Primary Connections and the NSW Syllabus: Teaching design technology *through* science inquiry

Workshop facilitators: Nicola Dziadkiewicz Jennifer Lawrence
ENGAGE
Introductions

• My school or organisation
• My role
• My teaching style described as an animal and why?
WHERE ARE WE AT?
Our STEM learning journey

Beginning

Destination
## Workshop outline

<table>
<thead>
<tr>
<th>Work Area</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td><strong>INTRODUCTION</strong></td>
<td>Welcome; Sign on; Experience estimators</td>
</tr>
<tr>
<td><strong>ENGAGE</strong></td>
<td>Where are we at?</td>
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<tr>
<td><strong>EXPLORE</strong></td>
<td>Why link design technology and science?</td>
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<tr>
<td></td>
<td>A whole unit approach</td>
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<td></td>
<td>A focused approach</td>
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<tr>
<td><strong>EXPLAIN</strong></td>
<td>Design technology and the 5Es teaching and learning approach</td>
</tr>
<tr>
<td><strong>ELABORATE</strong></td>
<td>Modifying existing inquiries to suit your students and school</td>
</tr>
<tr>
<td><strong>EVALUATE</strong></td>
<td>Summary, reflection, and feedback</td>
</tr>
</tbody>
</table>
PURPOSE: Learning intentions

- To establish a shared understanding of how teaching technology through science enhances both disciplines.

- To experience working technologically with existing PrimaryConnections units.

- To explore how to include design briefs and prototypes in a science inquiry approach.
PURPOSE: *Intended learning outcomes*

- Analyse the nature of design technology and its relationship to science.
- Experience and describe how to modify existing science inquiries to meet requirements of science and technology curriculums.
- Have a deeper understanding of aspects of working technologically (design and production skills).
Consensograms

1. How confident are you in your understanding of technology and its relationship to science?

2. How confident are you in your ability to teach design technology through a science inquiry approach, such as used by Primary Connections?
STEM in context

What does STEM look, feel and sound like in primary classrooms?
What would you like to **know** and **do** by the end of the workshop today?

Please write **one** idea or question per post-it note.
STEM in context

Q1. Which image best illustrates STEM in action?

Q2. Which image shows learning that is most accessible & practical for students and teachers in primary classrooms?

Q3. Which image highlights best practice for STEM learning?
Beliefs and attitudes towards Science

Looking at STEM skills (% respondents):

• more than 90% use technology skills at least a number of times a week
• nearly 80% use maths skills at least a number of times a week
• more than 50% also said they use science skills at least a number of times a week
• engineering skills used by a little less than 40%.

STEM matters…

(Office of the Chief Scientist 2013, p. 4)
“Through the national consultations, education and industry stakeholders agreed targeting high school students with STEM programs is too late. Student attitudes to STEM are established in primary school and this is when the work on engagement and excitement needs to begin”

*Optimising STEM Industry-School Partnerships: Inspiring Australia’s Next Generation*, p. 50
Why does the acronym STEM work for policy discussions, yet present challenges for education programs and classroom practices?
Purpose of STEM Education

To promote STEM learning in which:

- Students learn **discipline-specific** knowledge and **STEM skills**,  
- Students learn **Enterprise** skills (communication, creativity, critical thinking, collaboration and teamwork, personal and social capability, resilience, ethical understanding) and  
- Students increase their **Digital** proficiency (ICT capabilities)

In our classroom:

- The **5Es** teaching and learning model is an **inquiry practice**, informed by a strong evidence-base, that supports STEM learning.
WHY LINK TECHNOLOGY AND SCIENCE?
Defining technology

1. Write a list of 10 words that best describe your understanding of technology.

2. Compare the list with a partner.

3. Underline each word that is exactly the same.
Catalyst – Strentrode

- What resonated most with you in that clip about how innovative technology is developed?
- How does this inform your thinking about:
  - What STEM subjects share in common?
  - How they are different?
## Catalyst – Strentrode

<table>
<thead>
<tr>
<th>Science</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>Maths</td>
</tr>
<tr>
<td>Ways of thinking</td>
<td>Ways of working</td>
</tr>
</tbody>
</table>
How are *science* & *design technology* linked, & what are the benefits?
EXPLORE
A WHOLE UNIT APPROACH
How *can* design technology be at the heart of a science inquiry?
Package it better
(Year 4 Chemical Sciences)

From the Australian Curriculum:
Natural and processed materials have a range of physical properties; these properties can affect their use [ACSSU074].

From the NSW Syllabus:
ST2-7MW-T: Investigates the suitability of natural and processed materials for a range of purposes.
As well as
ST2-1WS-S: Questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations.
ST2-2DP-T: Selects and uses materials, tools and equipment to develop solutions for a need or opportunity.
Design challenge

How can we make a package that is able to protect a fragile gift?
Package it Better
Engage phase

Students consider the design brief (p10)

Students work collaboratively to define the task.
Package it Better
Explore phase

Hands-on investigations

Students investigate using hands on approaches and, where appropriate, in collaborative teams.
L5: Strong Shapes

How do you make paper stronger?

Suspended A4 paper with weight supported

Suggest ways to change the paper to support more weight
Package it Better
Explore phase

Lesson 5: Strong Shapes

Explore the task and complete the pages in your booklet

Equipment:
Several A4 sheets of paper
2 tissue boxes
1 container to hold weights
small weights
masking tape

Parameters:
• Conduct as many trials as you like
• Maximum 2 sheets A4 per trial
• Maximum 2 layers per trial
• Minimum distance between tissues boxes 1 hand span
• Masking tape cannot be used to strengthen the paper

Fair test mnemonic
Remember: cows Moo Softly
• Change one thing
• Measure one thing (dependent on the change)
• Keep everything else the Same
Investigating images
Students:

- Interview a guest speaker
- Write a procedural text plan for their design task
- Create a prototype
- Develop explanations about materials science and the design process.
Package it Better
Elaborate phase

Package performance

Students:

- Evaluate their prototype against design criteria
- Review prototype and suggest changes to design
- Modify procedural text to reflect updated design features
- Make the revised package develop an evaluation survey to dispatch with the package.
Package it Better
Evaluate phase

All wrapped up

Students:

- Evaluate the performance of their package using feedback from the survey.
- Reflect on their learning of materials, properties and the design process.
- Plan and deliver an oral presentation about their design and the design process.
A FOCUSED APPROACH
How can a science lesson be given a design focus?

Exploring design technology through the Physical Sciences - Year 2

From the Australian Curriculum:
A push or pull affects how an object moves or changes shape (ACSSU033).


From the NSW Syllabus:
ST1-9PW-ST: Investigates how forces and energy are used in products

As well as
ST1-1WS-S: Observes, questions and collects data to communicate and compare ideas.

Design briefs

1. Background statement

2. Challenge or task statement

3. Design criteria

Inspired by the Pay it forward movement, a group of high rise offices are thinking about a Helping hands project. They will launch little contraptions from their office windows carrying acts of kindness – such as greeting cards, vouchers or a tasty morsel of food.

The project team are still working out the details of when they might do this, how often, and how to manage potential frustrations if people don’t get one. For example, the Jafflechutes website strongly recommends people not climb trees in pursuit of their toasted sandwiches that float down on parachutes. While considering the options, the project team would like a technical design to inform their decisions.

Design a contraption that is:
- of suitable size to carry a small package (approx 10-15g weight)
- will descend slowly from a second or third story window
- water resistant
- low cost
- made of environmentally responsible materials
- eye-catching
Design challenge

• Work in **teams** of 3.
• Guided by the **design brief**, use the **materials** provided, **create** a contraption that will deliver a small packet of chocolate.
• Build and **test** your prototypes.
• Be guided by pages 18-22
5Es: Elaborate DVD
Argumentation is key to a scientific world view

“Research has shown that students will typically discount the data they have collect and revert to their previous non-scientific ideas… unless they go through this form of discussion.”

Julie Smith, Primary Connections Curriculum writer, 5Es DVD, Elaborate Chapter
**Assessment tool**

**What choices** did you make? (With regard to materials, construction, shape, sustainability etc.)

**What were the reasons** for your choices?
- What alternatives did you consider?
- How did you make your decision?
- Are there scientific claims you considered?

**What do you observe** now?
- Did the tests give you the results you expected?
- Did your choices work as intended?
- Did you notice anything that you didn’t originally think about?

**Why** do you think that is?
- Can you explain your test results using scientific claims and evidence?
- Did the combination of choices work well in the final product?

**What would you suggest next time?**
- What information would you like to inform your next prototype?
- What factors would influence your next design choices?

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Make links in your evaluation of your contraption to the Science Understanding:

‘A push or pull affects how an object moves or changes shape’

Retrieved from ACARA, 2016
Reflections

Having experienced an ‘Explore’ and ‘Elaborate’ activity:

Does it support STEM learning in the classroom? How?
## Alignment between Technology and Engineering

<table>
<thead>
<tr>
<th>Technology process</th>
<th>Engineering process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investigate</strong> – using a design brief</td>
<td>Define the problem; do the background work; specify requirements</td>
</tr>
<tr>
<td><strong>Design</strong> – brainstorm possible solutions</td>
<td>Brainstorm solutions; choose the best solution; do the developmental work</td>
</tr>
<tr>
<td><strong>Produce</strong> – create a product</td>
<td>Build a prototype</td>
</tr>
<tr>
<td><strong>Evaluate</strong> – test the product against design brief; suggest modifications</td>
<td>Test and redesign</td>
</tr>
</tbody>
</table>

Used with permission
### Design and Production Skills identified in the NSW Syllabus

<table>
<thead>
<tr>
<th>Identifying and defining</th>
<th>Students consider the contribution of technologies to their lives and make judgements about them, and explore needs and opportunities for designing. They question and review existing products, processes and systems, explore needs or opportunities for designing, define problems to be solved, describe a sequence of steps and decisions (algorithms) needed to solve a problem and establish criteria for a successful design solution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researching and planning</td>
<td>Students identify factors that may influence and dictate the focus of the design idea, explore options and represent and refine ideas. They investigate materials, components, tools, equipment and/or processes to achieve intended design solutions. Students generate, develop and communicate design ideas and information, using appropriate technical terms and graphical representations. They develop project plans that include consideration of resources and design, modify and follow simple algorithms and steps in the development of a design solution.</td>
</tr>
<tr>
<td>Producing and implementing</td>
<td>Students develop and apply a variety of skills and techniques to create products, services or environments to meet specific purposes. They select and use materials, components, tools, equipment and processes to safely produce designed solutions. Students implement digital solutions using visual programs.</td>
</tr>
<tr>
<td>Testing and evaluating</td>
<td>Students evaluate design ideas, processes and solutions to inform decision-making about the quality and effectiveness of designed solutions. They determine effective ways to test and judge designed solutions against predetermined criteria, reflect on processes and transfer their learning to other design opportunities. Students explore how people use information systems to meet needs and opportunities.</td>
</tr>
</tbody>
</table>

NSW Science and Technology K-6 Syllabus 2017, Pages 27-28
The science of toys...

EXPLAIN
What is the relationship between...

- Science as inquiry
- Technology as design

How does Primary Connections support teachers to incorporate Design and Technologies in a unit of science inquiry?
The 5Es – what is it?

- An inquiry-based model of teaching and learning designed to facilitate conceptual change.
5Es DVD
<table>
<thead>
<tr>
<th>PHASE</th>
<th>FOCUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGAGE</td>
<td>Engage students and elicit prior knowledge</td>
</tr>
<tr>
<td></td>
<td>Diagnostic assessment</td>
</tr>
<tr>
<td>EXPLORE</td>
<td>Provide hands-on experience of the phenomenon</td>
</tr>
<tr>
<td></td>
<td>Formative assessment</td>
</tr>
<tr>
<td>EXPLAIN</td>
<td>Develop scientific explanations for observations and represent developing conceptual understanding</td>
</tr>
<tr>
<td></td>
<td>Consider current scientific explanations</td>
</tr>
<tr>
<td></td>
<td>Formative assessment</td>
</tr>
<tr>
<td>ELABORATE</td>
<td>Extend understanding to a new context or make connections to additional concepts through a student-planned investigation</td>
</tr>
<tr>
<td></td>
<td><strong>Summative assessment</strong> of the Science Inquiry Skills (NSW: Working Scientifically)</td>
</tr>
<tr>
<td>EVALUATE</td>
<td>Students re-present their understanding and reflect on their learning journey and teachers collect evidence about the achievement of outcomes</td>
</tr>
<tr>
<td></td>
<td><strong>Summative assessment</strong> of the Science Understanding (NSW: Knowledge and Understanding)</td>
</tr>
</tbody>
</table>
5Es Card Sort

• Turn to page 53, cut out each heading and question
• Sort the questions in to the appropriate phase (Use the handout “5Es teaching and learning model: teacher perspective/ student perspective” to assist you)
• Glue on to page 28
• Add notes or ideas to page 30.
‘Scientific literacy is the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen.’

https://doi.org/10.1787/9789264281820-en
Why STEM education?
What do STEM subjects share in common?

- Skilled communication
- Gathering evidence
- Problem solving
- Critical and creative thinking
- Using tools and working collaboratively
- Knowledge construction

Support learning that enables everyday activities, participation in civic life and secures professional success.

Learning how to gather and use evidence answer questions, solve problems, justify solutions.

Provide the foundation for deep understanding and learning across subject areas.

(Primary Connections, 2018)
“Whether or not technology is developed by conscious application of existing knowledge, it is true that understanding **how technology works** does depend on **scientific knowledge**.

However, it is also true that **most**, if not all **scientific knowledge** depends upon the **application of technology** for its discovery.”

(Albion, Campbell & Jobling 2018, p.25)
Design technology through science inquiry

• Analyse the nature of design technology and its relationship to science.

• Experience and describe how to modify existing science inquiries to meet requirements of science and technology curriculums.

• Have a deeper understanding of aspects of working technologically.
In the NSW syllabus, Design and Production Skills align with the Design Cycle:

- Identifying and defining
- Researching and planning
- Producing and implementing
- Testing and evaluating
A whole unit approach using a learning journey through *Package it better* – technology through the phases of the 5Es science inquiry approach. The design portfolio explains that students move backwards and forwards through the design cycle.

<table>
<thead>
<tr>
<th>Phase</th>
<th>DEFINE</th>
<th>EXPLORE</th>
<th>PRODUCE</th>
<th>EVALUATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGAGE</td>
<td>Be presented with a design task.</td>
<td>Have a range of products to investigate/compare.</td>
<td>Create what they think a product might look like.</td>
<td>Evaluate a ‘bad’ product.</td>
</tr>
<tr>
<td>EXPLORE</td>
<td>Explore contexts and uses for design.</td>
<td>Design investigations and experiences to gain knowledge.</td>
<td>Create prototypes to test ideas.</td>
<td>Conduct product tests.</td>
</tr>
<tr>
<td>EXPLAIN 1</td>
<td>Suggest new success criteria based on what they know.</td>
<td>Explain what they have learned and how that product design.</td>
<td>Create prototypes to show what they know.</td>
<td>Critique prototypes based on what they know.</td>
</tr>
<tr>
<td>ELABORATE</td>
<td>Consider new contexts and success criteria.</td>
<td>Design investigations to gain understanding new contexts.</td>
<td>Produce prototypes, applying they have learned new context.</td>
<td>Suggest improvements on previous designs based on a new context.</td>
</tr>
<tr>
<td>EVALUATE</td>
<td>Create a design task and criteria based on a scenario, suggest what would need to be investigated to meet the brief.</td>
<td>Explain what they have learned, how that applies to the design task and what they still need to know.</td>
<td>Produce a final design to show what they know and suggest how they would modify for production.</td>
<td>Evaluate prototypes using success criteria and suggest improvements.</td>
</tr>
</tbody>
</table>
What we explored…

How? Design briefs in Push Pull

- **Background statement** (usually a narrative of the problem putting it in context)
- **Challenge or task statement** (describes the problem to be solved)
- **Design criteria** (lists the tasks underpinning the challenge and sets out the guidelines to be followed during the course of the design problem).
A focused approach using *Push Pull* – technology *through* a specific phase of the 5Es science inquiry approach.
## Circuits and switches—Australian Curriculum: Design and Technologies

<table>
<thead>
<tr>
<th>Strand</th>
<th>Code</th>
<th>Year 6 content descriptions</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and Understanding</td>
<td>ACTDEK020</td>
<td>Investigate how electrical energy can control movement, sound or light in a designed product or system</td>
<td>1–8</td>
</tr>
<tr>
<td></td>
<td>ACTDEK023</td>
<td>Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use</td>
<td>3–4, 6–8</td>
</tr>
<tr>
<td>Processes and Production Skills</td>
<td>ACTDEP024</td>
<td>Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACTDEP025</td>
<td>Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACTDEP026</td>
<td>Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACTDEP027</td>
<td>Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACTDEP028</td>
<td>Develop project plans that include consideration of resources when making designed solutions individually and collaboratively</td>
<td></td>
</tr>
</tbody>
</table>

All the material in the first four columns of this table is sourced from the Australian Curriculum.
Design and Technologies

How? Creating designed solutions

Processes and production skills:

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigating and defining</td>
<td>Investigating and defining involves students critiquing, exploring and investigating needs, opportunities and information.</td>
</tr>
<tr>
<td>Generating and designing</td>
<td>Generating and designing involves students in developing and communicating ideas for a range of audiences.</td>
</tr>
<tr>
<td>Producing and implementing</td>
<td>Students learn and apply a variety of skills and techniques to make products, services or environments designed to meet specific purposes and user needs.</td>
</tr>
<tr>
<td>Evaluating</td>
<td>Students evaluate and make judgements throughout a design process and about the quality and effectiveness of their designed solutions and those of others.</td>
</tr>
<tr>
<td>Collaborating and managing</td>
<td>Students learn to work collaboratively and to manage time and other resources to effectively create designed solutions.</td>
</tr>
</tbody>
</table>
# Design cycle and 5Es

*Creating design solutions using process and production skills:*

<table>
<thead>
<tr>
<th>Processes and Production Skills (ACARA 2016)</th>
<th>5Es Phases of Inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigating and defining</td>
<td>ENGAGE/EXPLORE</td>
</tr>
<tr>
<td>Generating and designing</td>
<td>EXPLORE/EXPLAIN</td>
</tr>
<tr>
<td>Producing and implementing</td>
<td>EXPLAIN &amp; ELABORATE</td>
</tr>
<tr>
<td>Evaluating</td>
<td>ELABORATE &amp; EVALUATE</td>
</tr>
<tr>
<td>Collaborating and managing</td>
<td>SCIENCE &amp; TECHNOLOGY LITERACY</td>
</tr>
</tbody>
</table>
Designed solutions

• Can be:
  • **Products** – a model, a circuit, a **contraption**, an app, a poster, a movie
  • **Environments** – a space or place such as a garden, a pet shelter, a solar cooker
  • **Services** – less tangible, such as a menu, water saving system and represented through plans, diagrams and flow charts

• All result from the design process
Design Cycle Question Sort

• Turn to page 55
• Read the questions. Determine the appropriate phase for each question.
  (Use p25 & p31 to assist you)
Why? General Capabilities

General Capabilities in the Australian Curriculum encompass:

- **Knowledge**
- **Skills**
- **Behaviours**
- **Dispositions**
How? Through science…

- Literacy
- Numeracy
- Information and Communication Technology (ICT) Capability
- Critical and Creative Thinking
- Personal and Social Capability
- Ethical Understanding
- Intercultural Understanding

## OUTCOMES CONTINUUM

### Science and Technology K–6 Syllabus

<table>
<thead>
<tr>
<th>Early Stage outcomes</th>
<th>Stage 1 outcomes</th>
<th>Stage 2 outcomes</th>
<th>Stage 3 outcomes</th>
<th>Stage 4 outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
</tr>
<tr>
<td>STe-1WS-S</td>
<td>ST1-1WS-S</td>
<td>ST2-1WS-S</td>
<td>ST3-1WS-S</td>
<td>SC4-4WS</td>
</tr>
<tr>
<td>observes, questions and collects data to communicate ideas</td>
<td>observes, questions and collects data to communicate and compare ideas</td>
<td>questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations</td>
<td>plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions</td>
<td>identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge</td>
</tr>
</tbody>
</table>

### Science Years 7–10 Syllabus and Technology Mandatory Years 7–8 Syllabus

<table>
<thead>
<tr>
<th>Stage 4 outcomes</th>
<th>Stage 4 outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
</tr>
<tr>
<td>SC4-4WS</td>
<td>collaboratively and individually produces a plan to investigate questions and problems</td>
</tr>
<tr>
<td>SC4-5WS</td>
<td>follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually</td>
</tr>
<tr>
<td>SC4-7WS</td>
<td>processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusions</td>
</tr>
<tr>
<td>SC4-8WS</td>
<td>selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems</td>
</tr>
<tr>
<td>SC4-9WS</td>
<td>presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations</td>
</tr>
</tbody>
</table>

### Working Scientifically

<table>
<thead>
<tr>
<th>Early Stage outcomes</th>
<th>Stage 1 outcomes</th>
<th>Stage 2 outcomes</th>
<th>Stage 3 outcomes</th>
<th>Stage 4 outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
</tr>
<tr>
<td>STe-2DP-T</td>
<td>ST1-2DP-T</td>
<td>ST2-2DP-T</td>
<td>ST3-2DP-T</td>
<td>TE4-1DP</td>
</tr>
<tr>
<td>develops solutions to an identified need</td>
<td>uses materials, tools and equipment to develop solutions for a need or opportunity</td>
<td>selects and uses materials, tools and equipment to develop solutions for a need or opportunity</td>
<td>plans and uses materials, tools and equipment to develop solutions for a need or opportunity</td>
<td>designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities</td>
</tr>
<tr>
<td>STe-3LP-ST</td>
<td>ST1-3LP-ST</td>
<td>ST2-3LP-ST</td>
<td>ST3-3LP-ST</td>
<td>TE4-2DP</td>
</tr>
<tr>
<td>explores the characteristics, needs and uses of living things</td>
<td>describes, follows and represents algorithms to solve problems</td>
<td>defines problems, describes and follows algorithms to develop solutions</td>
<td>defines problems, and designs, modifies and follows algorithms to develop solutions</td>
<td>plans and manages the production of designed solutions</td>
</tr>
<tr>
<td>STe-4LP-ST</td>
<td>ST1-4LP-ST</td>
<td>ST2-4LP-ST</td>
<td>ST3-4LP-ST</td>
<td>TE4-3DP</td>
</tr>
<tr>
<td>describes observable features of living things and their environments</td>
<td>compares features and characteristics of living and non-living things</td>
<td>examines how the environment affects the growth, survival and adaptation of living things</td>
<td>selects and safely applies a broad range of tools, materials and processes in the production of quality projects</td>
<td></td>
</tr>
</tbody>
</table>

### Design and Production

<table>
<thead>
<tr>
<th>Early Stage outcomes</th>
<th>Stage 1 outcomes</th>
<th>Stage 2 outcomes</th>
<th>Stage 3 outcomes</th>
<th>Stage 4 outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
</tr>
<tr>
<td>STe-3LP-ST</td>
<td>ST1-3LP-ST</td>
<td>ST2-3LP-ST</td>
<td>ST3-3LP-ST</td>
<td>TE4-4DP</td>
</tr>
<tr>
<td>explores the characteristics, needs and uses of living things</td>
<td>describes, follows and represents algorithms to solve problems</td>
<td>defines problems, describes and follows algorithms to develop solutions</td>
<td>defines problems, and designs, modifies and follows algorithms to develop solutions</td>
<td>designs algorithms for digital solutions and implements them in a general-purpose programming language</td>
</tr>
</tbody>
</table>

### Living World

<table>
<thead>
<tr>
<th>Early Stage outcomes</th>
<th>Stage 1 outcomes</th>
<th>Stage 2 outcomes</th>
<th>Stage 3 outcomes</th>
<th>Stage 4 outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
<td><strong>A student:</strong></td>
</tr>
<tr>
<td>STe-1LP-ST</td>
<td>ST1-1LP-ST</td>
<td>ST2-1LP-ST</td>
<td>ST3-1LP-ST</td>
<td>SC4-14LP</td>
</tr>
<tr>
<td>identifies how plants and animals are used for food and fibre products</td>
<td>describes how agricultural processes are used to grow plants and raise animals for food, clothing and shelter</td>
<td>examines how food and fibre are produced sustainably in managed environments for health and nutrition</td>
<td>relates the structure and function of living things to their classification, survival and reproduction</td>
<td></td>
</tr>
<tr>
<td>STe-2LP-ST</td>
<td>ST1-2LP-ST</td>
<td>ST2-2LP-ST</td>
<td>ST3-2LP-ST</td>
<td>SC4-15LP</td>
</tr>
<tr>
<td>describes observable features of living things and their environments</td>
<td>compares features and characteristics of living and non-living things</td>
<td>examines how the environment affects the growth, survival and adaptation of living things</td>
<td>explains how new biological evidence changes people’s understanding of the world</td>
<td></td>
</tr>
<tr>
<td>STe-3LP-ST</td>
<td>ST1-3LP-ST</td>
<td>ST2-3LP-ST</td>
<td>ST3-3LP-ST</td>
<td>TE4-5AG</td>
</tr>
<tr>
<td>identifies how plants and animals are used for food and fibre products</td>
<td>describes how agricultural processes are used to grow plants and raise animals for food, clothing and shelter</td>
<td>examines how food and fibre are produced sustainably in managed environments for health and nutrition</td>
<td>investigates how food and fibre are produced in managed environments</td>
<td></td>
</tr>
<tr>
<td>STe-4LP-ST</td>
<td>ST1-4LP-ST</td>
<td>ST2-4LP-ST</td>
<td>ST3-4LP-ST</td>
<td>TE4-6FO</td>
</tr>
<tr>
<td>describes observable features of living things and their environments</td>
<td>compares features and characteristics of living and non-living things</td>
<td>examines how the environment affects the growth, survival and adaptation of living things</td>
<td>explains how the characteristics and properties of food determine preparation techniques for healthy eating</td>
<td></td>
</tr>
<tr>
<td>Early Stage 1 outcomes</td>
<td>Stage 1 outcomes</td>
<td>Stage 2 outcomes</td>
<td>Stage 3 outcomes</td>
<td>Stage 4 outcomes</td>
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<tr>
<td>------------------------</td>
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</tr>
<tr>
<td><strong>Material World</strong></td>
<td><strong>Stage 1 outcomes</strong></td>
<td><strong>Stage 2 outcomes</strong></td>
<td><strong>Stage 3 outcomes</strong></td>
<td><strong>Stage 4 outcomes</strong></td>
</tr>
<tr>
<td>STe-4MW-ST</td>
<td>identifies that objects are made of materials that have observable properties</td>
<td>identifies that materials can be changed or combined</td>
<td>describes how adding or removing heat causes a change of state</td>
<td>describes the observed properties and behaviour of matter, using scientific models and theories about the motion and arrangement of particles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST2-6MW-T</td>
<td>ST3-6MW-T</td>
<td>SC4.16CW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>investigates the suitability of natural and processed materials for a range of purposes</td>
<td>explains how the properties of heat on the properties and behaviour of materials</td>
<td>explains how scientific understanding of, and discoveries about the properties of elements, compounds and mixtures relate to their uses in everyday life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST3-7MW-T</td>
<td></td>
<td>SC4.17CW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>explains how the properties of materials determine their use for a range of purposes</td>
<td></td>
<td>investigations how the characteristics and properties of tools, materials and processes affect their use in designed solutions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TE4.0MA</td>
</tr>
<tr>
<td><strong>Physical World</strong></td>
<td><strong>Stage 1 outcomes</strong></td>
<td><strong>Stage 2 outcomes</strong></td>
<td><strong>Stage 3 outcomes</strong></td>
<td><strong>Stage 4 outcomes</strong></td>
</tr>
<tr>
<td>STe-5PW-ST</td>
<td>observes the way objects move and relates changes in motion to push and pull forces</td>
<td>describes common forms of energy and explores some characteristics of sound energy</td>
<td>describes the characteristics and effects of common forms of energy, such as light and heat</td>
<td>describes the action of unbalanced forces in everyday situations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST2-8PW-ST</td>
<td>ST3-8PW-ST</td>
<td>SC4.10PW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>investigates how forces and energy are used in products</td>
<td>explains how energy is transformed from one form to another</td>
<td>discusses how scientific understanding and technological developments have contributed to finding solutions to problems involving energy transfers and transformations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST2-9PW-ST</td>
<td></td>
<td>SC4.11PW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>explains how contact and non-contact forces affect an object's motion</td>
<td></td>
<td>explains how force, motion and energy are used in engineered systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST3-9PW-ST</td>
<td></td>
<td>TE4.0EN</td>
</tr>
<tr>
<td><strong>Earth and Space</strong></td>
<td><strong>Stage 1 outcomes</strong></td>
<td><strong>Stage 2 outcomes</strong></td>
<td><strong>Stage 3 outcomes</strong></td>
<td><strong>Stage 4 outcomes</strong></td>
</tr>
<tr>
<td>STe-0ES-S</td>
<td>identifies how daily and seasonal changes in the environment affect humans and other living things</td>
<td>recognises observable changes occurring in the sky and on the land and identifies Earth's resources</td>
<td>investigates regular changes caused by interactions between the Earth and the Sun, and changes to the Earth's surface</td>
<td>describes the dynamic nature of models, theories and laws in developing scientific understanding of the Earth and solar system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST2-10ES-S</td>
<td>ST3-10ES-S</td>
<td>SC4.12ES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>investigates regular events in the solar system and geological events on the Earth's surface</td>
<td>explains regular events in the solar system and geological events on the Earth's surface</td>
<td>explains how advances in scientific understanding of processes that occur within and on the Earth, influence the choices people make about resource use and management</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SC4.13ES</td>
</tr>
<tr>
<td><strong>Digital Technologies</strong></td>
<td><strong>Stage 1 outcomes</strong></td>
<td><strong>Stage 2 outcomes</strong></td>
<td><strong>Stage 3 outcomes</strong></td>
<td><strong>Stage 4 outcomes</strong></td>
</tr>
<tr>
<td>STe-7DI-T</td>
<td>identifies digital systems and explores how instructions are used to control digital devices</td>
<td>identifies the components of digital systems and explores how data is represented</td>
<td>describes how digital systems represent and transmit data</td>
<td>explains how data is represented in digital systems and transmitted in networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST2-11DI-T</td>
<td>ST3-11DI-T</td>
<td>TE4.07I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>describes how digital systems represent data, connect together to form networks and transmit data</td>
<td>explains how digital systems represent data, connect together to form networks and transmit data</td>
<td>explains how people in technology related professions contribute to society now and into the future</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TE4.10T</td>
</tr>
<tr>
<td><strong>Technology and Society</strong></td>
<td><strong>Stage 1 outcomes</strong></td>
<td><strong>Stage 2 outcomes</strong></td>
<td><strong>Stage 3 outcomes</strong></td>
<td><strong>Stage 4 outcomes</strong></td>
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</tr>
</tbody>
</table>
### Digital Technologies: Sequence of content F-10  
**Strand: Knowledge and understanding**

<table>
<thead>
<tr>
<th></th>
<th>F-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7-8</th>
<th>9-10 (Elective subject)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital systems</strong></td>
<td>Recognise and explore digital systems (hardware and software components) for a purpose (ACTDIK001)</td>
<td>Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)</td>
<td>Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014)</td>
<td>Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance (ACTDIK023)</td>
<td>Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034)</td>
</tr>
<tr>
<td><strong>Representation of data</strong></td>
<td>Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002)</td>
<td>Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)</td>
<td>Examine how whole numbers are used to represent all data in digital systems (ACTDIK015)</td>
<td>Investigate how digital systems represent text, image and audio data in binary (ACTDIK024)</td>
<td>Analyse simple compression of data and how content data are separated from presentation (ACTDIK035)</td>
</tr>
</tbody>
</table>

### Digital Technologies: Sequence of content F-10  
**Strand: Processes and production skills**

<table>
<thead>
<tr>
<th></th>
<th>F-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7-8</th>
<th>9-10 (Elective subject)</th>
</tr>
</thead>
</table>
| **Collecting, managing and analysing data** | Collect, explore and sort data, and use digital systems to present the data creatively (ACTDIP003) | Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009) | Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016) | Acquire data from a range of sources and evaluate authenticity, accuracy and timeliness (ACTDIP025)  
Analyse and visualise data using a range of software to create information, and use structured data to model objects or events (ACTDIP026) | Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (ACTDIP036)  
Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data (ACTDIP037) |

### Creating digital solutions by:

| **Investigating and defining** | Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004) | Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010) | Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017) | Define and decompose real-world problems taking into account functional requirements and economic, environmental, technical and usability constraints (ACTDIP027) | Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038) |
## Digital Technologies: Sequence of content F-10  Strand: Processes and production skills

<table>
<thead>
<tr>
<th></th>
<th>F-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7-8</th>
<th>9-10 (Elective subject)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generating and designing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design a user interface for a digital system (ACTDIP013)</td>
<td></td>
<td></td>
<td></td>
<td>Design the user experience of a digital system, generating, evaluating and communicating alternative designs (ACTDIP028)</td>
<td>Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics (ACTDIP039)</td>
</tr>
<tr>
<td>Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)</td>
<td></td>
<td></td>
<td></td>
<td>Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029)</td>
<td>Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040)</td>
</tr>
<tr>
<td><strong>Producing and Implementing</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)</td>
<td></td>
<td>Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)</td>
<td>Implement and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language (ACTDIP030)</td>
<td>Implement modular programs, applying selected algorithms and data structures including using an object-oriented programming language (ACTDIP041)</td>
<td></td>
</tr>
<tr>
<td><strong>Evaluating</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Explore how people safely use common information systems to meet information, communication and recreation needs (ACTDIP005)</td>
<td>Explain how student solutions and existing information systems meet common personal, school or community needs (ACTDIP012)</td>
<td>Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021)</td>
<td>Evaluate critically how student solutions and existing information systems meet needs, are innovative, and take account of future risks and sustainability (ACTDIP031)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collaborating and managing</strong></td>
<td></td>
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</tr>
<tr>
<td>Create and organise ideas and information using information systems independently and with others, and share these with known people in safe online environments (ACTDIP006)</td>
<td>Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)</td>
<td>Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols (ACTDIP022)</td>
<td>Plan and manage projects that create and communicate ideas and information collaboratively online, taking safety and social contexts into account (ACTDIP032)</td>
<td>Create interactive solutions for sharing ideas and information online, taking into account safety, social contexts and legal responsibilities (ACTDIP043)</td>
<td></td>
</tr>
<tr>
<td>Plan and manage projects using an iterative and collaborative approach, identifying risks and considering safety and sustainability (ACTDIP044)</td>
<td></td>
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</tr>
</tbody>
</table>
Australian Computing Academy
Unpack the Curriculum
Understand the Australian Curriculum: Digital Technologies

https://aca.edu.au/curriculum/
ELABORATE
Modifying an existing inquiry unit

1. Select a PC unit that interests you. Find others in the room who would also like to work on that unit.
2. Use the guiding questions on p. 32 to familiarise yourself the unit.
3. Work collaboratively to suggest modifications to incorporate design technology in the unit of work.

– Record your ideas on a poster to share with the group

• Options for modifying

A. Suggest minor modifications to build on the existing design technology content to increase the number of NSW outcomes addressed.

B. Replace the current Elaborate/Evaluate phase with technology lessons (you may wish to still incorporate a fair test).

C. Create a design brief that draws on the science learning, and addresses NSW syllabus outcomes.
RESOURCES
Literacy focusses

- Design portfolios
- Procedural texts
- Science journals
- Tables
- TWLH charts

**Literacy focus**

**Why do we use a table?**

We use a **table** to organise information so that we can understand it more easily.

**What does a table include?**

A **table** includes a title, columns with headings and information organised under each heading.
## Design and Production Skills identified in the NSW Syllabus

<table>
<thead>
<tr>
<th>Identifying and defining</th>
<th>Students consider the contribution of technologies to their lives and make judgements about them, and explore needs and opportunities for designing. They question and review existing products, processes and systems, explore needs or opportunities for designing, define problems to be solved, describe a sequence of steps and decisions (algorithms) needed to solve a problem and establish criteria for a successful design solution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researching and planning</td>
<td>Students identify factors that may influence and dictate the focus of the design idea, explore options and represent and refine ideas. They investigate materials, components, tools, equipment and/or processes to achieve intended design solutions. Students generate, develop and communicate design ideas and information, using appropriate technical terms and graphical representations. They develop project plans that include consideration of resources and design, modify and follow simple algorithms and steps in the development of a design solution.</td>
</tr>
<tr>
<td>Producing and implementing</td>
<td>Students develop and apply a variety of skills and techniques to create products, services or environments to meet specific purposes. They select and use materials, components, tools, equipment and processes to safely produce designed solutions. Students implement digital solutions using visual programs.</td>
</tr>
<tr>
<td>Testing and evaluating</td>
<td>Students evaluate design ideas, processes and solutions to inform decision-making about the quality and effectiveness of designed solutions. They determine effective ways to test and judge designed solutions against predetermined criteria, reflect on processes and transfer their learning to other design opportunities. Students explore how people use information systems to meet needs and opportunities.</td>
</tr>
</tbody>
</table>

NSW Science and Technology K-6 Syllabus 2017, Pages 27-28
Identifying and defining

Researching and planning

Produces during the learning sequence

Producing and implementing

Occurs when students follow the steps they have decided upon to create their designs.
Can also be used to evaluate other products during research.

A self assessment tool for students own designs when Testing and evaluating.
**Change detectives—Australian Curriculum general capabilities**

<table>
<thead>
<tr>
<th>General capabilities</th>
<th>Australian Curriculum description</th>
<th>Change detectives examples</th>
</tr>
</thead>
</table>
| Literacy             | literacy knowledge specific to the study of science develops along with scientific understanding and skills. PrimaryConnections learning activities explicitly introduce literacy focuses and provide students with the opportunity to use them as they think about, reason and represent their understanding of science. | In Change detectives the literacy focuses are:  
- science journal  
- summaries  
- reports  
- word walls  
- tables  
- role-plays  
- procedural tests  
- graphs  
- Venn diagrams. |
| Numeracy             | Elements of numeracy are particularly evident in Science Inquiry Skills. These include practical measurement and the collection, representation and interpretation of data. | Students:  
- Use measurement (volume, capacity and time)  
- calculate averages  
- collect, interpret and represent data through tables and graphs  
- use measurement equipment appropriately (timer, o measures, weapon measures). |
| ICT competence       | ICT competence is particularly evident in Science Inquiry Skills. Students use digital technologies to investigate, create, communicate and share ideas and results. | Students are given optional opportunities to:  
- use a digital camera to record the mess scene  
- use online digital resources to explore dissolving  
- create a digital Venn diagram  
- create a digital report. |
| Critical and creative thinking | Students develop critical and creative thinking as they speculate and solve problems through investigations, make evidence-based decisions, and analyse and evaluate information sources to draw conclusions. They develop creative questions and suggest novel solutions. | Students:  
- brainstorm variables for investigations  
- devise testable questions  
- respond to teacher questions  
- discuss initial ideas  
- create classification groupings. |
| Ethical behaviour    | Students develop ethical behaviour as they explore principles and guidelines in gathering evidence and consider the implications of their investigations on others and their environment. | Students:  
- respect each other's ideas during discussions. |
| Personal and social competence | Students develop personal and social competence as they learn to work effectively in teams, develop collaborative methods of inquiry, work safely, and use their scientific knowledge to make informed choices. | Students:  
- identify ways to reduce risk and follow safety rules in the classroom during investigations  
- work in collaborative learning teams performing a role and practising team skills  
- discuss individual results with other team members  
- role-play science phenomena with other members of the class. |
| Inter-cultural understanding | Inter-cultural understanding is particularly evident in Science as a Human Endeavour. Students learn about the influence of people from a variety of cultures on developments of scientific understanding. | "Cultural perspectives’ opportunities are highlighted where relevant.  
Important contributions made to science by people from different cultural backgrounds are highlighted where relevant."

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**Teacher background information**

**Introduction to physical and chemical change**

Changes to objects can include changes to the size, shape, smell and appearance. For example, a rock crumbles, a teapot breaks, and a steak changes colour, odour and taste when cooked.

Objects have characteristics such as size, weight and appearance, which are determined by the materials that are used to make them. Materials can be made of several different substances, for example, air is a material made of many different gases. Substances are made of particles, atoms or ions.

Physical change is a change to the physical properties of an object or material where the substances remain the same. The object itself might not remain the same, such as, a rock could be ground to powder or a mug be smashed to pieces, but the substances are still present. There is still rock and porcelain. Physical change occurs when an object receives or loses energy. This might be from a force, for example, by being hit, or when a substance gains or loses heat energy, such as, when an ice cube melts or liquid water freezes.

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**Cross-curriculum priorities**

There are three cross-curriculum priorities identified by the Australian Curriculum:
- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia’s engagement with Asia
- Sustainability

For further information see: [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au)

**Aboriginal and Torres Strait Islander histories and cultures**

The PrimaryConnections Indigenous perspectives framework supports teachers’ implementation of Aboriginal and Torres Strait Islander histories and cultures in science. The framework can be accessed at: [www.primaryconnections.org.au](http://www.primaryconnections.org.au)

Change Detectives focuses on the Western science way of making evidence-based claims about the way objects change, whether physically, chemically or by the gaining or losing of heat energy to cause a change of state. Aboriginal and Torres Strait Islander Peoples might have other explanations for the observed phenomenon of materials changing from liquids to solids or vice versa.

PrimaryConnections recommends working with Aboriginal and Torres Strait Islander community members to access local and relevant cultural perspectives. Protocol for engaging with Aboriginal and Torres Strait Islander community members are provided in state and territory education guidelines. Links to these are provided on the PrimaryConnections website.

**Sustainability**

In the Change detectives unit students learn how changes to materials can be reversible or irreversible. This provides opportunities for students to understand why and how substances change and how the world is made up of constantly moving particles. A deeper understanding of the composition of everyday materials and the factors that influence change can assist them to develop knowledge, skills and values for making decisions about individual and community actions that contribute to sustainable patterns of use of the Earth’s natural resources.

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**Alignment with the Australian Curriculum: English and Mathematics**

<table>
<thead>
<tr>
<th>Strand</th>
<th>Sub-strand</th>
<th>Code</th>
<th>Year 6 content descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-Language</td>
<td>Language for interaction</td>
<td>ACELA1516</td>
<td>Understand that strategies for interaction become more complex and demanding as levels of formality and social distance increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACER 4412</td>
<td>Understand the urge of ambition and</td>
</tr>
</tbody>
</table>
34 Units are freely available on Scootle for download

e-Resource sheets, in digital formats, to adapt and customise freely available via the Primary Connections website
Create a free membership to our website.

In the members’ section you can access teaching information and resources including
• videos,
• professional reading, and
• planning documents
Primary Connections digital resources: Accessing e-Resource sheets via the Primary Connections website

1. Log in as a member via the Primary Connections website [https://primaryconnections.org.au/](https://primaryconnections.org.au/)
2. Select Curriculum resources

3. Scroll down the page and find the relevant Primary Connections unit. You can use the filters to support your search.
4. Select View unit

5. Scroll down the page to More for members and select Download

6. A zip file will appear in your Download folder
7. Open the file and each resource sheet will appear as a Word document ready to be saved and edited for your use.
Australian Academy of Science

Education Programs [https://www.science.org.au/](https://www.science.org.au/)

- Primary Connections
- reSolve: Mathematics by Inquiry

EVALUATE
Science matters…

Scientific literacy

Refers to an individual’s…

➢ Scientific knowledge and use of that knowledge to:
  • identify questions
  • acquire new knowledge
  • explain scientific phenomena and
  • draw evidence based conclusions about science-related issues

➢ Understanding of the characteristic features of science as a form of human knowledge and enquiry

➢ Awareness of how science and technology shape our material, intellectual, and cultural environments and

➢ Willingness to engage in science-related issues, with the ideas of science, as a reflective citizen.

(OECD 2013, p.127)
Science provides an excellent context for learning and teaching design technologies.
My teaching style animal metaphor
Reflection

Discuss answers to the questions

• The most useful thing I discovered…
• Something I will implement in my teaching is…
• The thing I would like to learn more about is…
Evaluation

Your feedback is important

Correlation Chart

Evaluation survey

https://www.surveymonkey.com/r/Y2PTYBK
Join the many teachers around Australia using PrimaryConnections

www.primaryconnections.org.au

Create a free membership on our website and freely access additional resources

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Contact the Primary Connections Professional Learning team pcpl@science.org.au