

Investigating outcomes across PrimaryConnections curriculum units

PrimaryConnections Project Stage 3
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Disclaimers

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Introduction

This document provides an overview of the investigating outcomes within the Stage 3 PrimaryConnections curriculum units.

PrimaryConnections consists of a professional learning programme supported by quality curriculum resources that promote a hands-on, inquiry-based approach to teaching and learning science.

The PrimaryConnections inquiry approach allows students' questions to become the focus for student-planned investigations and the basis for developing scientific explanations. Students are supported to produce multi-modal representations of their understanding. These are monitored by teachers so they can provide students with feedback that will enhance learning.



Figure 1: Elements of the PrimaryConnections inquiry approach

A key element of the inquiry approach is investigating. The stages of investigating include:

- Planning – developing the question for investigation, identifying variables, making predictions and planning the materials, equipment and steps.
- Conducting – conducting the investigation, observing, measuring and calculating, collecting evidence and recording and organising data.
- Interpreting and representing – thinking about the results and the question, looking for patterns in the results and representing the results in appropriate ways.
- Evaluating – developing explanations for the results based on evidence, analysing results in relation to the question and reflecting on the investigating process and looking for improvements.
- Communicating – using appropriate representations for the findings of the investigations, presenting findings to an audience, and presenting and talking about the evidence.

Summative assessment of the investigating outcomes is an important aspect of the *Elaborate* phase of the PrimaryConnections 5Es teaching and learning model - *Engage, Explore, Explain, Elaborate, Evaluate*.

PrimaryConnections unit map

Primary Connections Stage	Outcome level*	Year of schooling	Earth and Beyond	Energy and Change	Life and Living	Natural and Processed Materials	
Early Stage 1	< 1	1	Stage theme: Investigating my surroundings and me				What's it made of? Properties and uses of materials in the school environment
			Weather in my world Weather, its features and how it affects my daily life	On the move Movement of humans and toys	Staying alive Needs for survival of people and familiar animals; the senses		
Stage 1	1-2	2 & 3	Stage theme: Organising my world				Spot the difference Changes to observable properties of materials (eg when solids melt)
				Sounds sensational Properties, transmission and use of sound energy	Schoolyard safari Features, habitats and behaviour of small invertebrates		
			Water works Water as a natural resource; using water responsibly	Push pull Pushes and pulls in everyday situations			
Stage 2	2-3	4 & 5	Stage theme: Changes, patterns and relationships in my world				Material world Properties of materials determine their use
			Spinning in space Size and relative movement of Earth, Sun and Moon; day and night	Light fantastic Transmission and use of light energy	Plants in action Needs and life cycle of flowering plants		
				Smooth moves Effect on motion of different sized forces acting directly and indirectly			
Stage 3	3-4	6 & 7	Stage theme: Systems and how they work				Package it better Design and make a package to meet the criteria of a design brief
			Earthquake explorers Sudden changes to the Earth's surface caused by tectonic plate movement (eg, earthquakes)	It's electrifying Electrical energy is stored, transferred and transformed into other forms of energy; electric circuits	Marvellous micro-organisms Characteristics, needs and uses of micro-organisms (eg, yeast and mould)		
						Change detectives Physical and chemical changes to materials	

* From the National Scientific Literacy progress map.

PrimaryConnections investigating outcomes across the stages

Early Stage 1	Stage 1	Stage 2	Stage 3
<ul style="list-style-type: none"> Follow directions to make simple tools for observing and describing weather conditions. Follow directions to conduct simple investigations about rolling. Follow directions to conduct simple investigations of the amount of water consumed by an animal and by humans. Make and share observations. Follow directions to test materials for water resistance. Make and describe observations. Observe, describe or make non-standard measurements and limited records of data when given a question in a familiar context. Identify a variable to investigate. Make and record observations. Identify patterns in a simple picture graph. 	<ul style="list-style-type: none"> Follow directions to conduct simple investigations about water use in the home. Make and describe observations. Follow directions to conduct simple investigations about sound. Make and share observations. Follow directions to conduct simple investigations involving floating, sinking and falling through the air. Follow directions to conduct simple investigations about small animals. Follow directions to conduct simple investigations about how materials can change. Make and record observations. Identify patterns in a simple column graph. Identify some variables to investigate. Identify patterns in a simple graph. Make and record observations and draw conclusions. Identify basic elements of fair testing. 	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make and record observations. Identify some variables that can be investigated. Make observations and record measurements in a table. Make and record observations and measurements. Make non-standard measurements and record data in a table. Show awareness of the need for fair testing. Make measurements and observations. Record measurements in a table and display results in a column graph. Plan an investigation showing awareness of the need for fair testing. Display results in a column graph and summarise patterns in results. Make and record observations and measurements using table and column graphs. Describe the relationship between two variables plotted as a column graph. Make predictions. Display results in simple tables and graphs or as scientific diagrams. 	<ul style="list-style-type: none"> Analyse and compare data of earthquake magnitude for Australia and neighbouring countries to investigate patterns in data. Use a physical model to represent, investigate and describe how to measure the magnitude of earthquakes. Formulate a question for investigation and make a prediction. Summarise and explain observations made during an investigation. Plan investigations showing an awareness of the need for fair testing. Make and record observations, and identify patterns in results. Plan investigations and product evaluations using models and technical terms showing awareness of the need for fair testing. Make and record observations using a table. Formulate a question for investigation and make a prediction. Use secondary data to represent, investigate and describe the movement of the Earth's tectonic plates.

PrimaryConnections investigating outcomes across the stages

Early Stage 1	Stage 1	Stage 2	Stage 3
		<ul style="list-style-type: none"> • Identify and summarise patterns in results. • Display results from tests as a graph and summarise patterns in results. • Record results as a table and plot results as a column graph. • Make and record observations, and identify patterns in results. 	<ul style="list-style-type: none"> • Draw evidence-based conclusions about the locations of large earthquakes at the edges of tectonic plates. • Change one factor at a time when modifying circuits to test predictions about possible conductors and insulators and test sufficient samples to make reliable conclusions. • Formulate generalisations based on observations made during an investigation. • Make suggestions for improving the investigation. • Plan investigations involving a control, and repeat trials or replicates. • Analyse and explain patterns in results recorded from investigations. • Change one factor at a time during an investigation and test sufficient samples and make reliable conclusions. • Plan investigations and product evaluations involving a control and replicates. • Analyse patterns and make evidence-based conclusions from results recorded in investigations and product evaluations. • Plot results from an investigation as a line graph. • Analyse and explain patterns in results from an investigation.

PrimaryConnections investigating outcomes across outcome levels

Level 1

- Follow directions to make simple tools for observing and describing weather conditions.
- Follow directions to test materials for water resistance.
- Follow directions to conduct simple investigations about rolling.
- Follow directions to conduct simple investigations of the amount of water consumed by an animal and by humans.
- Follow directions to conduct simple investigations about water use in the home.
- Follow directions to conduct simple investigations about sound.
- Follow directions to conduct simple investigations involving floating, sinking and falling through air.
- Follow directions to conduct simple investigations about small animals.
- Follow directions to conduct a simple investigation about how materials can change.
- Make and describe observations.
- Make and share observations.

Level 2

- Identify some variables to investigate.
- Identify basic elements of fair testing.
- Identify patterns in a simple graph.
- Make and record observations.
- Make and record observations and draw conclusions.
- Make measurements and observations.
- Make observations and record measurements in a table.

Level 3

- Formulate a question for investigation and make a prediction.
- Make predictions.
- Show awareness of the need for fair testing.
- Plan an investigation showing awareness of the need for fair testing.
- Plan investigations and product evaluations using models and technical terms showing awareness of the need for fair testing.
- Make measurements and observations.
- Make and record observations, and identify patterns in results.
- Make and record observations using a table.
- Record results as a table and plot results as a column graph.
- Make and record observations and measurements using tables and column graphs.
- Summarise and explain observations made during an investigation.
- Record measurements in a table and display results in a column graph.
- Display results in a column graph and summarise patterns in results.
- Display results in simple tables and graphs or as scientific diagrams.
- Describe the relationship between two variables plotted as a column graph.
- Identify and summarise patterns in results.
- Display results from tests as a graph and summarise patterns in results.

PrimaryConnections investigating outcomes across outcome levels

- Analyse and compare data of earthquake magnitude for Australia and neighbouring countries to investigate patterns in data.
- Use a physical model to represent, investigate and describe how to measure the magnitude of earthquakes.

Level 4

- Use secondary data to represent, investigate and describe the movement of the Earth's tectonic plates.
- Draw evidence-based conclusions about the location of large earthquakes at the edges of tectonic plates.
- Change one factor at a time when modifying circuits to test predictions about possible conductors and insulators and test sufficient samples to make reliable conclusions.
- Formulate generalisations based on observations made during an investigation.
- Make suggestions for improving the investigation.
- Plan investigations involving a control, and repeat trials or replicates.
- Analyse and explain patterns in results recorded from investigations.
- Change one factor at a time during an investigation and test sufficient samples to make reliable conclusions.
- Plan investigations and product evaluations involving a control and replicates.
- Analyse patterns and make evidence-based conclusions from results recorded in investigations and product evaluations.
- Plan investigations involving a control, and repeat trials or replicates.
- Plot results from an investigation as a line graph.
- Analyse and explain patterns in results from an investigation.
- Make suggestions for improving the investigation.

Overview of investigating outcomes in PrimaryConnections units - Early Stage 1

Primary Connections Stage	PrimaryConnections curriculum unit	Level 1	Level 2
Early Stage 1	<i>Weather in my world</i>	<ul style="list-style-type: none"> Follow directions to make simple tools for observing and describing weather conditions. 	<ul style="list-style-type: none"> Identify a variable for investigation. Observe, describe or make non-standard measurements and limited records of data when given a question in a familiar context.
	<i>On the move</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations about rolling. Make and describe observations. 	<ul style="list-style-type: none"> Identify a variable to investigate. Make and record observations.
	<i>Staying alive</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations of the amount of water consumed by an animal and by humans. Make and share observations. 	<ul style="list-style-type: none"> Make and record observations. Identify patterns in a simple picture graph.
	<i>What's it made of?</i>	<ul style="list-style-type: none"> Follow directions to test materials for water resistance. Make and describe observations. 	<ul style="list-style-type: none"> Make and record observations.

Overview of investigating outcomes in PrimaryConnections units - Stage 1

Primary Connections Stage	PrimaryConnections curriculum unit	Level 1	Level 2
Stage 1	<i>Water works</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations about water use in the home. Make and describe observations. 	<ul style="list-style-type: none"> Make and record observations. Identify patterns in a simple column graph.
	<i>Sounds sensational</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations about sound. Make and share observations. 	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make and record observations.
	<i>Push-pull</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations involving floating, sinking and falling through air. Make and share observations. 	<ul style="list-style-type: none"> Identify some variable to investigate. Make and record observations.
	<i>Schoolyard safari</i>	<ul style="list-style-type: none"> Follow directions to conduct simple investigations about small animals. Make and describe observations. 	<ul style="list-style-type: none"> Make and record observations. Identify patterns in a simple graph.
	<i>Spot the difference</i>	<ul style="list-style-type: none"> Follow directions to conduct a simple investigation about how materials can change. Make and share observations. 	<ul style="list-style-type: none"> Make and record observations and draw conclusions. Identify basic elements of fair testing.

Overview of investigating outcomes in PrimaryConnections units - Stage 2

Primary Connections Stage	PrimaryConnections curriculum unit	Level 2	Level 3
Stage 2	<i>Spinning in space</i>	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make and record observations. 	<ul style="list-style-type: none"> Show awareness of the need for fair testing. Make measurements and observations. Record measurements in a table and display results in a column graph.
	<i>Light fantastic</i>	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make observations and record measurements in a table. 	<ul style="list-style-type: none"> Plan an investigation showing awareness of the need for fair testing. Display results in a column graph and summarise patterns in results.
	<i>Smooth moves</i>	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make and record observations and measurements. 	<ul style="list-style-type: none"> Show awareness of the need for fair testing. Make and record observations and measurements using tables and column graphs. Describe the relationship between two variables plotted as a column graph.
	<i>Plants in action</i>	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make and record observations. 	<ul style="list-style-type: none"> Show awareness of the need for fair testing. Make predictions. Make measurements and observations. Display results in simple tables and graphs or as scientific diagrams. Identify and summarise patterns in results.
	<i>Material world</i>	<ul style="list-style-type: none"> Identify some variables that can be investigated. Make non-standard measurements and record data in a table. 	<ul style="list-style-type: none"> Plan an investigation showing awareness of the need for fair testing. Display results from tests as a graph and summarise patterns in results.

Overview of investigating outcomes in PrimaryConnections units - Stage 3

Primary Connections Stage	PrimaryConnections curriculum unit	Level 3	Level 4
Stage 3	<i>Earthquake explorers</i>	<ul style="list-style-type: none"> Analyse and compare data of earthquake magnitude for Australia and neighbouring countries to investigate patterns in data. Use a physical model to represent, investigate and describe how to measure the magnitude of earthquakes. 	<ul style="list-style-type: none"> Use secondary data to represent, investigate and describe the movement of the Earth's tectonic plates. Draw evidence-based conclusions about the location of large earthquakes at the edges of tectonic plates.
	<i>It's electrifying</i>	<ul style="list-style-type: none"> Formulate a question for investigation and make a prediction. Plan for the investigation showing awareness of the need for fair testing. Summarise and explain observations made during an investigation. 	<ul style="list-style-type: none"> Change one factor at a time when modifying circuits to test predictions about possible conductors and insulators and test sufficient samples to make reliable conclusions. Formulate generalisations based on observations made during an investigation. Make suggestions for improving the investigation.
	<i>Marvellous micro-organisms</i>	<ul style="list-style-type: none"> Plan investigations showing an awareness of the need for fair testing. Make and record observations, and identify patterns in results. 	<ul style="list-style-type: none"> Plan investigations involving a control, and repeat trials or replicates. Analyse and explain patterns in results recorded from investigations.
	<i>Package it better</i>	<ul style="list-style-type: none"> Plan investigations and product evaluations using models and technical terms showing awareness of the need for fair testing. Make and record observations using a table. 	<ul style="list-style-type: none"> Change one factor at a time during an investigation and test sufficient samples to make reliable conclusions. Plan investigations and product evaluations involving a control and replicates. Analyse patterns and make evidence based conclusions from results recorded in investigations and product evaluations.
	<i>Change detectives</i>	<ul style="list-style-type: none"> Formulate a question for investigation and make a prediction. Plan investigations showing an awareness of the need for fair testing. Record results as a table and plot results as a column graph. Make and record observations, and identify patterns in results. 	<ul style="list-style-type: none"> Plan investigations involving a control, and repeat trials or replicates. Plot results from an investigation as a line graph. Analyses and explain patterns in results from an investigation. Make suggestions for improving the investigation.

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