PrimaryConnections®
Linking science with literacy

Conceptual outcomes across PrimaryConnections curriculum units

PrimaryConnections Project Stage 3
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Introduction

This document provides an overview of the conceptual outcomes within the Stage 3 Primary**Connections** units (see unit map page 2).

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

Primary**Connections** units provide students with opportunities to learn science as a human endeavour, a way to know and a body of knowledge (MCEETYA, 2006).

The units develop students' skills of working scientifically as they undertake investigations and communicate their understanding about science. Science concepts are described in four conceptual strands:

- Earth and Beyond (Earth and Space*)
- Energy and Change (Energy and Force*)
- Life and Living (Living Things*), and
- Natural and Processed Materials (Matter*).

*Statements of Learning for Science (MCEETYA, 2006)

The units have been organised into four stages of learning:

- Early Stage 1
- Stage 1
- Stage 2
- Stage 3

The stages are linked to the years of schooling and outcome levels in the National Scientific Literacy Progress Map, which was developed for the Year 6 national assessments of scientific literacy (MCEETYA, 2005). Table 1 illustrates the links between PrimaryConnections stages, years of schooling and outcome levels.

Table 1: Stages, years and outcome levels

Primary**Connections stage**	**Years of schooling**	**Outcome levels***
Early Stage 1	1	<1-1
Stage 1	2-3	1-2
Stage 2	4-5	2-3
Stage 3	6-7	3-4

* From the *National Scientific Literacy Progress Map 2005*

Each Primary**Connections** unit identifies conceptual outcomes for two levels, allowing teachers to cater for the range of abilities in the classroom.

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

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**			
			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	***What's it made of?*** Properties and uses of materials in the school environment
Stage 1	1-2	2 & 3	**Stage theme: Organising my world**			
				Sounds sensational Properties, transmission and use of sound energy	***Schoolyard safari*** Features, habitats and behaviour of small invertebrates	***Spot the difference*** Changes to observable properties of materials (eg when solids melt)
			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**			
			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		***Material world*** Properties of materials determine their use
Stage 3	3-4	6 & 7	**Stage theme: Systems and how they work**			
			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)	***Package it better*** Design and make a package to meet the criteria of a design brief
						Change detectives Physical and chemical changes to materials

* From the National Scientific Literacy progress map.

PrimaryConnections® Linking science with literacy

PrimaryConnections conceptual outcomes across the Stages

Early Stage 1	Stage 1	Stage 2	Stage 3
• Observe and describe features of the weather such as temperature, cloud cover, wind strength and rain using appropriate language and symbols. • Identify clothes that are suitable for particular weather conditions. • Identify activities that are suitable for particular weather conditions. • Describe changes in weather conditions with time and location. • Identify the basis needs for a human to survive such as air, food, water and shelter. • Identify the basic needs for an animal to survive such as air, food, water and shelter. • Identify the senses and describe how each sense helps us. • Identify similarities in the basic needs of an animal and a human. • Identify differences in the basic needs of an animal and a human. • Use the senses to respond to and describe a stimulus. • Identify and describe some ways in which humans and toys move. • Identify and describe some parts that enable humans and toys move. • Compare movements made by humans and by different objects. • Group objects according to the way they move.	• Identify and describe uses of water. • Identify sources of water. • Identify an action that can help to conserve water. • Describe differences between own and others use of water. • Describe a way of transferring water from its source to its point of use. • Identify actions that can be taken to conserve water. • Identify parts of a small animal used for movement, feeding and protection. • Identify conditions of a small animal's habitat, for example, moist, cool, dry or hot. • Identify and describe the behaviour of small animals in particular habitat. • Compare the structural features of two small animals. • Compare the habitats of different small animals. • Identify the habitat conditions needed for the survival of a particular small animal. • Identify sources of sound. • Describe some uses of sound. • Describe the characteristics of sound, for example, loud, soft, high, low. • Identify materials through which sound travels, for example, solids and water. • Using familiar examples, describe vibrations as the cause of sound.	• Describe the shapes and sizes of the Sun, Earth and Moon. • Describe the apparent movement of the Sun across the sky from East to West. • Describe changes in shadows, and differences between day and night, and relates these changes to the spinning of the Earth. • Describe the shapes and sizes, positions and movements of the Sun, Earth and Moon. • Explain how day and night occur on Earth. • Describe the changes to the seed during germination and to the seedling during its growth. • Identify a number of conditions required for plants to grow. • Identify parts of a seedling (for example, root, stem, leaves). • Identify parts of a flower (for example, petals, stamens) • Explain the role of roots, stems, leaves, flowers and fruits. • Explain the relationships between the stages of processes in the plant life cycle. • Use force-arrows to show the direction in which forces are acting on an object. • Explain that forces can make things start moving.	• Explain that the Earth's surface is composed of tectonic plates that move. • Identify how tectonic plates push into each other, pull apart from each other and slide past each other. • Describe the scales that are used to measure earthquake magnitude and intensity. • Explain that when tectonic push into each other, pull apart form each other and slide past each other energy builds up as stress in the plates. • Explain how the sudden release of energy causes movement of the ground which results in damage to the buildings and structures. • Explain why most large earthquakes occur at the edges of tectonic plates. • Explain that yeast obtains energy when it breaks down sugars, a process that releases a gas (carbon dioxide). • Explain that east grows faster at warm temperatures than when it is cold or hot. • Explain that the gas produced by yeast forms pockets of gas in the dough and this makes bread rise. • Describe the conditions that affect the growth of mould on food. • Explain that the pockets of (carbon dioxide) gas made by yeast in bread dough expand when heated in cooking, making the bread light.

PrimaryConnections conceptual outcomes across the Stages

Early Stage 1	Stage 1	Stage 2	Stage 3
• Identify examples of everyday materials. • Observe and describe properties of materials. • Describe why a material is used for a particular purpose. • Compare the properties of materials.	• Compare sounds in terms of loudness and pitch. • Compare the transmission of sounds through different materials, for example, solids, water and sound absorbers. • Explain how to change the pitch of a sound source. • Identify everyday materials and their properties. • Observe and describe changes to the properties of everyday materials. • Compare the observable properties of everyday materials. • Describe how changing a material can change its properties. • Identify and describe a push acting on an object in a familiar context. • Identify and describe a pull acting on an object in a familiar context. • Identify pushes and pulls acting on objects floating and sinking in water, and falling through air. • Use force-arrows to show the direction in which a push or pull is acting. • Given a familiar context, explain the effect of a push or pull on the movement of an object. • Given a familiar context, explain the effect of gravity on a falling or sinking object.	• Identify examples of forces that act in direct contact and at a distance. • Explain the effect of forces on the movement of an object. • Use different-sized arrows to represent and compare different-sized forces acting on the direction of movement of an object. • Explain that forces can make things stop moving. • Explain that a larger force has a greater effect on an object and a smaller force has less effect on the same object. • Identify several sources of light and their uses. • Explain that light travels in straight lines. • Explain that we see an object when light reflects off the object into our eyes. • Compare the ability of transparent, translucent and opaque materials to transmit light. • Draw a ray diagram to explain how light from a source is reflected off an object into our eyes so that we see the object. • Explain how transparent, translucent and opaque materials affect the transmission of light. • Describe and compare the properties of materials.	• Describe a circuit in terms of components that form a continuous path for the flow of electrons. • Describe how energy is stored and transferred within an electric circuit. • Explain the characteristics of conductors and insulators in terms of categories of materials. • Explain energy transfer within a circuit in terms of a flow of electrons. • Explain that electrical energy is changed into other forms of energy in circuit and is not used up – that is, energy is transformed and not destroyed. • Explain differences between conductors and insulators in terms of electron flow through these materials. • Describe the characteristics of packages and the properties of materials used to make them. • Explain how and why materials are chosen for particular purposes. • Identify key design features and environmental effects of products and processes used to make packages. • Identify design criteria that reflect the design brief. • Explore relationships between the properties of materials and their use. • Explain options and reasons for selection of materials and the design of a package.

PrimaryConnections conceptual outcomes across the Stages

Early Stage 1	Stage 1	Stage 2	Stage 3
		• Identify an appropriate use for a material based on its properties. • Select materials for various uses showing an awareness of consequences for humans and the environment. • Explain why the properties of a material make it suitable for a particular use.	• Generate package designs based on a design brief, that take into account some social and environmental implications. • Suggest creative solutions to a package and safely deliver a fragile gift. • Explain that changes of state involve physical changes. • Explain that physical changes do not produce new substances. • Explain that chemical changes produce new substances and consume the original substances. • Identify physical and chemical changes. • Identify reversible and irreversible changes. • Explain that physical changes involve changes in the movement and spacing of particles of a substance. • Explain that substances produced by chemical changes have different properties from those used in the reaction. • Explain the importance of classification for identifying differences and similarities between things.

PrimaryConnections conceptual outcomes across outcome levels

Level 1

- Identify and describe uses of water.
- Identify sources of water.
- Identify an action that can help to conserve water.
- Observe and describe features of the weather such as temperature, cloud cover, wind strength and rain using appropriate language and symbols.
- Identify clothes that are suitable for particular weather conditions.
- Identify activities that are suitable for particular weather conditions.
- Identify the senses and describe how each sense helps us.
- Identify parts of a small animal used for movement, feeding and protection.
- Identify conditions of a small animal's habitat, for example, moist, cool, dry or hot.
- Identify and describe the behaviour of small animals in particular habitat.
- Identify and describe some ways in which humans and toys move.
- Identify and describe some parts that enable humans and toys to move.
- Identify sources of sound.
- Describe some uses of sound.
- Describe characteristics of sound, for example, loud, soft, high, low.
- Identify materials through which sound travels, for example, solids and water.
- Identify examples of everyday materials.
- Observe and describe properties of materials.
- Identify everyday materials and their properties.
- Observe and describe changes to the properties of everyday materials.
- Identify and describe a push acting on an object in a familiar context.
- Identify and describe a pull acting on an object in a familiar context.

PrimaryConnections conceptual outcomes across outcome levels

Level 2

- Describe differences between own and others use of water.
- Describe a way of transferring water from its source to its point of use.
- Identify actions that can be taken to conserve water.
- Describe changes in weather conditions with time and location.
- Describe the shapes and sizes of the Sun, Earth and Moon.
- Describe the apparent movement of the Sun across the sky from East to West.
- Describe changes in shadows, and differences between day and night, and relates these changes to the spinning of the Earth.
- Identify similarities in the basic needs of an animal and a human.
- Identify differences in the basic needs of an animal and a human.
- Use the senses to respond to and describe a stimulus.
- Compare the structural features of two small animals.
- Compare the habitats of different small animals.
- Identify the habitat conditions needed for the survival of a particular small animal.
- Describe the changes to the seed during germination and to the seedling during its growth.
- Identify a number of conditions required for plants to grow.
- Identify parts of a seedling (for example, root, stem, leaves).
- Identify parts of a flower (for example, petals, stamens)
- Compare movements made by humans and by different objects.
- Group objects according to the way they move.
- Using familiar examples, describe vibrations as the cause of sound.
- Compare sounds in terms of loudness and pitch.
- Compare the transmission of sounds through different materials, for example, solids, water and sound absorbers.
- Explain how to change the pitch of a sound source.
- Describe why a material is used for a particular purpose.
- Compare the properties of materials.
- Compare the observable properties of everyday materials.
- Describe how changing a material can change its properties.
- Use force-arrows to show the direction in which forces are acting on an object.
- Explain that forces can make things start moving.
- Identify examples of forces that act in direct contact and at a distance.
- Explain the effect of forces on the movement of an object.
- Identify pushes and pulls acting on objects floating and sinking in water, and falling through air.
- Use force-arrows to show the direction in which a push or pull is acting.
- Given a familiar context, explain the effect of a push or pull on the movement of an object.
- Given a familiar context, explain the effect of gravity on a falling or sinking object.
- Identify several sources of light and their uses.
- Explain that light travels in straight lines.
- Explain that we see an object when light reflects off the object into our eyes.
- Compare the ability of transparent, translucent and opaque materials to transmit light.
- Describe and compare the properties of materials.
- Identify an appropriate use for a material based on its properties.

PrimaryConnections conceptual outcomes across outcome levels

Level 3

- Describe the shapes and sizes, positions and movements of the Sun, Earth and Moon.
- Explain how day and night occur on Earth
- Explain that the Earth's surface is composed of tectonic plates that move.
- Identify how tectonic plates push into each other, pull apart from each other and slide past each other.
- Describe the scales that are used to measure earthquake magnitude and intensity.
- Explain the role of roots, stems, leaves, flowers and fruits.
- Explain the relationships between the stages of processes in the plant life cycle.
- Explain that yeast obtains energy when it breaks down sugars, a process that releases a gas (carbon dioxide).
- Explain that yeast grows faster at warm temperatures then when it is cold or hot.
- Explain that the gas produced by yeast forms pockets of gas in the dough and this makes bread rise.
- Describe the conditions that affect the growth of mould on food.
- Describe a circuit in terms of components that forma a continuous path for the flow of electrons.
- Describe how energy is stored and transferred within an electric circuit.
- Explain the characteristics of conductors and insulators in terms of categories of materials.
- Describe the characteristics of packages and the properties of materials used to make them.
- Explain how and why materials are chosen for particular purposes.
- Identify key design features and environmental effects of products and processes used to make packages.
- Identify design criteria that reflect the design brief.
- Explain that changes of state involve physical changes.
- Explain that physical changes do not produce new substances.
- Explain that chemical changes produce new substances and consume the original substances.
- Identify physical and chemical changes.
- Identify reversible and irreversible changes.
- Use different-sized arrows to represent and compare different-sized forces acting on the direction of movement of an object.
- Explain that forces can make things stop moving.
- Explain that a larger force has a greater effect on an object and a smaller force has less effect on the same object.
- Draw a ray diagram to explain how light from a source is reflected off an object into our eyes so that we see the object.
- Explain how transparent, translucent and opaque materials affect the transmission of light.
- Select materials for various uses showing an awareness of consequences for humans and the environment.
- Explain why the properties of a material make it suitable for a particular use.

PrimaryConnections conceptual outcomes across outcome levels

Level 4

- Explain that when tectonic push into each other, pull apart form each other and slide past each other energy builds up as stress in the plates.
- Explain how the sudden release of energy causes movement of the ground which results in damage to the buildings and structures.
- Explain why most large earthquakes occur at the edges of tectonic plates.
- Explain that the pockets of (carbon dioxide) gas made by yeast in bread dough expand when heated in cooking, making the bread light.
- Explain energy transfer within a circuit in terms of a flow of electrons.
- Explain that electrical energy is changed into other forms of energy in a circuit and is not used up – that is, energy is transformed and not destroyed.
- Explain differences between conductors and insulators in terms of electron flow through these materials.
- Explore relationships between the properties of materials and their use.
- Explain options and reasons for selection of materials and the design of a package.
- Generate package designs based on a design brief, that take into account some social and environmental implications.
- Suggest creative solutions to a package and safely deliver a fragile gift.
- Explain that physical changes involve changes in the movement and spacing of particles of a substance.
- Explain that substances produced by chemical changes have different properties from those used in the reaction.
- Explain that the importance of classification for identifying differences and similarities between things.

Overview of conceptual outcomes in PrimaryConnections units - Early Stage 1

Primary **Connections Stage**	Primary**Connections curriculum unit**	**Level 1**	**Level 2**
Early Stage 1	*Weather in my world*	• Observe and describe features of the weather such as temperature, cloud cover, wind strength and rain using appropriate language and symbols. • Identify clothes that are suitable for particular weather conditions. • Identify activities that are suitable for particular weather conditions.	• Describe changes in weather conditions with time and location.
	On the move	• Identify and describe some ways in which humans and toys move. • Identify and describe some parts that enable humans and toys to move.	• Compare movements made by humans and by different objects. • Group objects according to the way they move.
	Staying alive	• Identify the basis needs for a human to survive such as air, food, water and shelter. • Identify the basic needs for an animal to survive such as air, food, water and shelter. • Identify the senses and describe how each sense helps us.	• Identify similarities in the basic needs of an animal and a human. • Identify difference in the basic needs of an animal and a human. • Use the senses to respond to and describe a stimulus.
	What's it made of?	• Identify examples of everyday materials. • Observe and describe properties of materials.	• Describe why a material is used for a particular purpose. • Compare the properties of materials.

Overview of conceptual outcomes in PrimaryConnections units - Stage 1

Primary **Connections Stage**	Primary**Connections curriculum unit**	**Level 1**	**Level 2**
Stage 1	*Water works*	• Identify and describe uses of water. • Identify sources of water. • Identify an action that can help to conserve water.	• Describe differences between own and others use of water. • Describe a way of transferring water from its source to its point of use. • Identify actions that can be taken to conserve water.
	Sounds sensational	• Identify sources of sound. • Describe some uses of sound. • Describe characteristics of sound, for example, loud, soft, high, low. • Identify materials through which sound travels, for example, solids and water.	• Using familiar examples, describe vibration as the cause of sound. • Compare sounds in terms of loudness and pitch. • Compare the transmission of sounds through different materials, for example, solids, water and sound absorbers. • Explain how to change the pitch of a sound source.
	Push-pull	• Identify and describe a push acting on an object in a familiar context. • Identify and describe a pull acting on an object in a familiar context.	• Identify pushes and pulls acting on objects floating and sinking in water, and falling through air. • Use force-arrows to show the direction in which a push or a pull is acting. • Given a familiar context, explain the effect of a push or pull on the movement of an object. • Given a familiar context, explain the effect of gravity on a falling or sinking object.
	Schoolyard safari	• Identify parts of a small animal used for movement, feeding and protection. • Identify conditions of a small animal's habitat, for example, moist, cool, dry or hot. • Identify and describe the behaviour of small animals in particular habitat.	• Compare the structural features of two small animals. • Compare the habitats of different small animals. • Identify the habitat conditions needed for the survival of a particular small animal.
	Spot the difference	• Identify everyday materials and their properties. • Observe and describe changes to the properties of everyday materials.	• Compare the observable properties of everyday materials. • Describe how changing a material can change its properties.

Overview of conceptual outcomes in PrimaryConnections units - Stage 2

Primary **Connections Stage**	Primary**Connections curriculum unit**	**Level 2**	**Level 3**
Stage 2	*Spinning in space*	• Describe the shapes and sizes of the Sun, Earth and Moon. • Describe the apparent movement of the Sun across the sky from East to West. • Describe changes in shadows, and differences between day and night, and relates these changes to the spinning of the Earth.	• Describe the shapes and sizes, positions and movements of the Sun, Earth and Moon. • Explain how day and night occur on Earth.
	Light fantastic	• Identify several sources of light and their uses. • Explain that light travels in straight lines. • Explain that we see an object when light reflects off the object into our eyes. • Compare the ability of transparent, translucent and opaque materials to transmit light.	• Draw a ray diagram to explain how light from a source is reflected off an object into our eyes so that we see the object. • Explain how transparent, translucent and opaque materials affect transmission of light.
	Smooth moves	• Use force-arrows to show the direction in which forces are acting on an object. • Explain that forces can make things start moving. • Identify examples of forces that act in direct contact and at a distance. • Explain the effect of forces on the movement of an object.	• Use force-arrows to represent and compare different-sized forces acting on the direction of movement of an object. • Explain that forces can make things stop moving. • Explain that a larger force has a greater effect on an object and a smaller force has less effect on the same object.
	Plants in action	• Describe changes to the seed during germination and to the seedling during its growth. • Identify a number of conditions required for plants to grow. • Identify parts of a seedling (for example, root, stem, leaves). • Identify parts of a flower (for example, petals, stamens).	• Explain the role of roots, stems, leaves, flowers and fruits. • Explain the relationships between the stages and processes in the plant life cycle.
	Material world	• Describe and compare the properties of materials. • Identify an appropriate use for a material based on its properties.	• Select materials for various uses showing an awareness of consequences for humans and the environment. • Explain why the properties of a material make it suitable for a particular use.

Overview of conceptual outcomes in PrimaryConnections units - Stage 3

Primary **Connections Stage**	Primary**Connections curriculum unit**	**Level 3**	**Level 4**
Stage 3	*Earthquake explorers*	• Explain that the Earth's surface is composed of tectonic plates that move. • Identify how tectonic plates push into each other, pull apart from each other and slide past each other. • Describe the scales that are used to measure earthquake magnitude and intensity.	• Explain that when tectonic push into each other, pull apart form each other and slide past each other energy builds up as stress in the plates. • Explain how the sudden release of energy causes movement of the ground which results in damage to the buildings and structures. • Explain why most large earthquakes occur at the edges of tectonic plates.
	It's electrifying	• Describe a circuit in terms of components that form a continuous path for the flow of electrons. • Describe how energy is stored and transferred within an electric circuit. • Explain the characteristics of conductors and insulators in terms of categories of materials.	• Explain energy transfer within a circuit in terms of a flow of electrons. • Explain that electrical energy is changed into other forms of energy in a circuit and is not used up - that is, energy is transformed and not destroyed. • Explain differences between conductors and insulators in terms of categories of materials.
	Marvellous micro-organisms	• Explain that yeast obtains energy when it breaks down sugars, a process that releases a gas (carbon dioxide). • Explain that yeast grows faster at warm temperatures than when it is cold or hot. • Explain that the gas produced by yeast forms pockets of gas in the dough and this makes bread rise.	• Explain that the pockets of (carbon dioxide) gas made by yeast in bread dough expand when heated in cooking, making bread light.

Overview of conceptual outcomes in PrimaryConnections units - Stage 3

Primary **Connections Stage**	Primary**Connections curriculum unit**	**Level 3**	**Level 4**
Stage 3	*Package it better*	• Describe the characteristics of packages and the properties of materials used to make them. • Explain how and why materials are chosen for particular purposes. • Identify key design features and environmental effects of products and processes used to make packages. • Identify design criteria that reflect the design brief.	• Explore relationships between the properties of materials and their use. • Explain options and reasons for selection of materials and the design of a package. Generate package designs based on a design brief, that take into account some social and environmental implications. • Suggest creative solutions to a package and safely deliver a fragile gift.
	Change detectives	• Explain that changes of state involve physical changes. • Explain that physical changes do not produce new substances. • Explain that chemical changes produce now substances and consume the original substances. • Identify physical and chemical changes. • Identify reversible and irreversible changes.	• Explain that physical changes involve changes in the movement and spacing of particles of a substance. • Explain that substances produced by chemical changes have different properties from those used in the reaction. • Explain the importance of classification for identifying differences and similarities between things.

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