PLANTING FOR Bees

Year 7 - Year 10

Complete Unit of Work

11 Lessons (approx 60 minutes each)
Aligned to the Australian & Victorian Curriculum

Proud Partners
Inspiring a love of bees through learning





ABOUT

Provide your students with an In depth exploration into the invaluable role of pollinators! Discover the symbiotic relationship between pollinators and plants, and how we as humans can support them. Explicit teaching of concepts around plant biology, pollination, and food security will provide students with the knowledge they require to undertake research and design their own pollinator friendly garden.

'Planting for Bees' provides students with opportunities to:

- · Learn about the reproductive anatomy of flowers to gain a deeper understanding into how pollination occurs.
- Explore the importance of pollinators and pollination for food security.
- Understand the importance of the symbiotic relationship between pollinators, plants, and humans, and how each helps the other to survive, as well as the impact of environmental factors on these relationships.
- Enjoy a honey tasting experience to explore how the nectar source creates the unique taste profile of different honeys and how honey is produced as part of a larger food system.
- Discover what 'bee friendly' flowers are, and how we can encourage pollinators into our environments.
- Undertake research to meet criteria of 'Bee Friendly Farming GARDEN'.

Students apply their new learning by:

- Planting 'bee friendly' seeds in an environment within the school grounds which is lacking food for pollinators.
- Discovering which plants have adapted to grow in their schools' particular region.
- Use research to drive their design of a pollinator friendly garden.

'Planting for Bees' (Year 7 - Year 10) is aligned with the Australian and Victorian Curriculums. It has been adapted to include Geographical Knowledge, Geographical Concepts and Skills, Science Understanding, Science as a Human Endeavour, Inquiry Skills Standards, and the Sustainability Cross-Curriculum Priorities. The unit of work has been created by a team of qualified and experienced teachers from Bee School by Beechworth Honey in collaboration with the Wheen Bee Foundation. With minimal adaptations required, this unit of work can be used by secondary school teachers, science specialists, geography specialists, home school groups, and school holiday programs.

Everything you need to deliver this engaging and hands-on learning experience will be provided - including lesson plans, assessment opportunities, seeds for planting, honey for tasting, reading material, videos, and printable information

* 'Bee Friendly Farming GARDEN' is specifically designed for home, public, school and community gardeners who promote and provide habitat and pollinator health in non-commercial settings.

This unit of work provides students with the knowledge and skills to be advocates for pollinators and create a pollinator friendly environment. This project provides students with a purposeful and real-life inquiry project. By purchasing this unit you are gaining registration for your school as a Bee Friendly GARDEN which enables the continuation of learning from this unit in real life ways such as:

- · Access to grants for free or subsidised trees and seeds to support habitat restoration projects.
- Becoming part of a learning network of like-minded farmers and gardeners.
- Monthly newsletter/blog/ website/other features to learn from and be featured in.

For more information about Bee Friendly Farming GARDEN please head to: www.beefriendlyfarming.org.au

ABOUT

What's included:

- Background information for educators on the topics of pollinators and plants.
- 11 x 1-hour lessons including:
 - · Learning intentions and success criteria
 - Resource list (all resources included and noted below)
 - Assessment opportunities
- · Curriculum links:
 - · Australian Curriculum Science and Geography
 - · Victorian Curriculum Science and Geography
 - · Science Inquiry Skills
 - Sustainability Cross-Curriculum Priorities
- · All resources needed to teach the lessons are included:
 - Complete unit of work 11 x 1 hour lesson plans
 - · Worksheets and assessment templates
 - · Supporting videos and sound clips
 - 30 x Bee Friendly Seed packets*
 - 3 x Jars of Single Varietal Honey*
 - Bee Friendly Farming GARDEN Registration (value \$39)
 - Bee Friendly Farming GARDEN Sign (value \$30)

Disclaimer

While all reasonable efforts have been taken to ensure the contents of this educational resource are factually correct and aligned with the Australian and Victorian Curriculum, it is the responsibility of the individual educators and schools to ensure these lessons meet their curriculum needs and are suitable for their students.

All videos, photographs, and resources have been created by Bee School by Beechworth Honey in collaboration with the Wheen Bee Foundation, unless otherwise stated and referenced, and are to be used for education and training purposes only.

*Please note: Due to domestic quarantine restrictions Bee Friendly Seeds and Honey cannot be shipped to Tasmania or Western Australia and will not be included in the Planting for Bees learning kit.

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Geographical Knowledge & Understanding

Year 7	Year 8
-	Human causes and effects of landscape degradation (ACHGK051)
Year 9	Year 10
Distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivity (ACHGK060) Human alteration of biomes to produce food, industrial materials and fibers, and the use of	Human-induced environmental changes that challenge sustainability (ACHGK070) The application of systems thinking to understanding the causes and likely consequences of the environmental change being investigated (ACHGK073)
systems thinking to analyse the environmental effects of these alterations (ACHGK061)	The application of geographical concepts and methods to the management of the environmental change being investigated
Environmental, economic and technological factors that influence crop yields in Australia and across the world (ACHGK062)	(ACHGK074)
Challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world (ACHGK063)	

Geography Inquiry and Skills

	Year 7 and Year 8	Year 9 and Year 10
Observing, Questioning and Planning	Develop geographically significant questions and plan an inquiry using appropriate geographical methodologies and concepts (ACHGS047) (ACHGS055)	Develop geographically significant questions and plan an inquiry that identifies and applies appropriate geographical methodologies and concepts (ACHGS063) (ACHGS072)
Collecting, Recording, Evaluating and Representing	Evaluate sources for their reliability and usefulness and select, collect and record relevant geographical data and information, using ethical protocols, from appropriate primary and secondary sources (ACHGS048) (ACHGS056)	Evaluate sources for their reliability, bias and usefulness and select, collect, record and organise relevant geographical data and information using ethical protocols, from a range of appropriate primary and secondary sources (ACHGS064) (ACHGS073)
Interpreting, Analysing and Concluding	Interpret geographical data and other information using qualitative and quantitative methods, and digital and spatial technologies as appropriate, to identify and propose explanations for spatial distributions, patterns and trends and infer relationships (ACHGS051) (ACHGS059) Apply geographical concepts to draw conclusions based on the analysis of the data and information collected (ACHGS052) (ACHGS060)	Interpret and analyse multi-variable data and other geographical information using qualitative and quantitative methods, and digital and spatial technologies as appropriate, to make generalisations and inferences, propose explanations for patterns, trends, relationships and anomalies, and predict outcomes (ACHGSO67) (ACHGSO76) Apply geographical concepts to synthesise information from various sources and draw conclusions based on the analysis of the data and information taking into account alternative points of view (ACHGSO68) (ACHGSO77)
Communicating	Present findings, arguments and ideas in a range of communication forms selected to suit a particular audience and purpose; using geographical terminology and digital technologies as appropriate (ACHGS053) (ACHGS061)	Present findings, arguments and explanations in a range of appropriate communication forms, selected for their effectiveness and to suit audience and purpose; using relevant geographical terminology, and digital technologies as appropriate (ACHGS070) (ACHGS079)
Reflecting and Responding	Reflect on their learning to propose individual and collective action is response to a contemporary geographical challenge, taking account of environmental, economic and social considerations, and predict the expected outcomes of their proposal (ACHGS054) (ACHGS062)	Reflect on and evaluate findings of an inquiry to propose individual and collective action in response to a contemporary geographical challenge, taking account of environmental, economic, political and social considerations; and explain the predicted outcomes and consequences of their proposal (ACHGS071) (ACHGS080)

Science

	Year 7	Year 8
Science Understanding	Classification helps organise the diverse group of organisms (ACSSU111) Interactions between organisms including the effects	Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce (ACSSU150)
	of human activities can be represented by food chains and food webs (ACSSU112)	
Science as a Human Endeavour	Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119)	Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE134)
	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121)	People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE136)
	Year 9	Year 10
Science Understanding	Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment (ACSSU175)	
	Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176)	
Science as a Human Endeavour	People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect peoples lives including generating new career opportunities (ACSHE160)	People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect peoples lives including generating new career opportunities (ACSHE194)
	Values and needs of contemporary society can influence the focus of scientific research (ACSHE228)	Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)

Science Inquiry Skills

	Year 7 - Year 8	Year 9 - Year 10
Questioning and Predicting	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS124) (ACSIS139)	Formulate questions or hypotheses that can be investigated scientifically (ACSIS164) (ACSIS193)
Planning and Conducting	Collaboratively and individually plan and conduct a range of investigation types, including field work and experiments, ensuring safety and ethical guidelines are followed (ACSIS125) (ACSIS140) Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACSIS126) (ACSIS141)	Plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data; access risk and address ethical issues associated with these methods (ACSIS165) (ACSIS199) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS166) (ACSIS200)
Processing and Analysing Data and Information	Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (ACSIS129) (ACSIS144) Summarise data from students; own investigation and secondary sources and use scientific understanding to identity relationships and draw conclusions based on evidence (ACSIS130) (ACSIS145)	Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS169) (ACSIS203) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS170) (ACSIS204)
Evaluating	Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS131) (ACSIS146) Use scientific knowledge and findings from investigations to evaluate claims based on evidence (ACSIS132) (ACSIS234)	Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS171) (ACSIS205) Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (ACSIS172) (ACSIS206)
Communicating	Communicate ideas, findings and evidence- based solutions to problems using scientific language, and representations, using digital technologies as appropriate (ACSIS133) (ACSIS148)	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS174) (ACSIS208)

Sustainability Cross-Curriculum Priorities

Systems	All life forms, including human life, are connected through ecosystems on which they depend, for their wellbeing and survival (Ol.2)
	Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems (OI.3)
World Views	World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability (OI.4)
	World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability (OI.5)
Futures	Actions for a more sustainable future reflect values of care, respect and responsibility and require us to explore and understand environments (OI.7)
	Sustainable futures results from actions designed to preserve and/or restore the quality and uniqueness of environments (OI.9)



Please note:

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VICTORIAN CURRICULUM LINKS

Geographical Knowledge

Level 7 - Level 8	Level 9 - Level 10	
Different types of landscapes and their distinctive landform features (VCGGK116)	Environmental, economic and technological factors that influence crop yields in Australia and across the world (VCGGK134)	
Human causes of landscape degradation, the effects on landscape quality and the implications for places (VCGGK119)		
	Human alteration of biomes to produce food, industrial materials and fibres, and the environmental effects of these alterations (VCGGK136)	
	Effects of the production and consumption of goods on places and environments (VCGGK142)	
	Environmental, economic and technological factors that influence environmental change and human responses to its management (VCGGK145)	

Geographical Concepts and Skills

	Level 7 - Level 8	Level 9 - Level 10
Place, Space and Interconnection	Explain processes that influences the characteristics of places (VCGGC099) Identify, analyse and explain interconnections within places and between places and identify and explain changes resulting from these interconnections (VCGGC101)	Predict changes in the characteristics of places over time and identify possible implications of change for the future (VCGGC127) Identify, analyse and explain significant interconnections within places and between places over time and at different scales, and evaluate the resulting changes and further consequences (VCGGC129)
Data and Information	Collect and record relevant geographical data and information from useful primary and secondary sources, using ethical protocols (VCGGC102) Select and represent data and information in different forms including by constructing appropriate maps at different scales that conform to cartographic conventions, using digital and spatial technologies as appropriate (VCGGC103)	Collect and record relevant geographical data and information, using ethical protocols, from reliable and useful primary and secondary sources (VCGGC130) Select, organise and represent data and information in different forms, including by constructing special purpose maps that conform to cartographic conventions, using digital and spatial technologies as appropriate (VCGGC131)

VICTORIAN CURRICULUM LINKS

Science

	Level 7 - Level 8	Year 9 - Level 10
Science Understanding	There are differences within and between groups of organisims; classifications help organise this diversity (VCSSU091) Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093) Multicellular organisms contain systems of organs that carry out specialised functions that enable	Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (VCSSU121)
	them to survive and reproduce (VCSSU094)	
Science as a Human Endeavour	Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across the disciplines and practice of science (VCSSU089)	Scientific understanding, including models and theories are contestable and are refined overtime through a process of review by the scientific community (VCSSU114) The values and needs of contemporary society can influence the focus of scientific research (VCSSU116)

Science Inquiry Skills

	Level 7 - Level 8	Level 9 - Level 10
Questioning and Predicting	Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge (VCSIS107)	Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables (VCSIS134)
Planning and Conducting	Collaboratively and individually plan and conduct a range of investigation types, including field work and experiments, ensuring safety and ethical guidelines are followed (VCSISO18)	Independently plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data, access risk and address ethical issues associated with these investigation types (VCSIS135)
		Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability (VCSIS136)
Recording and Processing	Construct and use a range of representations including graphs, keys and models to record and summarise data from students own investigations and secondary sources, and to represent and analyse patterns and relationships (VCSIS110)	Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discreet and continuous data (VCSIS137)
Analysing and Evaluating	Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions (VCSIS111)	Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence (VCSIS138)
Communicating	Communicate ideas, findings and solutions to problems including identifying impacts and limitations of conclusions and using appropriate scientific language and representations (VCSIS113)	Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (VCSIS140)

Please note:

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UNIT OUTLINE

Lesson	Overview	Resources
Lesson 1 Bee Intrigued	Learning Intention: To elicit students current understanding of pollinators, pollination and the relationship to global food security. Success Criteria: Students demonstrate their current understanding of pollinators, pollination and the relationship global food security. Assessment Opportunity: Formative Assessment in the form of pre-assessment.	 'Honey Bee Sounds' audio 'Planting for Bees Pre-Assessment' worksheet 'Life in the Hive' video
Lesson 2 Pollination	Learning Intention: To understand the process of pollination and the role of a pollinator. Success Criteria: Students demonstrate their understanding of the role of pollinators in the process of pollination through research. Assessment Opportunity: Can students accurately identify and understand the reproductive system of a flower?	 'Pollinator' worksheet 'What is Pollination?' Video
Lesson 3 How Does Pollination Occur?	Learning Intention: To identify the reproductive parts of a flower. To understands the role a pollinator plays in plant fertilisation. Success Criteria: Students demonstrate an understanding of plant reproduction and the physical role a pollinator plays in this process. Assessment Opportunity: Can students accurately identify and understand the reproductive system of a flower?	 'Cross Section of a Flower' worksheet 'Cross Section of a Flower (Answer Sheet)' resource 'What is Pollination?' Video Large flowers (not included) Tweezers (not included) Scissors or knife (not included)
Lesson 4 Symbiosis	Learning Intention: To understand symbiotic relationships. Success Criteria: Students present their knowledge of the types of symbiotic relationships and demonstrate knowledge of the relationship between pollinators and plants. Assessment Opportunity: Are the students able to identify the type of symbiosis between a plant and pollinator and explain why.	
Lesson 5 Food Security - The Wider Picture	Learning Intention: To discover how pollination is essential for our food security. Success Criteria: Students show knowledge of the relationship between pollination and our food security in relation to farming. Assessment Opportunity: Students construct a food web accurately considering the relationship between pollinators and our food system. Can we help improve this?	 3 x Jars of Single Varietal Honey 90 x tasting sticks 'What is Pollination?' Video

Lesson 6

Food Security - At Home

Learning Intention: To appreciate how pollination is essential for the food we eat at home.

Success Criteria: Students explore products found in their homes/pantry and make connections to their understanding of pollination dependent food industries.

Assessment Opportunity: Can students identify the relationship between pollinators and the food they eat at home?

- Pantry Item Packages (not included)
- 'Food Security Needs Bee Security' resource
- 'Bees for Food Security'
 video
- 'Pollination Dependence' worksheet

Lesson 7

Is Your School Pollinator Friendly?

Learning Intention: To investigate school grounds to collect data on pollinators. To use this data to infer what makes the space pollinator friendly.

Success Criteria: Students identify pollinators and the areas they are thriving in within the school grounds. Students share data collected and use it to infer what makes a space 'pollinator friendly'.

Assessment opportunity Are students able to identify what makes a space 'pollinator friendly' from the data collected?

- 'Discovery Walk' worksheet
- Bee Friendly Farming Handbook

Lesson 8

Pollinator Power

Learning Intention: To research how we can support pollination and pollinators. To use data to inform decisions and ideas of pollinator friendly environments.

Success Criteria: Students use data collected to inform further research. Students identify aspects of environments attractive to different pollinators. Students use information collected to make informed decisions about how to improve school grounds.

Assessment Opportunity: Have students made a well-informed decision as to why they chose their 'region specific' plants to add to the plan for a bee friendly garden?

- Map of School grounds (not included)
- Bee Friendly Farming Handbook
- Powerful Pollinators Guide area specific (not included)
- 'Discovery Walk' worksheet

Lesson 9

Pollinator Friendly Garden (Part One)

Learning Intention: To use research and justifications to redesign the school grounds and gardens.

Success Criteria: Students plan school grounds using bee friendly farming criteria and independent research.

Assessment Opportunity: Students are able to support their plan using research and findings.

- Bee Friendly Farming Handbook
- Powerful Pollinator Guide area specific (not included)
- 'Honey Bee Needs' video
- 'Supporting Bees' resource

Lesson 10

Pollinator Friendly Garden (Part Two)

Learning Intention: To identify areas in school grounds that are lacking food for pollinators with the aim of improving this through planting.

Success Criteria: Students use their maps to identify area in the school lacking food for pollinators.

 30x 'Bee Friendly Seed' packs

Lesson 11

That's a Wrap!

Learning Intention: To explore students newfound understanding of pollinators, pollination and the importance for global food security.

Success Criteria: Students demonstrate their developed understanding of pollinators, pollination, global food security and, consider future actions.

Assessment Opportunity: Summative post-assessment

- 'Planting for Bees Postassessment' worksheet
- 'Honey bee sounds' audio

Please note: Access to the internet is required in lessons 2, 4, 8, 9 and 10. This is for students to conduct research.

*Powerful Pollinator Planting Guides

Visit <u>wheenbeefoundation.org.au/our-work/powerful-pollinators</u> to see if there is a guide published for your region. You can access the pollinator guides online or contact Wheen Bee for hard copies of these documents.

These will be used in lessons eight and nine. If you would like hard copies of these resources, order prior to beginning the unit to ensure they have arrived in time.