



THE SUPER POLLINATORS
NSW NESA CURRICULUM ALIGNMENT
2019

NSW NESA CURRICULUM 2019

STAGE 1

SCIENCE & TECHNOLOGY

GEOGRAPHY

STAGE 1 SCIENCE & TECHNOLOGY

UNIT & ALIGNED CONTENT	CODE	OUTCOMES - A student:	CONTENT: Students:
LIVING WORLD Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> • Bees are invertebrates that have identifiable external features which allow them to be identified • Invertebrate specimens of a range of species are provided for examination under magnification • A large bee model is provided • Different bee species require certain habitats (bare earth, hollows, stems) and seasonal flowers to be available all year round • Science and technology is used to monitor bees and their needs • The life cycle of several different bees species is showcased including a resin encased model of the honey bee lifecycle • Scientists have identified that bees are impacted by many human actions • Humans need bees to pollinate crops • Bees are needed to pollinate natural environments • We can create bee friendly environments • Stingless bees produce honey that is a prized bush tucker by indigenous people 	ST1-4LW-S	describes observable features of living things and their environments	External features of living things Students: <ul style="list-style-type: none"> • describe the external features of a variety of living things (ACSSU017) • identify and group plants and animals using their external features (SciT, SysT) Living things live in different places Students: <ul style="list-style-type: none"> • identify that living things live in different places that suit their needs (ACSSU211) • recognise that people use science and technology in their daily lives, including when caring for their environment and living things (ACSHE022, ACSHE035) Living things change Students: <ul style="list-style-type: none"> • explore how living things grow, change and have offspring similar to themselves (ACSSU030, SciT) Plants and animals used for food and fibre Students: <ul style="list-style-type: none"> • identify some plants and animals that are grown and used for food production (ACTDEK003, SysT) • explore the plants and animals used in customary practices of Aboriginal and Torres Strait Islander Peoples
SKILLS Example of how The Super Pollinators content develops and applies skills: <ul style="list-style-type: none"> • A 5-step bee hotel is constructed of simple materials using a hammer and nails • The hotel is finished with bee-friendly products • The bee hotel is designed to be attractive to over 20 local bee species 	ST1-5WT	observes, questions and collects data to communicate and compare ideas	Students develop and apply skills in: <ul style="list-style-type: none"> • scientific inquiry through the process of working scientifically

ADDRESSING KEY INQUIRY QUESTIONS FOR ST1 LIVING WORLD

Q: What are the external features of living things?

A: Invertebrates have observable external features such as body shape and parts that allow them to be identified

Q: How can we improve a local environment to encourage living things to thrive?

A: We can care for places by encouraging specific animal habitat, varied seasonal food sources and chemical free environments

Q: How do living things change as they grow?

A: Bees have different life stages and undergo metamorphosis

Q: How do humans use plants and animals?

A: Bees are used for the pollination of agricultural crops and for honey production

The Super Pollinators content supports:

Needs of Living Things (ASTA), Schoolyard Safari (Primary Connections), Watch it grow! (Primary Connections)

The Super Pollinators content chiefly supports:

Cross-curriculum priorities (sustainability), general capabilities (critical and creative thinking, ethical understanding, personal and social capability) and civics and citizenship





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STAGE 2

SCIENCE & TECHNOLOGY

GEOGRAPHY

STAGE 2 SCIENCE & TECHNOLOGY

UNIT & ALIGNED CONTENT	CODE	OUTCOMES - A student:	CONTENT
LIVING WORLD Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> • Bees are invertebrates that have external features that allow them to be classified • Invertebrate specimens of a range of species and a large model are provided for examination under magnification • The life cycle of several different bees are showcased including a resin encased model • Science is used to predict and describe patterns of bee behaviour and abundance, as well as impacts from human intervention • Bees have different lifecycles (many have an annual cycle) • Bees are important for pollination of agricultural and native plants • Bees are impacted by many human actions • Bees require specific habitat, weather and seasonal conditions • Environmental conditions affect the lifecycle of plants and animals • Students are encouraged to conduct a pollinator survey of a site and communicate findings • Bees have specific habitat requirements (hollows, stems, bare earth) and target different plants for foraging • Plants rely on specific pollinators for survival (mutual relationship) • Science has demonstrated all bees species behave differently and are active seasonally • Plant diversity is important for bee survival (E.g. agricultural monocultures are detrimental to bee health) • Science has shown the importance of bee diversity for pollination success, the affects on bees of pesticides use and the value of diverse habitats for bee survival • Plan Bee - we can create a sustainable environment for bees 	ST2-4LW-S	compares features and characteristics of living and non-living things	Classification of living things Students: <ul style="list-style-type: none"> • collect data and identify patterns to group living things according to their external features, and distinguish them from non-living things (ACSSU044, SysT) • identify that science involves making predictions and describing patterns and relationships (ACSHE050, ACSHE061, SciT)
	ST2-5LW-T	describes how agricultural processes are used to grow plants and raise animals for food, clothing and shelter	Life cycles of living things Students: <ul style="list-style-type: none"> • identify that living things have life cycles (ACSSU072) • conduct an investigation into the life cycle of plants and/or animals (ACSSU072) Survival of living things Students: <ul style="list-style-type: none"> • describe how living things depend on each other and the environment to survive (ACSSU073, SysT) Producing food and fibre from living things Students: <ul style="list-style-type: none"> • investigate and compare advancing technologies used in food and fibre production in Australian agriculture and those used in traditional agriculture (ACTDEK012, SciT, SysT)
MATERIAL WORLD Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> • A 5-step bee hotel is built specifically designed to meet the needs of over 20 bee species discussed in the program • Students can decorate their hotel using colours and designs that are attractive to bees • The bee hotels are made from untreated cut timber and bamboo • Students select different sizes of bamboo to accommodate a range of bee species • Students decorate and water proof their hotels with environmentally friendly products • The materials are sustainably grown and harvested 	ST2-7MW-T	investigates the suitability of natural and processed materials for a range of purposes	Material world Students: <ul style="list-style-type: none"> • investigate how different properties of materials affect their suitability for products
SKILLS Example of how The Super Pollinators content develops and applies skills: <ul style="list-style-type: none"> • Students question the suitability of the local environment for bees and determine a site for their bee hotel • A pollinator survey of school grounds can be conducted and findings communicated using scientific representations 	ST2-1WS-S	questions, plans and conducts scientific investigations, collects and summarises data and communicates using scientific representations	Students develop and apply skills in: <ul style="list-style-type: none"> • scientific inquiry through the process of working scientifically

ADDRESSING KEY INQUIRY QUESTIONS FOR ST2 LIVING WORLD

Q: How can we group living things?

A: Bees have external features such as body shape and parts that allow them to be classified

Q: What are the similarities and differences between the life cycles of living things?

A: Bees species have different lifecycles - many have a solitary existence with each female being reproductive, while other species form a colony with a reproductive queen

Q: How are environments and living things interdependent?

A: Plants rely on particular bees species for pollination, and bees rely on particular habitats for nesting

The Super Pollinators content supports: Living and non-living things (ASTA), Feathers, fur or leaves? (Primary Connections), Plants in Action (Primary Connections), Friends or foe? (Primary Connections), Among the gum trees (Primary Connections).

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STAGE 2

SCIENCE & TECHNOLOGY

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STAGE 2 GEOGRAPHY

UNIT & ALIGNED CONTENT	CODE	OUTCOMES - A student:	CONTENT: Students:
PLACES ARE SIMILAR AND DIFFERENT Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> • Bees are found in varied habitats and climates (E.g. Ground burrowing desert bees) • Places can be protected or improved to encourage greater bee diversity • The more bee species the better for biodiversity and agricultural productivity • Animals are found in limited ranges, and their distribution is limited by habitat suitability • Weather and climate influences habitat suitability for plants and animals 	GE2-1 GE2-2 GE2-3	examines features and characteristics of places and environments describes the ways people, places and environments interact examines differing perceptions about the management of places and environments	<ul style="list-style-type: none"> • The Australian continent: investigate Australia's major natural and human features • Climate of places: investigate the climates of different places • Perception and protection of places: investigate how the protection of places is influenced by people's perception of places

ADDRESSING KEY INQUIRY QUESTIONS FOR PLACES ARE SIMILAR AND DIFFERENT

Q: How and why are places similar and different?

A: Different habitats occur due to climate and other geographical variations. Bees and other animals are found in limited ranges where their needs are met.

Q: How do people's perceptions about places influence their views about the protection of places?

A: Bees have specific habitat requirements. Bees are vital for pollination of agricultural and natural places. People who understand this have cause to protect bee habitat for their own well being as well as that of biodiversity generally.

THE EARTH'S ENVIRONMENT Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> • Bees require specific and varied natural habitats • Natural vegetation is important for bees • Natural vegetation requires bee pollination which is vital for biodiversity and ecosystem function • Bees are influenced by human behaviour (E.g. habitat modification, agricultural monocultures and pesticide use, garden design) • Bees are vital for pollination of crops and native plants • More bee species are found where habitat is diverse • Bees can be encouraged with sustainable practices • Indigenous people harvested native bee honey sustainably 	GE2-1 GE2-2 GE2-3	examines features and characteristics of places and environments describes the ways people, places and environments interact examines differing perceptions about the management of places and environments	<ul style="list-style-type: none"> • Different environments: investigate the natural characteristics of Australia • Significance of environments: investigate the importance of natural vegetation and natural resources to the environment, animals and people • Perception of environments: investigate the ways people, including Aboriginal and Torres Strait Islander Peoples, value environments • Protection of environments: investigate sustainable practices that protect environments, including those of Aboriginal and Torres Strait Islander Peoples
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ADDRESSING KEY INQUIRY QUESTIONS FOR THE EARTH'S ENVIRONMENT

Q: How does the environment support the lives of people and other living things?

A: Bees are vital for pollination of agricultural and natural places

Q: How do different views about the environment influence approaches to sustainability?

A: Different agricultural practices, landscape design, and gardener's decisions impact bees. People have differing views on land use and management practices may not always be sustainable

Q: How can people use places and environments more sustainably?

A: Habitat and crop variation, and sustainable pest controls, improve bee abundance and diversity, which supports ecosystem function and human well being.

The Super Pollinators supports geographical inquiry and tools for example:

FIELDWORK: (Post incursion) Survey for bee species, bee habitat and flowering resources and identify location for bee hotel

GRAPHS AND STATISTICS: (Post incursion) Tally the diversity and abundance of pollinator species using the survey provided to create graphs and statistics

VISUAL REPRESENTATIONS: Students observe invertebrates under magnification providing detail for visual representations

The Super Pollinators content chiefly supports:

Cross-curriculum priorities (sustainability), general capabilities (critical and creative thinking, ethical understanding, personal and social capability) and civics and citizenship





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STAGE 3

SCIENCE & TECHNOLOGY

GEOGRAPHY

STAGE 3 SCIENCE & TECHNOLOGY

UNIT & ALIGNED CONTENT	CODE	OUTCOMES - A student:	CONTENT: Students:
LIVING WORLD Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> Bees are impacted by the physical condition of their environment including habitat (hollow, earth or stem dweller) and climate variations (bees fly at different temperatures and many solitary species are in larval stage over winter) Different physical habitat variation influences the suitability for bee and plant diversity Science and technological knowledge are used to monitor bees and impacts on their environment Humans can influence the survival of living things by considering and accommodating their requirements There are over 200 bee species in Sydney that are varied in their appearance and abilities (E.g. short and long tongue specialists, buzz pollinators, different life cycles, different flight capability, different habitat requirements) Bee species have adaptations that allow them to survive in their environment A large bee model is provided to easily identify structural features, and over 100 preserved invertebrates can be observed under magnification Many plants are reliant on particular bee species for pollination (such as tomatoes need buzz pollinators, tubular flowers need small bees or those with long tongues) Bees are threatened by many agricultural practices including chemical use and monocultures Honey bees hives are hired for intensive pollination of agricultural systems Bee diversity and habitat retention benefits agriculture Indigenous people sustainably harvest bee products such as sugar bag 	ST3-4LW-5	examines how the environment affects the growth, survival and adaptation of living things	Growth and survival of living things Students: <ul style="list-style-type: none"> describe how changing physical conditions in the environment affect the growth and survival of living things test predictions by gathering data and use evidence to develop explanations of events and phenomena (ACSHE081, ACSHE098, SciT) understand that scientific and technological knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100, SciT) Adaptations of living things Students: <ul style="list-style-type: none"> describe adaptations as existing structures or behaviours that enable living things to survive in their environment (ACSSU043, SciT) describe the structural and/or behavioural features of some native Australian animals and plants and why they are considered to be adaptations (SciT) Sustainably managing environments to source food and fibre Students: <ul style="list-style-type: none"> explore examples of managed environments used to produce food and fibre (SysT) investigate how and why food and fibre are produced in managed environments (ACTDEK021) explore plants and animals, tools and techniques used to prepare food to enable people to grow and be healthy (ACTDEK021) explain a sustainable practice used by Aboriginal and/or Torres Strait Islander communities to manage food and fibre resources
	ST3-5LW-T	explains how food and fibre are produced sustainably in managed environments for health and nutrition	
SKILLS Example of how The Super Pollinators content develops and applies skills: <ul style="list-style-type: none"> Students collect information about bee species and consolidate findings to conclude the importance of bee diversity for pollination success 	ST3-1WS-5	plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions	Students develop and apply skills in: <ul style="list-style-type: none"> scientific inquiry through the process of working scientifically
MATERIAL WORLD Example of The Super Pollinators content for this unit: <ul style="list-style-type: none"> The bee hotel is built to specifically accommodate a range of bee species A range of bamboo provides varied opportunities for different bee species The materials are sustainably grown and harvested The timber is untreated for the safety of the bees. the hotel has an awning to provide weather protection The exterior is finished with eco friendly waterproof lacquer The placement of the finished hotel needs consideration for suitability 	ST3-7MW-T	explains how the properties of materials determine their use for a range of purposes	Properties of materials determine their use Students: <ul style="list-style-type: none"> critique needs or opportunities for designing using sustainable materials (DeST) design a sustainable product, system or environment individually and/or collaboratively considering the properties of materials (SysT DeST) select appropriate materials, components, tools, equipment and techniques and apply safe procedures to produce designed solutions (DeST)

ADDRESSING KEY INQUIRY QUESTIONS FOR LIVING WORLD

Q: How do physical conditions affect the survival of living things?

A: Bees can only survive where their needs are met which includes nesting and foraging opportunities, climate and weather patterns

Q: How do the structural and behavioural features of living things support survival?

A: Bees have different physical features such as tongue length which allows them to access certain flowers

Q: Why is it important for food and/or fibre to be produced sustainably?

A: A sustainable approach needs to be implemented to address the issues facing bees which include habitat loss, chemical use and monocultures. Humans rely on pollination by bees for 75% of crops

The Super Pollinators content supports: Survival (ASTA), Desert Survivor's (Primary Connections)





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STAGE 3

SCIENCE & TECHNOLOGY

GEOGRAPHY

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UNIT & ALIGNED CONTENT	CODE	OUTCOMES - A student:	CONTENT: Students:
<p>FACTORS THAT SHAPE PLACES</p> <p>Example of The Super Pollinators content for this unit:</p> <ul style="list-style-type: none"> • People change the environment for bees by reducing habitat and modifying it through land use like agriculture • The natural environment provides vital ecosystem services such as pollination, which in turn influence agricultural success and biodiversity • People influence places through land use, chemical use, introducing foreign species to Australia (like honey bees), and altering species diversity through modifying habitat • Human induced climate change will impact seasonal flowering times, bee distribution and pollination • Bushfire removes habitat for bees. A contemporary example occurred in South Australia which contributed to the extinction of the green carpenter bee in that state 	<p>GE3-1</p> <p>GE3-2</p> <p>GE3-3</p>	<p>describes the diverse features and characteristics of places and environments</p> <p>explains interactions and connections between people, places and environment</p> <p>compares and contrasts influences on the management of places and environments</p>	<ul style="list-style-type: none"> • Factors that change environments: investigate the ways people change the natural environment in Australia and another country • Environments shape places: investigate how the natural environment influences people and places • Humans shape places: investigate how people influence places • Bushfire Hazard: investigate the impact of ONE contemporary bushfire hazard in Australia

ADDRESSING KEY INQUIRY QUESTIONS FOR FACTORS THAT SHAPE PLACES

Q: How do people and environments influence each other?

A: Bee's are vital for pollination of agricultural and natural places, however habitat diversity is vital for bee abundance - which is influenced by human activity

Q: How do people influence places and the management of spaces within them?

A: Different agricultural practices, landscape design, and even an individual gardener's decisions, influence habitat suitability for bees

Q: How can the impact of bushfires on people and places be reduced?

A: Planned and appropriate fire regimes can reduce bush fire risk for people and biodiversity, including bees

The Super Pollinators supports geographical inquiry and tools for example:

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