

STEM Project Program of Learning (Part 1)

Inquiry Questions	Teaching and Learning Sequence (Science/Maths/Geography) <i>(See each unit of work for more details)</i>	Other Syllabus Links	Useful Resources
How do people use their local outside environments?	<p><u>Geography Learning Sequence 1</u></p> <ul style="list-style-type: none"> - photographing around the school - definition of 'natural features' - definition of 'landscape' - introduce term 'Geography' - formulating questions to solve problems - create a survey <p>Formative assessment:</p> <ul style="list-style-type: none"> -photographs -class/group discussions -questioning -survey answers 	<p>Maths - Data collection & interpretation</p> <p>ICT</p> <ul style="list-style-type: none"> - laptops - MS Office 365 - FORMS, -internet, -Class Notebook -ipads 	iPads, class Notebook file, Google app - FORMS
	<p><u>Geography Learning Sequence 2</u></p> <ul style="list-style-type: none"> -discussion of data collected from previous Geography lesson -sorting data and graphing data collected -exploration of Australian landscapes 	<p><u>Maths</u></p> <ul style="list-style-type: none"> - Data collection & interpretation - sorting & graphing 	

<p><u>Plants in Action 1</u></p> <ul style="list-style-type: none"> -develop <u>KWL</u> - plant life cycle overview -arrange pictures to represent the life cycle of flowering plants -create a list of plant words to develop a vocabulary word wall -discuss students' ideas and questions for a <u>KWL</u> chart -develop a science journal entry <p>Diagnostic Assessment:</p> <ul style="list-style-type: none"> -KWL <p>Formative Assessment:</p> <ul style="list-style-type: none"> -Plant Life stages jumble (Resource sheet 1) -Plant life cycle diagram/explanation -Labelling - looking at the root, stem, leaves, fruit (Resource sheet 2) -STEM Journal notations 	<ul style="list-style-type: none"> -Cycles -Word wall -STEM Journal 	
<p><u>Plant a broadbean early in the Semester</u></p> <ul style="list-style-type: none"> -make weekly observations over the Semester <p>Formative assessment:</p> <ul style="list-style-type: none"> -photographs -timeline 	<p><u>Maths</u></p> <ul style="list-style-type: none"> -measurement/timeline of broad bean growth 	
<p><u>Plants in Action 1 Garden Buddy Option Activity - HOMEWORK</u></p> <ul style="list-style-type: none"> -Students to survey the types of plants in their garden and annotate reasons for those plants ie. planted for food, cultural, preference (beauty, smells nice, needed plant for shady area), native, other (they were there when we moved in) 	<p><u>Art Activity</u> Jen B resource</p>	<p>'Information note for families' (Resource sheet 3)</p>

	<p>-observe, record and report on plants growing in their garden and the jobs and activities done in the garden. -write about and draw their observations.</p> <p>Post Homework Task <u>How different plants grow in different environments</u> (our gardens as examples) -compare & contrast different students garden -brainstorm/mind map/compare & contrast writing</p> <p>Formative Assessment: -survey -discussions -annotations</p>	<p>Maths -measurement - length & area of students' gardens -draw to scale using graph paper -2D/3D pictorial representations of their gardens (including use of angles??)</p>	<p>'Garden Buddy's visit task list' (Resource sheet 3)</p>

AT END

Some suggested literacy resources:	
Nadia Wheatley Playground	Factual, Picture book, Australian, Insights into Aboriginal experiences in Australia
Alison Lester and Coral Tullock One Small Island: The Story of Macquarie Island	Factual, Picture book, Australian, Aspects of environmental and social sustainability
Stephanie Owen Reed Lost, A True Tale from the Bush	Factual, Australian, Aspects of environmental and social sustainability - 1860s
Yalata and Oak Valley Communities with Christobel Mattingley <i>Maralinga: The Anangu Story</i>	Picture book, Australian, Insights into Aboriginal experiences in Australia, Aspects of environmental and social sustainability
Shaun Tan Tales from outer suburbia	
John Heffernan	

Two summers	
Ruthie May and Leigh Hobbs <i>Stew a Cockatoo: My Aussie Cookbook -</i>	Factual, Australian
Kylie Dunstan Collecting Colour	Factual, Australian, Insights into Aboriginal experiences in Australia
Dianne Lucus Walking through the seasons in Kakadu	

Vocabulary

Time 1 - time, clock, analog, digital, hour hand, minute hand, **second hand**, **revolution**, numeral, hour, minute, second, o'clock, **(minutes) past**, **(minutes) to**

Time 2 - calendar, date, **timetable**, **timeline**, time, hour, minute, second, **midday**, **noon**, **midnight**, **am (notation)**, **pm (notation)**

Data 1 - information, data, collect, category, display, symbol, list, table, **column graph**, picture graph, **vertical columns**, **horizontal bars**, equal spacing, **title**, key, **vertical axis**, **horizontal axis**, **axes**, **spreadsheet**

Data 2 data, collect, **survey**, **recording sheet**, **rating scale**, category, display, symbol, tally mark, table, column graph, picture graph, vertical columns, horizontal bars, **scale**, equal spacing, title, key, vertical axis, horizontal axis, axes, spreadsheet, **misleading**

Length 1 length, distance, metre, centimetre, **millimetre, ruler**, measure, estimate, handspan

Length 2 length, distance, metre, centimetre, millimetre, ruler, **tape measure, trundle wheel**, measure, estimate, **perimeter, height, width, temperature, cold, warm, hot, degree (Celsius), thermometer**

Area 1 area, surface, measure, grid, row, column, **square centimetre, square metre**, estimate

Area 2 area, **irregular area**, measure, grid, row, column, parts of (units), square centimetre, square metre, estimate

Multiplication & Division 1 group, row, column, **horizontal, vertical**, array, **multiply, multiplied**

by, multiplication, multiplication facts, double, shared between, **divide, divided by, division, equals, strategy, digit**, number chart

Multiplication & Division 2 multiply, multiplied by, **product**, multiplication, multiplication facts, **tens, ones**,

double, **multiple, factor**, shared between, divide, divided by, division, **halve, remainder**, equals, is the same as, strategy, digit

STEM Project Program of Learning (Part 2)

Inquiry Questions	Teaching and Learning Sequence (Science/Maths/Geography) <i>(See each unit of work for more details)</i>	Other Syllabus Links	Useful Resources
How Do different views about the environment influence approaches to sustainability?	<p><u>ICT Lesson 1</u></p> <ul style="list-style-type: none"> - Refer back to the list of landscapes you identified in previous geography learning - How can I look at these landscapes using ICT? - Lead discussion about to use Google images to find out what landscapes in Australia look like - Google Australian landscapes - Is there a way I can identify each landscape separately, using one search and highlight more easily? - Look at Google Image colour search (best on PC, only new to iPad) change colour EG - green to find rainforests and bush pictures - What colours for other landscapes? - Add any you don't already have to your list 		<p>ICT</p> <p>Google Image (colour search)</p>
	<p><u>Homework Task</u></p> <ul style="list-style-type: none"> - Find a picture no bigger than 6 x 4in or 10 x 15cm (photo size) of a chosen landscape. Required before next Geography lesson begins. - For maximum effect in next lesson, encourage students to bring in multiple copies of similar chosen landscape images 		

<p><u>Geography Learning Sequence 3</u></p> <ul style="list-style-type: none"> - Where in Australia can I find an additional landscape? - mapping Australian landscapes researched - use pictures collected and create a map of Australia with the class to indicate where these landscapes are found. - How do we find out where these types of landscapes are in Australia? - Discuss ways to find information including looking at maps in atlases and image searches on the Internet. - Complete landscape study sheet for justification - Allow access to resources as needed - Once position is justified, picture can be added to the map. <p>Additional Activity</p> <ul style="list-style-type: none"> - Identify different natural vegetation (forests, grasslands & deserts). What different natural vegetation do we have at BHNPS? Venn diagram, table, pictures, photograph - see unit of work. Make note of Aboriginal names of plants (word wall in Plants in Action p73). Look at maps (Australia, NSW, local) <p>Formative Assessment</p> <ul style="list-style-type: none"> - Justification and reasoning of landscape/s - Venn Diagram, Table, pictures or photographs (dependent on presentation choice) - Identification and association of Aboriginal names 	<p>Visual Arts</p>	<p>ICT</p> <p>Maps/Atlases Ruthie May and Leigh Hobbs - <i>Stew a Cockatoo: My Aussie Cookbook</i> - Factual Australian</p>
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Geography Learning Sequence 4

- different vegetations in different landscapes - purposes/uses
- What inquiry question can we propose to solve the problem and what do we need to do to collect information. (What vegetation exists in different environments?)
- Write down questions in books or in Notebook and discuss as necessary/briefly
- In groups, use ICT resources to investigate what vegetation exists in the different landscapes, why those certain types exist there and what they think it's purpose would be - EG habitat, production of oxygen, sustainability, food, medicine, building materials
- Allocate groups different landscapes to work on, they will then be the experts in that area.
- Present findings to the class
- Audience to take summary notes about each presentation (vary, depending on student ability - between 2-5)

- Using the knowledge you have researched and gained so far, determine which vegetation would be most appropriate for the landscape at BHNPS. Why would these be your choices?

Homework Task - Complete MS Form or Google Form about the most important landscapes

Formative Assessment

- Questions

Maps

Stephanie Owen Reed
- Lost, A True Tale from the Bush - Factual, Australian, Aspects of environmental and social sustainability - 1860s

<ul style="list-style-type: none"> - Communication and collaboration - Landscapes research - Notetaking - 		
<p><u>ICT Lesson 2 (Option)</u></p> <ul style="list-style-type: none"> - Seasonal Calendars - ATSI link - http://www.bom.gov.au/ - Look at the BOM site, search for the -Indigenous Weather Knowledge link. Allow them to search first (bottom right corner of home page) - IWK link direct http://www.bom.gov.au/iwk/?ref=ftr - Discuss and learn about Indigenous calendars and seasons in comparison to European versions. - Students can work in groups to investigate different indigenous calendars and seasons and compare <p>Formative Assessment</p> <ul style="list-style-type: none"> - Navigation and research skills - Collaborative learning - Cultural appreciation and understanding 	<p>Maths</p> <ul style="list-style-type: none"> - Time <p>ATSI</p>	
<p><u>EAL/D Add On</u></p> <ul style="list-style-type: none"> - DIFFERENT ENVIRONMENTS - native gardens in Australia compared to a country in Asia, (climate, vegetation, animals) research task, speech - Cultural perspectives with links to Asia - Use skills developed in previous lessons to research in groups, a particular Asian region. EG China 	<p>EAL/D Support</p>	<p>ICT</p> <p>Maps/Atlases</p>

	Formative Assessment <ul style="list-style-type: none">- Presentation of task (student option or types - speech, PPT, Poster, Diagrams etc)- Reinforcement of acquired skills from previous learning		

STEM Project Program of Learning (Part 3)

Inquiry Questions	Teaching and Learning Sequence (Science/Maths/Geography) <i>(See each unit of work for more details)</i>	Other Syllabus Links	Useful Resources
How do plants grow? How do new plants occur/start? What do plants need to grow?	<u>Science Unit - Plants in Action - Lessons 3 & 6</u> - Plant a broad bean seed (Brad to source seeds/cups) in a clear plastic cup with a paper towel. Make routine observations on the germination process - collect data, discuss, photos (Lesson 3). - Draw a labelled diagram: learn how to draw a scientific diagram - Create a timeline of germination p51 Lesson 6 (Patterns in plants)	Maths - data, timelines ICT	Various library books have broad bean seed diagrams etc. as well as other germination examples. ICT option - ReadWriteThink: timeline maker
	<u>Science Unit - Plants in Action - Lesson 2, 4 & 5</u> - Cut open and examine a seed (Lesson 2). What are the parts of a seed? - draw a labelled diagram. - Investigate how plants pollinate (Lesson 4). - Investigate the stages in the life of a plant and the process of flowers to fruits to seeds (Lesson 5). Draw cross-sections of fruits.	Maths - data, timelines	David Attenborough: 'Life of Plants' DVD Students bring in fruits.
	<u>Plants In Action Activity 7</u> - investigate conditions for plant growth - plant birdseed/alfalfa seeds (Brad to source). What do plants need? (Fair test)		Nursery excursion
	<u>Geography Learning Sequence 5</u> - background on food - How do people use food?	Plants in Action lessons 4,5,6 Discussion contributions Completion of table	

	<p><u>Geography Learning Sequence 6</u> -Origins of food (mapping)</p> <p><u>Geography Learning Sequence 7 (Have done this in History Semester 1)</u> -Habitats - compare & contrast habitats pre & post Australian colonisation</p> <p><u>Assessment</u> Discussion contributions Completion of table Mapping task Mind map \Visual representation in books</p>	<p>Plants in Action lessons 4,5,6 Maps</p> <p>History ICT STEM Project LS 1</p>	<p>Yalata and Oak Valley Communities with Christobel Mattingley - <i>Maralinga: The Anangu Story</i> - Picture book, Australian, Insights into Aboriginal experiences in Australia, Aspects of environmental and social sustainability</p>
<p>spaces at school for? What spaces aren't we using /would be a good place to plant a garden?</p>	<p><u>STEM Project Learning Sequence</u> - can complete this session at any time during the above activities where relevant and when your students are ready -use photographs already taken or walk around playground, photographing the natural environment with view to the key inquiry focus. Discussion - what spaces have we got here at BHNPS? What are the spaces currently used for? What do they currently look like? How can we improve these spaces? Take some data/survey.</p>	<p>Maths - Data collection & interpretation</p> <p>ICT</p>	

Collate and discuss findings.		
<u>Geography Learning Sequence 8/9/10</u> -Habitats in BHNPS Playground -collage - BHNPS Habitats in the PG	STEM Project LS	Shaun Tan - <i>Tales from Outer Suburbia</i>
<u>Maths - OPTIONAL EXTRA DURING SEMESTER</u> Data collection - survey the pattern of sunlight as a time lapse (ongoing - beginning Term 3, end Term 3, Mid Term 4). Photograph shadows of 1 part of the playground and plot against time. -use as on-going discussion about changes observed. -Will link to a later lesson	Maths - Data collection & interpretation	
<u>Beneath Our Feet Activity 1 & 2 What's in Soil?</u> Brad to get soil & students to source 1 sample from home (labelled). -experiments about layers in soil. -make comparisons between soil samples, discuss, draw conclusions, tables, diagrams, photograph - take samples from around the school and test using the 4 senses (no taste) -look at maps (Australia, NSW, local, Indigenous) -What type of natural vegetation and natural resources are important to people and why? What type of farming is done where and why? NSW, Australia -Macadamias, finger limes, kangaroo meat, crocodile, lemon myrtle, bush tomatoes - research bush tucker foods that are becoming more popular		John Heffernan - <i>Two Summers</i>

	<u>Beneath Our Feet Activities 3/4/5</u> -rocks investigation -landscapes changing over time (mountains etc.)	Reflection - can use digital versions eg: SWAY	
	<u>Beneath Our Feet Activities 7 & 6</u> -landscapes forming over time -erosion		
	<u>Evaluate - Meticulous Maps - Beneath our Feet Lesson 8</u> Change over time - mapping Homework: Project - model building (T4 Wks 5 - 9)	Measurement - length, area, scale, angles, 2D and multi/division	
	<u>Assessment</u> Data collection Photographing Discussion contributions Visual representation as collage Mind map Developing questions / proposal Dot points / mind map		
Culminating Event 6 th December	<u>Showcase</u> - invite students, parents, community contributors, newspaper etc. Students present their garden designs.		

STEM Outcomes Overview

English	Maths	Science	Geography
<p>communicates in a range of informal and formal contexts by adopting a range of roles in group, classroom, school and community contexts</p> <p><u>EN2-1A</u></p>	<p>uses appropriate terminology to describe, and symbols to represent, mathematical ideas</p> <p><u>MA2-1WM</u></p>	<p>shows interest in and enthusiasm for science and technology, responding to their curiosity, questions and perceived needs, wants and opportunities</p> <p><u>ST2-1VA</u></p>	<p>examines features and characteristics of places and environments</p> <p><u>GE2-1</u></p>
<p>plans, composes and reviews a range of texts that are more demanding in terms of topic, audience and language</p> <p><u>EN2-2A</u></p>	<p>selects and uses appropriate mental or written strategies, or technology, to solve problems</p> <p><u>MA2-2WM</u></p>	<p>demonstrates a willingness to engage responsibly with local, national and global issues relevant to their lives, and to shaping sustainable futures</p> <p><u>ST2-2VA</u></p>	<p>describes the ways people, places and environments interact</p> <p><u>GE2-2</u></p>
<p>uses effective handwriting and publishes texts using digital technologies</p> <p><u>EN2-3A</u></p>	<p>checks the accuracy of a statement and explains the reasoning used</p> <p><u>MA2-3WM</u></p>	<p>develops informed attitudes about the current and future use and influence of science and technology based on reason</p> <p><u>ST2-3VA</u></p>	<p>examines differing perceptions about the management of places and environments</p> <p><u>GE2-3</u></p>
<p>uses an increasing range of skills, strategies and knowledge to fluently read, view and comprehend a range of texts on increasingly challenging topics in different media and technologies</p> <p><u>EN2-4A</u></p>	<p>applies place value to order, read and represent numbers of up to five digits</p> <p><u>MA2-4NA</u></p>	<p>investigates their questions and predictions by analysing collected data, suggesting explanations for their findings, and communicating and reflecting on the processes undertaken</p> <p><u>ST2-4WS</u></p>	<p>acquires and communicates geographical information using geographical tools for inquiry</p> <p><u>GE2-4</u></p>
<p>uses a range of strategies, including knowledge of letter–sound correspondences and common letter patterns, to spell familiar and some unfamiliar words</p> <p><u>EN2-5A</u></p>	<p>uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers</p> <p><u>MA2-5NA</u></p>	<p>applies a design process and uses a range of tools, equipment, materials and techniques to produce solutions that address specific design criteria</p> <p><u>ST2-5WT</u></p>	
<p>identifies the effect of purpose and audience on spoken texts, distinguishes between different forms of English and identifies organisational patterns and features</p> <p><u>EN2-6B</u></p>	<p>uses mental and informal written strategies for multiplication and division</p> <p><u>MA2-6NA</u></p>	<p>identifies ways heat is produced and that heat moves from one object to another</p> <p><u>ST2-6PW</u></p>	
<p>identifies and uses language forms and features in their own writing appropriate to a range of purposes, audiences and contexts</p> <p><u>EN2-7B</u></p>	<p>represents, models and compares commonly used fractions and decimals</p> <p><u>MA2-7NA</u></p>	<p>describes everyday interactions between objects that result from contact and non-contact forces</p> <p><u>ST2-7PW</u></p>	

<p>identifies and compares different kinds of texts when reading and viewing and shows an understanding of purpose, audience and subject matter</p> <p><u>EN2-8B</u></p>	<p>generalises properties of odd and even numbers, generates number patterns, and completes simple number sentences by calculating missing values</p> <p><u>MA2-8NA</u></p>	<p>describes some observable changes over time on the Earth's surface that result from natural processes and human activity</p> <p><u>ST2-8ES</u></p>	
<p>uses effective and accurate sentence structure, grammatical features, punctuation conventions and vocabulary relevant to the type of text when responding to and composing texts</p> <p><u>EN2-9B</u></p>	<p>measures, records, compares and estimates lengths, distances and perimeters in metres, centimetres and millimetres, and measures, compares and records temperatures</p> <p><u>MA2-9MG</u></p>	<p>describes how relationships between the sun and the Earth cause regular changes</p> <p><u>ST2-9ES</u></p>	
<p>thinks imaginatively, creatively and interpretively about information, ideas and texts when responding to and composing texts</p> <p><u>EN2-10C</u></p>	<p>measures, records, compares and estimates areas using square centimetres and square metres</p> <p><u>MA2-10MG</u></p>	<p>describes that living things have life cycles, can be distinguished from non-living things and grouped, based on their observable features</p> <p><u>ST2-10LW</u></p>	
<p>responds to and composes a range of texts that express viewpoints of the world similar to and different from their own</p> <p><u>EN2-11D</u></p>	<p>measures, records, compares and estimates volumes and capacities using litres, millilitres and cubic centimetres</p> <p><u>MA2-11MG</u></p>	<p>describes ways that science knowledge helps people understand the effect of their actions on the environment and on the survival of living things</p> <p><u>ST2-11LW</u></p>	
<p>recognises and uses an increasing range of strategies to reflect on their own and others' learning</p> <p><u>EN2-12E</u></p>	<p>measures, records, compares and estimates the masses of objects using kilograms and grams</p> <p><u>MA2-12MG</u></p>	<p>identifies that adding or removing heat causes a change of state between solids and liquids</p> <p><u>ST2-12MW</u></p>	
	<p>reads and records time in one-minute intervals and converts between hours, minutes and seconds</p> <p><u>MA2-13MG</u></p>	<p>identifies the physical properties of natural and processed materials, and how these properties influence their use</p> <p><u>ST2-13MW</u></p>	
	<p>makes, compares, sketches and names three-dimensional objects, including prisms, pyramids, cylinders, cones and spheres, and describes their features</p> <p><u>MA2-14MG</u></p>	<p>describes how people interact within built environments and the factors considered in their design and construction</p> <p><u>ST2-14BE</u></p>	
	<p>manipulates, identifies and sketches two-dimensional shapes, including special quadrilaterals, and describes their features</p>	<p>describes ways that information solutions are designed and produced, and factors to consider when people use and interact with information sources and technologies</p>	

	<u>MA2-15MG</u>	<u>ST2-15I</u>	
	identifies, describes, compares and classifies angles <u>MA2-16MG</u>	describes how products are designed and produced, and the ways people use them <u>ST2-16P</u>	
	uses simple maps and grids to represent position and follow routes, including using compass directions <u>MA2-17MG</u>		
	selects appropriate methods to collect data, and constructs, compares, interprets and evaluates data displays, including tables, picture graphs and column graphs <u>MA2-18SP</u>		
	describes and compares chance events in social and experimental contexts <u>MA2-19SP</u>		