

**BREMER**  
STATE HIGH SCHOOL



# Bremer State High School

## Science Extension Pathway



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[bremershhs.eq.edu.au](http://bremershhs.eq.edu.au)



*We Believe. We Strive. We Achieve.*

ADDRESS: 133 -153 Warwick Road, Ipswich, QLD, 4305 POST: PO Box 23, Booval, QLD, 4304  
TELEPHONE: (07) 3810 9333 FACSIMILE: (07) 3812 9950 EMAIL: [info@bremershhs.eq.edu.au](mailto:info@bremershhs.eq.edu.au) [bremershhs.eq.edu.au](http://bremershhs.eq.edu.au)

NTIS Registered Training Organisation #30054

## **Rationale**

The Bremer State High School Science Extension Pathway aims to develop student knowledge and a deeper understanding of Science in today's scientific and technological age, while implementing skills in scientific investigative processes and critical thinking.

With the introduction of STEM into EQ legislation and the Australian Curriculum it is important to offer an academic pathway for our students in the Science and Maths fields that engages and challenges talented students, in contexts outside of the Australian Curriculum.

As society moves from a knowledge economy towards a thinking economy it is vital that students engage in developing skills in higher order thinking, critical thinking and creative thinking. Through this, students will have a better developed knowledge and understanding of scientific principles and how they influence the world around us.

## **Aims**

The Science Extension Pathway aims to:

- Provide high level, rigorous and tailored learning to motivate students to become talented critical and creative thinkers.
- Motivate and encourage students to reflect on world issues at a sophisticated level
- Engage students in competition and enrichment programs beyond the school curriculum

## **Program Information**

### *Entry requirements*

Applicant suitability will be determined using the following criteria:

- PAT-Science Test – Week 3, Term 3, Year 6
- Academic Results (Science, Maths and English)
- NAPLAN results (focus on Reading, Writing and Numeracy)
- Any other requirements specified by Bremer SHS (Primary School Reference, Interview etc.)

*NOTE: Entrance into the program is at the discretion of the Principal. Bremer SHS reserves all rights to determine entrance into the BSEP program.*

## Year 7 – 10 Science Program Overview

<b>Year 7 Science</b>		
<b>Curriculum</b>	<b>Differentiation</b>	<b>Enrichment</b>
<p>By the end of Year 7, students describe techniques to separate pure substances from mixtures. They represent and predict the effects of unbalanced forces, including Earth’s gravity, on motion. They explain how the relative positions of Earth, the sun and moon affect phenomena on Earth. They compare processes of rock formation, including the timescales involved. They explain global features and events in terms of geological processes and timescales. They analyse how biological systems function and respond to external changes with reference to interdependencies, energy transfers and flows of matter. They analyse how the sustainable use of resources depends on the way they are formed and cycle through Earth systems. They predict the effect of human and environmental changes on interactions between organisms and classify and organise diverse organisms based on observable differences. Students describe situations where scientific knowledge from different science disciplines and diverse cultures has been used to solve a real-world problem. They explain possible implications of the solution for different groups in society.</p> <p>Students identify questions that can be investigated scientifically. They plan fair experimental methods, identifying variables to be changed and measured. They select equipment that improves fairness and accuracy and describe how they considered safety. Students draw on evidence to support their conclusions. They summarise data from different sources, describe trends and refer to the quality of their data when suggesting improvements to their methods. They communicate their ideas, methods and findings using scientific language and appropriate representations.</p>	<p>Adjust content by using different methods of inquiry</p> <p>Adjust process by using open ended tasks</p> <p>Adjust product by using real world problem based learning</p> <p>Adjust environment by using a variety of learning spaces, including access to USQ Ipswich campus</p>	<p>Science and Engineering Challenge</p> <p>World Science Festival</p> <p>Maths Team Challenge</p>

## Year 8 Science

Curriculum	Differentiation	Enrichment
<p>By the end of Year 8, students compare physical and chemical changes and use the particle model to explain and predict the properties and behaviours of substances. They identify different forms of energy and describe how energy transfers and transformations cause change in simple systems. They analyse the relationship between structure and function at cell, organ and body system levels. Students examine the different science knowledge used in occupations. They explain how evidence has led to an improved understanding of a scientific idea and describe situations in which scientists collaborated to generate solutions to contemporary problems. They reflect on implications of these solutions for different groups in society.</p> <p>Students identify and construct questions and problems that they can investigate scientifically. They consider safety and ethics when planning investigations, including designing field or experimental methods. They identify variables to be changed, measured and controlled. Students construct representations of their data to reveal and analyse patterns and trends, and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their own scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate language and representations to communicate science ideas, methods and findings in a range of text types.</p>	<p>Adjust content by using different methods of inquiry</p> <p>Adjust process by using open ended tasks</p> <p>Adjust product by using real world problem based learning</p> <p>Adjust environment by using a variety of learning spaces, including access to USQ Ipswich campus</p>	<p>CREST Bronze Medallion</p> <p>Science and Engineering Challenge</p> <p>PICSE Competition</p> <p>World Science Festival</p> <p>Maths Team Challenge</p>

## Year 9 Science

Curriculum	Differentiation	Enrichment
<p>By the end of Year 9, students explain chemical processes and natural radioactivity in terms of atoms and energy transfers and describe examples of important chemical reactions. They describe models of energy transfer and apply these to explain phenomena. They describe social and technological factors that have influenced scientific developments and predict how future applications of science and technology may affect people's lives.</p> <p>Students design questions that can be investigated using a range of inquiry skills. They design methods that include the control and accurate measurement of variables and systematic collection of data and describe how they considered ethics and safety. They analyse trends in data, identify relationships between variables and reveal inconsistencies in results. They analyse their methods and the quality of their data, and explain specific actions to improve the quality of their evidence. They evaluate others' methods and explanations from a scientific perspective and use appropriate language and representations when communicating their findings and ideas to specific audiences.</p>	<p>Adjust content by using different methods of inquiry</p> <p>Adjust process by using open ended tasks</p> <p>Adjust product by using real world problem based learning</p> <p>Adjust environment by using a variety of learning spaces, including access to USQ Ipswich campus</p>	<p>Science and Engineering Challenge</p> <p>PICSE Competition</p> <p>World Science Festival</p> <p>CREST Silver Medallion</p>

## Year 10 Science

Curriculum	Differentiation	Enrichment
<p>By the end of Year 10, students analyse how the periodic table organises elements and use it to make predictions about the properties of elements. They explain how chemical reactions are used to produce particular products and how different factors influence the rate of reactions. They explain the concept of energy conservation and represent energy transfer and transformation within systems. They apply relationships between force, mass and acceleration to predict changes in the motion of objects. Students describe and analyse interactions and cycles within and between Earth’s spheres. They evaluate the evidence for scientific theories that explain the origin of the universe and the diversity of life on Earth. They explain the processes that underpin heredity and evolution. Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.</p> <p>Students develop questions and hypotheses and independently design and improve appropriate methods of investigation, including field work and laboratory experimentation. They explain how they have considered reliability, safety, fairness and ethical actions in their methods and identify where digital technologies can be used to enhance the quality of data. When analysing data, selecting evidence and developing and justifying conclusions, they identify alternative explanations for findings and explain any sources of uncertainty. Students evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, the quality of the methodology and the evidence cited. They construct evidence-based arguments and select appropriate representations and text types to communicate science ideas for specific purposes.</p>	<p>Adjust content by using different methods of inquiry</p> <p>Adjust process by using open ended tasks</p> <p>Adjust product by using real world problem based learning</p> <p>Adjust environment by using a variety of learning spaces, including access to USQ Ipswich campus</p>	<p>Science and Engineering Challenge</p> <p>PICSE Competition</p> <p>World Science Festival</p> <p>UQ Titration Competition</p>

## **Year 10 Science:**

A new elective is anticipated to be developed (commencing 2019) titled SCIENCE CREST GOLD to allow students who have completed the Crest bronze and silver medallions to complete the CSIRO Crest Gold Medallion with 100 hours of research and project work. These students will have to opportunity to submit their projects into the annual Rio Tinto Big Science Competition.

## **Assessment and Reporting**

The Science Extension Pathway is based on the principals of the Australian Curriculum and the Queensland Curriculum and Assessment Authority. Students will be given the opportunity to present alternative assessment in formats such as research reports.

## **Pathways**

It is anticipated that students will remain in the Science Extension Pathway for the duration of Years 7, 8, 9 and 10. Students will also have the opportunity to be in a Maths class where they will have access to extended learning experiences.

## **Costs**

Throughout the duration of the Extension Pathway, students will have the opportunity to participate in competitions and excursions that may attract an additional cost. This can include:

- World Science Festival
- Science and Engineering Challenge
- Crystal growing competition
- PICSE Competition
- Bridge Building Competition
- Maths Team Challenge
- Chemistry Competition
- Titration Competition

## **Expert Staff**

Teachers of the Science Extension Pathway are experienced Science and Maths specialists, with a commitment to talented and motivated students demonstrated through their:

- Training as a Gifted Education Mentor (GEM)
- Coordination of extra-curricular academic programs

## **Contact Details**

For further information concerning Bremer State High School's Science Extension Pathway please contact:

Name: Elizabeth Ricketts (BSEP Coordinator)

Name: Michelle Imhoff (HOD Science)

Phone: (07) 3810 9333

Email: [bsep@bremershs.eq.edu.au](mailto:bsep@bremershs.eq.edu.au)