 Construction Capers – 6M STEM

Stage 3 Term 2/3 2016

Big ideas/why does the learning matter?

Enable the local community access to recreational sites more efficiently.

Built Environments (BE) – students develop their understanding about places and spaces, and their uses. People create, construct and modify their surroundings for a wide range of purposes. The environments people build are an important part of our communities and culture.

Driving questions

How can we improve accessibility to recreational areas at Penrith Lakes?

Central syllabus ideas/concept

* Science – Built Environments, Technology Apps, Spread sheet, Graphs, ICT – Research – [Science (incorporating Science and Technology K-6) K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/science/science-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* Mathematics – Numeration, Measurement & Geometry – [Mathematics K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/mathematics/mathematics-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* Geography – Place – [Geography K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/hsie/geography-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2015
* English – Writing (Letter, Report, Explanation) – [English K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/english/english-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* Creative Arts – Design artwork – [Creative Arts K-6 Syllabus](http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/creative-arts/creative-arts-k-6-syllabus) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2006

Hook/entry event

Excursion to Nepean River and Penrith Lakes Scheme.

Possible experts

Penrith Lakes Management centre, Penrith City Council, Stuart Ayres (local MP), Bridge Companies, Local newspapers.

Audience

School Community – Years 3-6 and their families.

Culminating event

Invite students (3-6) and their families to an Open Day to view displays of student’s work.

Outcomes that could be covered

Mathematics

Length – MA3-9MG selects and uses the appropriate unit and device to measure lengths and distances, calculates perimeters, and converts between units of length

Addition and Subtraction – MA3-5NA selects and applies appropriate strategies for addition and subtraction with counting numbers of any size

Multiplication and Division – MA3-6NA selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation

Working Mathematically – MA3-2WM selects and applies appropriate problem- solving strategies, including the use of digital technologies, in undertaking investigations

Two-Dimensional Space – MA3-15MG manipulates, classifies and draws two- dimensional shapes, including equilateral, isosceles and scalene triangles, and describes their properties

Angles – MA3-16MG measures and constructs angles, and applies angle relationships to find unknown angles

Position – MA3-17MG locates and describes position on maps using a grid-reference system

Data – MA3-18SP uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables

English

EN3-6B – uses knowledge of sentence structure, grammar, punctuation and vocabulary to respond to and compose clear and cohesive texts in different media and technologies

EN3-2A – composes, edits and presents well-structured and coherent texts

EN3-3A – uses an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies

History

HT3-1 – describes and explains the significance of people, groups, places and events to the development of Australia

HT3-2 – describes and explains different experiences of people living in Australia over time

HT3-3 – identifies change and continuity and describes the causes and effects of change on Australian society

Science

ST3-5WT – plans and implements a design process, selecting a range of tools, equipment, materials and techniques to produce solutions that address the design criteria and identified constraints

ST3-13MW – describes how the properties of materials determine their use for specific purposes

ST3-14BE – describes systems in built environments and how social and environmental factors influence their design

Creative Arts

VAS3.1 – investigates subject matter in an attempt to represent likenesses of things in the world

* Closely observes details of things in the world and seeks to make artworks about these
* Utilises different artistic forms and explores how symbols may be used in their interpretation of selected subject matter
* Explores subject matter of personal and social interest from particular viewpoints including objects, events, places and spaces.

Open-ended assessment opportunities

Assessments integrated across KLAs.

Students develop knowledge and understanding of the Natural Environment and the Made Environment through the Material World

Students justify through their research and investigations their choice of structures. They describe how the properties of materials determine their use for specific purposes.

| Week | Task | Evidence to collect |
| --- | --- | --- |
| Pre | Explanation – why local residents need easier and wider access for recreation purposes | Not applicable |
| Midpoint | Projected activities   * learning journals – STEM learning journey incorporating all KLA areas * invite Aboriginal elders from the community to explain how the crossed waterways in the Penrith area in varying climatic conditions * research – environment, recreational activities * research and survey recreational requirements of the local community * students take iPads and cameras into the local community to investigate existing facilities * students develop graphs using Excel * writing – letters & reports to appropriate authorities * students use websites and interactive videos to view types of bridges * students use coordinates to find defined areas on a map * research – Students research designs of bridges * students sketch their choice of design * students use Excel to cost bridge designs to engineer and build prototypes * students use suitable equipment and materials to build bridges * students use maps to determine distance between areas * students develop QR codes, movies, Aurasmas to document their learning journey * students accurately observe, measure and record data, using digital technologies as appropriate * based on students investigations and discussions, students must make a bridge to suit a specific criteria * students document students journey on iMovie * an instructional PDF on how to build a bridge in a classroom exercise – <http://www.maa.org/sites/default/files/images/upload_library/4/vol6/Maring/BridgeActivity.pdf> | Project Based Learning  A systematic teaching that engages students in learning essentials; knowledge and life-enhancing skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and tasks.   * It starts with the questions or challenge * It is a student-centred activity * It requires critical thinking, collaboration and communication * It involves meaningful tasks * It is assessed on individual basis * learning journals * checklist if outcomes with successes recorded (emotives) * checklist – Six Thinking Hats (de Bono) * children monitor own success criteria against learning outcomes * writing samples (reports) * plans (sketches) * completed plans (drawings) * Aurasma – a website on creating and using augmented reality – <https://www.aurasma.com/> * QR codes * movies * build a working bridge that spans 50cm, is as light as possible and can support a designated weight (item at least 1kg) * New South Wales Department of Education Learning Tools Selector web application – <https://app.education.nsw.gov.au/learning-tools-selector/Search> |
| Post | Students are asked to explain the reasoning behind choices they made, their inquiry process, how they worked, what they learned, etc.  Emu Heights collaborative STEM Exhibition  Invite school community and media. | QR, Aurasma https://www.aurasma.com/presentation  displays  learning Journals |