy into their humanities and social sciences teaching and their critical capacities as numerate readers of curriculum.

12.30pm – 1.15pm Lunch

1.15pm – 2.45pm **Session 3**
Choose from one of the four workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Unpacking the statistics in working with uncertainty in senior science. The revised senior curriculum in the science disciplines that came into use in 2019 through the QCAA focuses on data analysis at a deeper level than its predecessor. Given that many of us came through higher education at a time when there was less emphasis on statistics this change has been one of the pressure points of the senior science subjects. In this session we will use the QCAA resources on the IA2 sample responses in physics, chemistry and biology as a stimulus for discussion on the underpinning ideas in working with measures of central tendency (mean, etc) and spread (range, standard deviation, etc). We will look to make links back to the appropriate parts of the junior maths classroom, in an effort to show the connections with topics the students will have experienced before getting to senior science. It is intended this refresher will clarify some of the assumptions implicit in the way the sample IA2 responses are written.	**Coding 101** Coding is the new "literacy" according to the Queensland Dept. of Education and Training. This session is a beginners' introduction to coding using the Arduino platform. An Arduino is a low-cost microcontroller that is ideal for building smart devices like sensors and robots. With the right accessories, you can use it in your science classroom for measuring temperature, humidity, light intensity, soil moisture, sound levels, voltages, and more. It's also a perfect platform for teaching coding, to prepare your students for the high-tech future. **Note:** a laptop will be required for this session.	**Indigenous texts in the curriculum** Text lists on the QCAA curriculum have been refreshed for 2022 to 2025. Teachers are often nervous about approaching texts written about Indigenous lives and characters or by Indigenous authors. This presentation will offer some strategies to build confidence around respectfully working with such texts.

2.45pm – 3.15pm **Afternoon tea and Close**

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