Shell Cove Public School

Science and Technology Scope & Sequence

Stage Three

Science EVEN Year			Stage 3	
	Outcomes + Thinking Skills	**Inquiry Questions**	**Content + Unit**	**Assessment**
1	- **ST3-4LW-S -** Examines how the environment affects the growth, survival and adaptation of living things Working Scientifically - **ST3-1WS-S** - Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions • Questioning and predicating • Planning and conducting investigations • Processing and analysing - Scientific Thinking – SciT - Computational Thinking	- How do physical conditions affect the survival of livingthings? - How do the structural and behavioural features of living things support survival?	**Living World** Primary Connections Unit - Desert Survivors - Plans and conducts a fair test to show the conditions needed for a particular plant or animal to grow and survive in its environment. - Describes how changing physical conditions in the environment affect the growth and survival of living things, for example: – Aboriginal Peoples' use of fire - stick farming – temperature of water in aquatic environments - Describes adaptations as existing structures or behaviours that enable living things to survive in their environment. - Describes the structural and/or behavioural features of some native Australian animals and plants and why they are considered to be adaptations.	- Week 3 Pre-Test - Week 10 Post-Test **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit.
2	- **ST3-10ES-S** - Explains regular events in the solar system and geological events on the Earth's surface Working Scientifically - **ST3-1WS-S** - Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions • Processing and analysing data • Communicating - Scientific Thinking – SciT - Systems Thinking- SysT - Design Thinking – DesT	- How do sudden geological changes and extreme weather events affect the Earth's surface?	**Earth and Space** Primary Connections Unit: Earthquake Explorers - Investigates the effects of sudden geological changes and extreme weather events on the Earth's surface, for example: – earthquakes, volcanic eruptions, tsunamis, cyclones, storms, drought and floods - Investigates ways that advances in science and technology have assisted people to plan for and manage natural disasters to minimise their effect, for example: –design and construction of buildings and roads – detection systems for tsunamis –digital flood and fire warning systems	- Week 1 Pre-Test - Week 5 Post-Test (Reports) - Week 10 **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit.

Working Scientifically			
	Term 1 and Term 2 - Constructs and uses a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data. - Employs appropriate technologies to represent data.		
All	**ST3-2DP-T** **ST3-3DP-T** **ST3-11DI-T**	Digital Technologies Design Production and Technology Skills and Understanding	**See Computer Technology Scope and Sequence**

Science EVEN Year			Stage 3	
	Outcomes + Thinking Skills	**Inquiry Questions**	**Content + Unit**	**Assessment**
3	- **ST3-6MW-S -** Explains the effect of heat on the properties and behaviour of materials. Working Scientifically - **ST3-1-WS-S** - Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions • Questioning and predicating • Planning and conducting investigations • Processing and analysing - Scientific Thinking- SciT - Computational thinking- ComT	- How can the state of materials be changed and manipulated? - What is the result of combining materials?	**Material World** Unit: Change Detectives - Explores that when materials are combined, such as salt and water or bicarbonate of soda and vinegar, the result is either a mixture or a new substance. - Identifies that mixtures can be separated using different techniques. - Investigates and compares the properties of solids, liquids and gases.	- Week 1 Pre-Test - Week 10 **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit.
4	- **ST3-8PW-ST -** Describes the characteristics and effects of common forms of energy, such as light and heat Working Scientifically - **ST3-1WS-S -** Questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations. • Planning and Conducting Investigations • Processing and Analysing data - Scientific Thinking- SciT	- How do heat, light and electrical energy make thingshappen?	**Physical World** Unit: Circuit + Switches - Identifies different types of energy transformations including: gravitational energy to energy of movement, heat energy to light energy. - Investigates how electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources. - Describes examples where light, sound, heat and electrical energy transform from one type of energy to another, for example: – a toaster transforms electrical energy into heat energy– a microphone transforms sound energy into electrical energy– a solar panel transforms light energy into electrical energy. - Designs, tests and evaluates a product or system that involves an energy transformation to meet an identified need using electrical energy.	- Week 1 Pre-Test - Week 5 Post-Test (Reports) **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit.

Working Scientifically			
	Term 3 and Term 4 - Compares data with predictions. - Communicates ideas, explanations and processes, using scientific representations including multimodal forms.		
All	**ST3-2DP-T** **ST3-3DP-T** **ST3-11DI-T**	Digital Technologies Design Production and Technology Skills and Understanding	**See Computer Technology Scope and Sequence**

Technology + STEM EVEN Year			**Stage 3**	
	Outcomes + Thinking Skills	**Inquiry Questions + Links**	**Unit + Content**	**Assessment**
1	- **ST3-11DI-T -** explains how digital systems represent data, connect together to form networks and transmit data - Scientific Thinking – SciT - Systems Thinking – Sys-T - Computational Thinking – Com-T	- How do the components of digital systems connect together to form networks? - Authentic Link to Living World - Garden to entice animals	**Unit – Connecting Digital Components** - Explores how the main components of digital systems connect together to form networks that transmit data. - Investigates internal and external components of digital systems that perform functions. - Explores how the main components of digital systems connect together to form networks that transmit data (ACTDIK014)	- Week 3: Pre-test - Week 10: Post-test **Ongoing** - Photos or work samples - Evidence of learning against goals - Diagnostic checklist – ICT Skills) Links to outside agencies - UOW Education Students - Young Einstein Day Whole School Event
2	- **ST3-3DP-T -** defines problems, and designs, modifies and follows algorithms to develop solutions - Scientific Thinking – SciT - Design Thinking – DesT - Systems Thinking – Sys-T - Computational Thinking – Com-T	- How do we represent decision-making in an algorithm? - Authentic Link to Earth and Space – Earthquakes and disasters why?	**Unit – To be written** - Develops, records and communicates design ideas, decisions and processes units in appropriate technical terms. - Designs, modifies and follows simple algorithms. - Extends sequences of steps to provide a series of possibilities through branching. - Develops solutions through trialling and redefining using iterations.	- Week 1 Pre-test - Week 5 Mid-test (Reports) - Week 10 Post-test **Ongoing** - Photos or worksamples - Evidence of learning against goals - Diagnostic checklist – ICT Skills) Links to outside agencies - STEM Share – Augmented Reality Space Kit

3	- **ST3-2DP-T -** plans and uses materials, tools and equipment to develop solutions for a need or opportunity - Scientific Thinking – SciT - Design Thinking – DesT - Computational Thinking – Com-T	- How can we make and design to solve a real world problem? - Authentic Link to Material World – Mixtures	**Unit – Real World Problems** - Examines and critiques needs, opportunities or modifications using a range of criteria to define a project. - Examines and determines functional requirements to define a problem. - Identifies, organises and performs strategic roles within a group to solve a problem. - Manages projects within time constraints.	- Week 1 Pre-test - Week 10 Post-test **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit. Links to outside agencies/competitions - Aeroplane Jelly Competition - Sculptures @ Killalea - Azarak's Experimental Kitchen
4	- **ST3-11DI-T -** explains how digital systems represent data, connect together to form networks and transmit data - Scientific Thinking – SciT - Design Thinking – DesT - Systems Thinking – Sys-T - Computational Thinking – Com-T	- How do the components of digital systems connect together to form networks? - Authentic Link to Physical World - Circuits and Switches – How can we assist the Elderly?	**Unit – Representing Images Using Binary** - Collects, stores and interprets different types of data. - Uses sensors to collect data. - Uses software to interpret and visualise data.	- Week 1 Pre-test - Week 5 Mid-test (Reports) **Phase/Assessment Focus:** - Engage- Diagnostic - Explore/ Explain – Formative - Elaborate – Summative of Science Inquiry Skills - Evaluate - Summative of Science Understanding - See specific details in the unit. Links to outside agencies/competitions - Film Making - UOW Science Fair

Stage Three Learning Continuum

A huge thankyou to Glenys Goffet and Steph Westwood for these pages.

Managing/Operating	Stage 3	
Identify technology equipment	5	6
Keyboard & Mouse		
Monitor		
Printer		
Hard Drive		
Data Projector/IWB		
Laptop		
Digital Camera		
iPad		
Internal Components *(RAM/CPU etc)*		
Care & use of tech. equipment	5	6
Move mouse		
Click & double click mouse		
Identify letters on the keyboard		
Select & move objects		
Use special keys - enter/space bar		
Manage files – name/save/open/delete		
Turn computer on/off		
Correct posture		
Access & exit software/apps		
Print files		
Select a printer		
Understand terms	5	6
Cursor		
Software/Hardware		
Internet		
Menu		
Open/Close program or app		
Login & Password		
Tool bar/scroll bar		
Cell, Row, Column		
Save/save as		
Database	r	
Spreadsheet		
Software Skills	5	6
Locate software/app		
Select/Open/Close		

Investigating	Stage 3	
Using the internet	5	6
Open browser		
Find a specific location		
Use "back, forward, home, close & refresh."		
Completes a search using key words		
Explores features of web page hyperlink		
Broaden/narrow search		
Uses a bookmark or favourite		
Uses history		
Understands parts of a url		
Evaluate information useful/credible/accurate	r	
Cites sources in a bibliography	r	
Using the school domain	5	6
Log in to computer		
Find a specific programme		
Open; close; minimise; maximise		
Changes Portal password		
Uses Portal for simple email		
Using email	5	6
Open portal		
Open mail program		
Compose & send an email (with help)		
Read an email		
Reply to an email		
Forward an email		
Print an email		
Add an attachment		
Know email address		
Use address book		
Delete emails		
Empty trash		

Ethics/Cybersafety	Stage 3	
Shows appropriate ethical conduct	5	6
Follows school computer policy		
Use "safe" habits when using technology to ensure personal safety and security of private information		
Discuss & establish "safe" habits when using technology to ensure personal safety and security of private information	r	r
Uses computer based technologies appropriately		
Uses computer netiquette		
Awareness of copyright laws & obligations		
Well being	5	6
Correct posture	r	r
Holding mouse		
Careful use of equipment		
Eye distance from screen,		
Taking a break		
Examines the use of computers in society	5	6
Can identify where computers are being used		
Can identify how computers affect their way of life		
Examines online security; safety of information; hacking; viruses etc	i	r
Examines privacy & safety	5	6
Keeping passwords safe		
Use of computers/internet		
Privacy & safety concerns		
Avatars & aliases		
Social network sites	r	

Creating -Multimedia	Stage 3	
(using software/iPad/Wacom/online programs)		
Use a paint/draw program	5	6
Identify tool bar		
Use tools e.g. fill, brush, pencil		
Use colour palette		
Delete an object		
Print a drawing		
Resize an object		
Rotate an object		
Save a picture as a file		
Insert drawing into a document		
Create a slide show	5	6
Insert a slide		
Design layout		
Add shapes		
Import picture		
Add animation		
Show slide show		
Format design layout		
Add a sound		
Add a variety of transitions		
Print slide show		
Add a video clip (if required)		
Use and edit preset themes		
Insert hyperlinks		
Save show as wmv		
Use Peripherals	5	6
Use an iPad		
Use a Wacom tablet		
Use digital camera (still/movie)		
Use a microphone		
Use a digital camera	5	6
Learns basic functions		
Uses to create digital image		
Uploads image to computer		
Use a Wacom tablet	5	6
Parts of the Wacom		
usb plug & plugging into computer		
Operating the Wacom		
Removal & storage of Wacom		

i– skill is introduced | *r – skill is reinforced* | *skill is used independently*

Investigating	Stage 3	
Investigating Web 2.0 tools	5	6
Locate/use suitable web 2.0 tools		
Creating & Publishing to blog/Gsuite/O365	5	6
Understands (ethical) responsibilities when publishing on line	r	
Contributes to blog/seesaw		
Familiar with interface		
Can edit/save text		
Can upload file/image		
Can create a hyperlink		
Can embed object/widget		

Creating -Robotics	Stage 3	
Build a Robot	5	6
Use materials provided to build a robot		
Test robot		
Modify build		
Observe & discuss function		
***ArtBot**		
***BrushBot**		
***WiggleBot**		
Unplugged Robotics	5	6
Create symbols		
Program "robot" to follow your instructions		
Test & modify programme		

Ethics/Cybersafety	Stage 3	
Responsible use of information	5	6
Acknowledging that words & pictures belong to another person		
Understand authors own their work		
Understand you cannot use their work as your own		
Acknowledging anyone whose work you have used in creating your own		
Understand the meaning of copyright		
Understand there are copyright laws to protect ownership		
Giving credit to an information source by citing sources	r	
Correct cites of sources	i	r
Use Creative Commons	i	r

Communicating - Database	Stage 3	
Using databases	5	6
Use database for research	r	
Understand terms such as "field"	r	
Create a database	5	6
Cell, row, column		
Enter & edit data in fields	i	r
Name fields	i	r
Retrieve data	5	6
Sort data	i	r
Create charts	i	r
Print database	i	r

Creating -Multimedia	Stage 3	
Create a movie – iMovie	5	6
Become familiar with interface		
Import & edit photos		
Add text & recorded voice		
Add transitions & effects		
Add music		
Add title screen & credits		
Render & save		
Create a movie – green screen/DoInk	5	6
Become familiar with interface	r	
Take, import & edit photos	r	
Add text & recorded voice	r	
Add transitions & effects	r	
Add music	r	
Render & save	r	
Add title screen & credits	r	
Create a movie – Movie Maker	5	6
Introduce Movie Maker interface		
Import & edit photos/videos		
Add text & recorded voice		
Add transitions & effects		
Add music		
Render & save		
Add title screen & credits		
Use Notebook 10	5	6
Identify parts of interface		
Use gallery/animations/special features		
Create an audio book – using Audacity	5	6
Introduce Audacity interface	i	r
Add recorded voice	i	r
Save as mp3	i	r

Creating - Coding	Stage 3	
What is Coding?	5	6
Introduction to coding – what is it?		
Simple examples of coding		
Examples - looking at script (page source code)		
SYMBOL BASED CODING		
Understanding symbol commands	5	6
Recognising Fwd, bwd, turn left, turn right		
Create Coding – Symbol based	5	6
Planning		
Program robot to move - fwd,/bwd, left/right		
Developing a sequence		
Running a sequence		
Modify coding - Problem solving		
Symbol Based Applications	5	6
• **iPad apps** (BeeBot/CodeAPillar/LightBox/ALEX/Kodable)		
• **online software**		
• **BeeBots**		
• **Edisons**		
• **Code-A-Pillar**		
• **Ozobots**		
• **MakeyMakey**		
• **MicroBits**	i	r
BLOCK BASED CODING	5	6
Planning (may be hands on for juniors)		
Developing a sequence		
Using code blocks		
Adding an "if" variation		
Adding "if/else"		
Include a repeat block		
Include a repeat "times" block		
Functions		
Parameters		
Create actions – simple		
Create actions – moderate		
Create actions – advanced	r	
Block Based Applications	5	6
• **iPad apps** (Tynker; Daisy; Hopscotch)		
• **web based** (Scratch; Hour of Code/code.org)		

i– introduced | *r – reinforced* | *used independently* | *Continue development*

Creating -Animations	Stage 3	
Introduce simple animation – Power Point	5	6
Use Power Point to animate an item		
Create slide		
Insert shapes		
Group shapes		
Import images		
Manipulate images		
Create a background		
Import background		
Insert clip art		
Ordering objects and perspective		
Adding duplicate slides		
Moving objects consistent distance		
Use animation tools		
Apply transitions		
Use loops & timing		
Save as ppt/pptx/wmv		
Animation - DoInk	5	6
Become familiar with interface		
Draw images		
Import images		
Animate images using onion skin technique (1)		
Save in gallery		
Create background		
Create a composition		
Animate images using key frames (2)		
Save/export		
Animation - Pivot	5	6
Investigate interface		
Investigate creating backgrounds		
Manipulate figures		
Create figures/objects		
Create movement – using onion skin technique		
Manage speed		
Saving as .piv		
Saving as .gif		
Rendering as a movie		
Adding sound	i	r
Animation – online programs	5	6
Creates an animation using **picasion**		
Creates an animation using **abcya**		

Communicating - Spreadsheets	Stage 3	
Using a spreadsheet	5	6
Understand uses of spreadsheet		
Understand such terms as cell, column…		
Gather information		
Creating a spreadsheet	5	6
Enter & edit data in cells		
Identify a cell		
Identify the formula bar		
Change column width & height		
Insert a row or column		
Delete row or column		
Insert graphics		
Apply formulae	i	r
Retrieving data	5	6
Sort data		
Create charts/graphs		
Print spreadsheets		

Communicating – Word Processing	Stage 3	
Manipulate documents	5	6
Use drop down menus		
Open/Close file		
Save file - with help		
Name file - with help		
Use "save" and "save as"		
Select page orientation		
Change line spacing		
Add a page border		
Indent text/use tab		
Use a header/footer/page number		
Change margins		
Use templates		
Enter & modify text	5	6
Enter text		
Select - highlight text		
Delete text (letters, words)		
Modify text - colour; size; font		
Copy text		
Paste text		
Select text		
Change font style e.g. bold		
Change font size		
Change font		
Change text justification		
Use Undo and Redo		
Use columns & tables		
Use spell checker		
Use short cuts to edit text		
Use grammar checker		
Use thesaurus		
Use bullets & numbering		
Use find and replace	r	
Insert & manipulate Word Art		
Insert & manipulate Shapes		

Communicating – Word Processing	Stage 3	
Print documents	5	6
Print completed documents (with help)		
Use print preview		
Print selected parts		
Add graphics	5	6
Insert pictures		
Manipulate pictures - size; position; order		
Insert online pictures		
Insert & manipulate Word Art		
Insert & manipulate Shapes		

Communicating – Typing Skills	Stage 3	
Sit straight in chair		
Keep feet flat on the floor		
Have body one outstretched hand width from keyboard		
Have wrists in straight position		
Place hands on the home row		
Use correct touch-typing techniques for alphabet keys		
Use correct touch-typing techniques for numeric keys		
Use correct touch-typing techniques for punctuation keys		
Use word processing software effectively		
Use quick gentle stroke for keys		
Develop rhythm and control in keying process		
Identify and use proof readers' marks		
Keep eyes on the copy		
Increase keying speed		
Decrease keying errors		
Compose at the keyboard		
Act appropriately in the computer lab		

i– introduced | *r – reinforced* | *used independently* | *Continue development*