# Sample Unit – Living World Science Life Skills – Year 12

***Sample for implementation for Year 12 from Term 4, 2018***

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| **Unit title** | Working with Plants | **Duration** | 10 weeks (following completion of this unit students engage in regular visits to the garden for maintenance)  |
| **Unit description** | In this unit, students investigate how the environment affects plant growth, and develop an understanding of sustainable alternatives to the use of chemicals to control plants. Students may also undertake fieldwork such as visiting local gardens to further develop their understanding. Students use the knowledge and understanding gained to design and safely plant and maintain a garden. Finally, students explore career options in the gardening industry. |
| **Outcomes** A student:* poses questions and hypotheses for scientific investigation SCLS6-1
* plans an investigation individually or collaboratively to obtain primary or secondary data and information SCLS6-2
* participates in investigations individually or collaboratively to collect primary or secondary data and information SCLS6-3
* collects and represents qualitative or quantitative data and information using media as appropriate SCLS6-4
* develops conclusions from primary or secondary data and information SCLS6-5
* uses strategies to solve scientific problems SCLS6-6
* communicates information about an investigation using scientific language and terminology SCLS6-7
* explores models and descriptions of phenomena SCLS6-10
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| **Working Scientifically skills**In this module, students participate in planning and conducting investigations to test questions, and to collect, represent and draw conclusions from data and information gathered. Students also explore models as representations of ecosystems in order to explore interrelationships within an ecosystem.*Note: This unit includes practical investigations, including undertaking fieldwork. Teachers will need to comply with legislation, guidelines and system and school requirements in relation to student safety.*  | **Depth study**Depth studies allow students a pathway to pursue their interests in science and engage more fully with scientific investigations. In this module, through practical investigations, students conduct experiments and collect data to explore how the environment affects plant growth. By participating in fieldwork, by engaging with community experts and participating in excursions the students apply the knowledge gained to design and safely plant and maintain their own garden. This can take any form, such as:* an existing garden in the school or classroom
* a sensory garden – consider plants that are safe to smell, to touch, to taste; variations in colour (flowers, leaves and stems); plants that make a sound (in a breeze), or creating sounds using wind chimes
* a native garden
* a Bush Food Garden.

The following resources may be helpful in selecting a garden:*Great Indigenous Plants for Creating a Sensory Garden*<http://www.latrobe.edu.au/wildlife/downloads/Plants-for-Sensory-Garden.pdf>Aboriginal Plant Use - NSW Southern Tablelands – *A Bush Food Garden for your school or community!*<https://www.anbg.gov.au/apu/index.html> |
| **Assessment overview**Assessment should provide opportunities for students to demonstrate achievement in relation to the outcomes and to apply their knowledge, understanding and skills to a range of situations or environments, including the school and the wider community. When undertaking this unit, it is important to take into account the individual communication strategies used by students. Students’ responses may be communicated through gestures and/or facial expressions, use of visual aids or symbols such as a communication board, assistive or augmentative technology and varying degrees of verbal or written expression.Assessment strategies could include but are not limited to:* participation in conducting investigations to explore how the environment affects plant growth
* identifying the basic needs of plants for growth
* recording and interpreting data and information gathered through fieldwork and investigation
* demonstrating the ways in which garden chemicals are stored safely
* recognising environmentally friendly methods to control garden pests
* participation in fieldwork activities
* participation in fieldwork to design, plant and maintain a garden
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| **Content** | **Teaching, learning and assessment** | **Resources** |
| --- | --- | --- |
| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* make observations and pose questions based on these observations
* accurately record observations and data when participating in an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv

*Substances needed for the survival of living things** recognise resources needed by living things to survive
 | The focus of this module is investigating how the environment affects plant growth and how humans can demonstrate responsible garden management. However, before beginning the investigations into plant growth some students may require a review of what living and non-living things are and the two main groups of living things – plants and animals.**Review living and non-living things**Students engage in a variety of activities to review their understanding of the difference between living and non-living things, for example:* select examples and pictures of living and non-living items from around the school, home, community, magazines, internet
* sort and display the collected items into a classification chart
* identify living and non-living items
* label living and non–living items
* identify the odd one out
* create a poster showing living and/or non–living items
* describe characteristics of living things, eg grow and change, use food, use water and air, respond to changes, reproduce
* make a multimedia presentation or other means of communication to present findings.

**Review two main groups of living things – plants and animals**Students engage in a variety of activities to review their understanding of the difference between plants and animals, for example:* collect pictures of plants and animals
* sort and display the collected items into a classification chart
* respond to teacher questioning to identify which are plants and which are animals
* create a poster
* make a multimedia presentation or other means of communication to present findings
* identify the odd one out
* identify external features of animals and plants
* discuss how Aboriginal and/or Torres Strait Islander Peoples’ classification of objects such as food, shelter, fibre, medicine and tools depends on how they are used. For example, Aboriginal People may classify kangaroos as food, clothing or as a totem moiety or to represent a clan.
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| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* make observations and pose questions based on these observations
 | **Introductory stimulus material for investigations and fieldwork activities**With each investigation, to create interest and stimulate inquiry, students may be introduced to the activity through a phrase, picture, poem, short excerpt or video. From this students generate a list of ideas, words and associations, making connections where possible. For example, when doing the investigation *‘Do seeds need water to germinate?’* read the poem ‘Little Brown Seeds’ (author unknown) from *The Flower Fields* about a seed needing water to grow. Activities in response to the texts may include:* ask ‘What do you think ...?’ – generate a list of ideas, words and associations, making connections where possible
* ask ‘What made you think of …?’
* ask ‘Do you have any new ideas about …?’
* create a ‘What I **K**now; What I **W**ant to Learn; **H**ow am I to Learn; What I **L**earned’ chart (KWHL)
* create a sight-word garden.
 | *The Flower Fields*<http://www.theflowerfields.com/wp-content/uploads/2016/02/FF_plant_poetry.pdf> *Sid the Seed* by Daniel R Pagan<https://www.youtube.com/watch?v=jm12JKhNnWY>*The Tiny Seed* by Eric Carle<https://www.youtube.com/watch?v=ls6wTeT2cKA>*Plant Growth – 4 Important Factors – A teaser*<https://www.youtube.com/watch?v=jEzNUVMHjJ8> |
| Students:*Working scientifically** identify practices to enhance safety in a scientific investigation https://lh5.googleusercontent.com/WVSnRyGnrqlCrqSS5v-anrdJeyEAzrmzIiGCgHA5OJdUeM-cCS7sZ7L1q4KU1DJHGVnzOB3HSZxQawqPOH2MDWicptTdg2Aj316dtBVlxMBzJCmuKPz_ZlS8HaFKfik1Fzg9rcXa
* use strategies to solve problems https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit
* communicate ideas related to an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* use digital, visual, written or oral forms of communication as appropriate https://lh6.googleusercontent.com/WSefKq_SVlkCAk8JjIg-pKyEHoJ9mbq8vmhjNlaSXq0PM2NXsYXw6HhprbvvU0SC_O7S7pZxOTygyLn98r1oPNm-O5E79mQsI6M1JEU8xlv8c6iKp1oIe6_2wgLfuojrK4cfjYe5
 | **Inquiry question: How does the environment affect plant growth?**The following investigations explore some aspects of plant growth and the requirements for successful plant growth (for example, availability of water, sunlight and nutrients). Investigations can be conducted individually, in groups, or by the whole class, as appropriate to the needs of the students. If time does not allow for all investigations to be conducted, the videos listed with each investigation can be used to simulate the investigations for the students.For each investigation undertaken by students, incorporate some or all of the following teaching and learning experiences:* review how to be safe when conducting investigations – recognising safety rules and equipment
* consider how changing the variables can affect the result of the investigation
* consider the most appropriate medium to communicate your plan and results, eg digital, visual, multimodal
* create a visual representation of the steps you will use to plan your investigation, record your questions, observations and results
* take photos at regular intervals to create a flipbook to show your results over the time period of the investigation
* create a stop motion or video of your findings.

Students will use the knowledge gained from these investigations to design and safely plant and maintain a class garden. For example, from doing the investigation *‘Do seeds need water to germinate?’* students may show how they apply the knowledge learnt from the investigation by responding with:* ‘When we create our garden we will need water to make the seeds, seedlings and plants grow.’
* ‘When it is hot the plants will need more water.’
* ‘I wonder if it is better to water the plants in the morning or afternoon?’
* ‘After it rains, we may not need to water the plants, should I check the garden?’
 |  |
| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* make observations and pose questions based on these observations
* make predictions based on questions from observations
* recognise variables to be measured, changed and maintained in an investigation https://lh5.googleusercontent.com/IgYyZGyDyB28iBMNCjiZ1KbmAIve8AlHfOPQPXqn8NC_aPegbvHTbzMR3EKm6ilUjLX7l9oqXwX5dPNLVfSBG_OnZIDS1MZMsv6OpLwzTocJuABBhfk-yj1BlbpoioCXdFXoMiSd
* recognise a plan as a sequence of steps https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* follow a plan to participate in an investigation https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* engage in safe practices when participating in an investigation https://lh5.googleusercontent.com/WVSnRyGnrqlCrqSS5v-anrdJeyEAzrmzIiGCgHA5OJdUeM-cCS7sZ7L1q4KU1DJHGVnzOB3HSZxQawqPOH2MDWicptTdg2Aj316dtBVlxMBzJCmuKPz_ZlS8HaFKfik1Fzg9rcXa
* accurately record observations and data when participating in an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv
* work individually and/or collaboratively to conduct an investigation https://lh5.googleusercontent.com/WVSnRyGnrqlCrqSS5v-anrdJeyEAzrmzIiGCgHA5OJdUeM-cCS7sZ7L1q4KU1DJHGVnzOB3HSZxQawqPOH2MDWicptTdg2Aj316dtBVlxMBzJCmuKPz_ZlS8HaFKfik1Fzg9rcXa
* use digital technologies to collect or represent qualitative information or quantitative data https://lh6.googleusercontent.com/WSefKq_SVlkCAk8JjIg-pKyEHoJ9mbq8vmhjNlaSXq0PM2NXsYXw6HhprbvvU0SC_O7S7pZxOTygyLn98r1oPNm-O5E79mQsI6M1JEU8xlv8c6iKp1oIe6_2wgLfuojrK4cfjYe5 https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv
* describe data and information collected https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv
* develop further questions from conclusions Critical and creative thinking icon
* communicate ideas related to an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* use digital, visual, written or oral forms of communication as appropriate https://lh6.googleusercontent.com/WSefKq_SVlkCAk8JjIg-pKyEHoJ9mbq8vmhjNlaSXq0PM2NXsYXw6HhprbvvU0SC_O7S7pZxOTygyLn98r1oPNm-O5E79mQsI6M1JEU8xlv8c6iKp1oIe6_2wgLfuojrK4cfjYe5 https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX

*Substances needed for the survival of living things** identity the importance of the Sun for plants and animals Critical and creative thinking icon
* investigate how the environment provides for the needs of living things Difference and diversity icon

*Factors that affect plant growth** identify the basic needs of plants for growth
* observe the effects of water on plants
* observe different types of soil https://lh5.googleusercontent.com/IgYyZGyDyB28iBMNCjiZ1KbmAIve8AlHfOPQPXqn8NC_aPegbvHTbzMR3EKm6ilUjLX7l9oqXwX5dPNLVfSBG_OnZIDS1MZMsv6OpLwzTocJuABBhfk-yj1BlbpoioCXdFXoMiSd
* investigate how different types of soil affect plant growth and ways to improve soil structure https://lh5.googleusercontent.com/IgYyZGyDyB28iBMNCjiZ1KbmAIve8AlHfOPQPXqn8NC_aPegbvHTbzMR3EKm6ilUjLX7l9oqXwX5dPNLVfSBG_OnZIDS1MZMsv6OpLwzTocJuABBhfk-yj1BlbpoioCXdFXoMiSd
* participate in an investigation to identify and resolve a specific nutritional problem for a plant https://lh3.googleusercontent.com/E1zMyu_wVrGGPtHw-Y6vOBNArgDRHuQRF9WxfiBXXdADWIIrCOtfPHTaPX0Xxt_2vcH9KtM__I-hMdtBkp0UsxwRz0t87vXv5dwg6O-ZZKJ2n7D_WwHb8i3fI2xfbW0vDEym_ydg https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit
 | ***Investigation 1:*** **Do seeds need water to germinate?** Students participate in an investigation to determine whether seeds and seedlings need water to germinate or grow. *Investigation:* * What do you need? – clear plastic cups, cotton wool (same number for each cup), fast-growing seeds, such as Cress seeds (same number for each cup)
* What will you do? – water one of the cups
* What do you think will happen? – ‘The seeds with water will grow’; ‘I need to drink water so the seed will need water too’
* What did you observe? – observe, record and communicate observations which may include ‘Only the seeds that we watered grew’; ‘The seeds that we did not water did not grow’
* What conclusions can you make from this investigation? – ‘For a seed to germinate you need to water it’
* Further student questions from investigation may include – Do bigger seeds need more water than little seeds?

***Investigation 2:* Do plants need soil to grow?** Knowing that water is needed for seeds to germinatethis investigation considers whether seeds need soil to grow. Further investigations consider the type of soil for optimum growth and what can be done to improve soil structure for better plant growth.*Investigation:* * What do you need? – Clear plastic cups, cling film for lids, seeds, range of materials (soil, sand, paper, compost, cotton wool), one cup for no material
* What will you do? – Fill each cup with either soil, sand, paper, compost or cotton wool; add the same number of seeds to each cup; place all the cups in the same location; water each cup with the same amount of water and at the same time each day. Discuss what is meant by amount (is it weight, or volume or depth?)
* What do you think will happen?
* What did you observe? – Observe, record and communicate observations.
* What conclusions can you make from this investigation?
* Further student questions from investigation may include – ‘Will the seeds grow on something hard, like a footpath?’; ‘What about on clay?’

*Possible further investigations:***Does the type of soil affect plant growth?*** Collect different soil types from around the school and home, eg sandy, clay, loam.
* Create a vocabulary list to describe the different soil types.
* Use your senses to observe the soil – handle each type of soil. Does it stay together when you squeeze it? Does it crumble?
* Use a magnifying glass to look closely at the particles.
* Place each type of soil in a container (have holes in the bottom of the container) and pour some water on it. What happens to the water?
* Create a settling tube – using a plastic drink bottle, place soil types in the bottle (about half–way), add water (about 3 cm) and shake vigorously. When the soil settles, draw and describe your findings. Compare your findings. What do you notice about the soil particles?
* Photograph the vegetation growing at the location where each soil type was gathered – students identify the soil the vegetation is growing in. For example, the teacher may ask ‘The grass is not growing very well here, what type of soil was collected at this spot?’

***Investigation 3:*** **Do plants need light to grow?**Having established that seeds and seedlings need water and soil to grow, students investigate whether seeds and seedlings need light to grow.*Investigation:** What do you need? – Clear yoghurt tub with clear lid, black tub with black lid (paint it), black tub with black lid and a hole near the lid, potting medium.
* What will you do? – Place the same amount of potting medium and seeds in each tub. Place the tubs in the same location. Water each tub with the same amount of water and at the same time each day.
* What do you think will happen? – ‘All the seeds will grow?’; ‘The seeds in the dark won’t grow at all.’
* What did you observe? – ‘The seeds in the pot with the hole in it grew to the side’; ‘The seeds with light grew the best’.
* What conclusions can you make from this investigation?
* Further student questions from investigation may include – ‘Why did the seed with no light still grow?’; ‘Are there plants that don’t need light to grow?’

Students undertake further research to identify plants that don’t need light to grow and report findings to the class. The video *The Dark World of Fungi* can be used as a stimulus or to support students’ understanding.***Investigation 4:*** **Does fertilising help plants grow better?**Having established that seeds and seedlings need water, loamy soil and light to grow, students investigate the use of fertiliser for plant growth.*Investigation:*Before conducting the investigation, discuss what is meant by ‘better’ – is it size, colour, weight, height?* What do you need? – Tubs, mineral salts or liquid fertiliser, water, radish seeds.
* What will you do? – Plant the same number of seeds in each tub. Add varying amounts of fertiliser to each tub (ensure one tub receives no fertiliser). Place tubs in the same location. Water the tubs with the same amount of water and at the same time each day.
* What do you think will happen? – ‘The seeds with the most fertiliser will grow the best’; ‘Just water is good enough’.
* What did you observe? – Compare the size and width of the largest slices of radish to find which amount of fertiliser gave the best result.
* What conclusions can you make from this investigation?
* Further student questions from investigation may include: ‘You can have too much fertiliser.’; ‘How do you know what is the right amount of fertiliser to use?’

*Possible further investigation:***Can we make the soil better to improve plant growth?**Refer back to the photographs and matching soil type. Teacher directed questioning may include, ‘We wish to have the plants growing better where there is clay soil. How can we do this?’; ‘One way of improving soil structure is to add compost. What is compost?’Using the *Gardening Australia* article on ‘How to Make Compost’, students:* identify ‘scraps’ that are suitable for a compost, classifying brown and green ingredients
* design a pie chart to show brown and green ingredients
* create a ‘lasagne’ display by using pictures from magazines/newspapers to show the ingredients and the steps in making the compost
* identify ‘scraps’ that are unsuitable to use.

As a class, students make a compost heap, deciding collaboratively on the best location. Students communicate where the compost will be located, who will collect the ‘scraps’ and how the ‘scraps’ are to be collected safely. Students create a job list displaying who will be doing which jobs and when, and complete a timesheet to show when they have done their jobs. | Videos that can be viewed in place of the investigations*Effect of water on plant growth*<https://www.youtube.com/watch?v=Ai-UoMfldsU> *Types of Soil - Clay, Sandy, Loam - Activity & Quiz*<https://www.youtube.com/watch?v=uS7zfeK4OTQ> *Does the type of soil affect the growth rate of plants?*<https://www.youtube.com/watch?v=1AcSQe8QxMk> *Effect of light on plant growth*<https://www.youtube.com/watch?v=Sw46uQciI-A>*Coloured lights affect plant growth*<https://www.youtube.com/watch?v=FBOSXWQ6dM4> *The Dark World of Fungi*<http://splash.abc.net.au>Gardening Australia – *Compost*<http://www.abc.net.au/gardening/stories/s3683114.htm> |
| Students:*Working scientifically** communicate ideas related to an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* use digital, visual, written or oral forms of communication as appropriate https://lh6.googleusercontent.com/WSefKq_SVlkCAk8JjIg-pKyEHoJ9mbq8vmhjNlaSXq0PM2NXsYXw6HhprbvvU0SC_O7S7pZxOTygyLn98r1oPNm-O5E79mQsI6M1JEU8xlv8c6iKp1oIe6_2wgLfuojrK4cfjYe5 https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX

*Substances needed for the survival of living things** investigate how the environment provides for the needs of living things Difference and diversity icon
 | **Conclusion from investigations**Having participated in the four investigations, students develop an infographic, multimedia presentation or video to communicate what is needed to grow a garden.  |  |
| Students:*Working scientifically** make predictions based on questions from observations
* engage in safe practices when participating in an investigation Work and enterprise icon
* locate information in a secondary source Literacy icon
* draw conclusions from data and information gathered in an investigation Critical and creative thinking icon
* use digital, visual, written or oral forms of communication as appropriate  Information and communication technology capability icon Literacy icon

*Impact of human activity on garden habitats** identify and classify pests that can damage a garden Difference and diversity icon
* recognise a range of chemicals used on gardens
* explore why chemicals are used on gardens
* predict some dangers associated with chemical use on or in a garden Sustainability icon Ethical understanding icon
* explore how chemicals can be used safely and appropriately in the garden Ethical understanding icon
* demonstrate the ways in which garden chemicals are stored safely Ethical understanding icon Personal and social capability icon
 | **Inquiry question: How can humans demonstrate responsible garden management?** Students develop an understanding of insects and where they are found. They complete an investigation of bugs in the school yard, local park or own backyard, using the *Backyard Bugs Guide* (CSIRO). Discussion: Can bugs be harmful to our garden?Students view the video *How to identify pests in your vegetable garden* to identify insects that can harm their garden. Explain to students that pests are often controlled using chemicals, such as weed killers and insecticides. Students view some images of chemicals being used on gardens and identify some dangers of chemical use, such as unsafe storage, breathing in the fumes, the chemicals being carried to other places by the wind, chemicals leaching into waterways, the effect of the chemicals on other plants and animals. Students view labels from common garden chemicals to recognise the danger symbol and note the potential dangers associated with their use. Students create a visual representation for the classroom of the chemicals they might use in the garden and how to safely store these chemicals, eg locked shed, locked cupboard, dry containers, clearly labelled containers. What action should be taken if a person suspects they are suffering from chemical poisoning? Students include safety phone numbers, such as the Poisons Information Hotline and emergency number, on their chemicals visual representation. Students consider other safety issues associated with gardening, such as tool use, sunburn, dehydration, lifting, storage, toxic plants, safe use of potting mix, care with creatures. They engage in a range of activities to demonstrate understanding of safe practices when gardening, such as:* listing the clothing that can be worn to increase safety in the garden
* matching the item of clothing with the body part it protects
* finding images of personal protective equipment that should be used when operating garden tools
* completing the ‘garden’ section of the *Poison Safety Checklist*
* creating a visual representation of a danger and the precautions that might be taken
* creating a role play displaying safe gardening practices
* visiting a garden centre, a community garden, a grower’s market garden, turf farm, sporting venue to observe the diversity of plants, how they care for plants, the safe use of chemicals and the use of environmentally friendly and sustainable alternatives to chemicals.
 | CSIRO – *Backyard Bug Biodiversity*<https://www.csiro.au/en/Education/DIY-science/Biology/Backyard-Bug-Biodiversity> *How to identify pests in your vegetable garden - “CSI: Garden Pests”*<https://www.youtube.com/watch?v=1rJeen4huv4> NSW Poisons Information Centre – *Poison Safety Checklist* <http://www.poisonsinfo.nsw.gov.au/Fact-Sheets.aspx>  |
| Students:*Working scientifically** identify strategies that can be used to solve a problem Critical and creative thinking icon
* use technology when participating in an investigation  Information and communication technology capability icon
* engage in safe practices when participating in an investigation Work and enterprise icon
* work individually and/or collaboratively to conduct an investigation Work and enterprise icon

*Impact of human activity on garden habitats** investigate different ways of controlling pests in the garden
* investigate environmentally friendly methods to control garden pests Sustainability icon
 | Discuss with students environmentally friendly methods to control garden pests. Why are these preferable to chemicals? Students examine the infographic *Pest Controlling Your Garden* to identify alternatives to using chemicals in the garden. Using this information, students create a table of methods they would like to use in their garden, including the reasons why this method is preferable. Students engage in a practical investigation to make their own sustainable alternative to chemicals. A common recipe can be found at <http://www.towergarden.com/blog.read.html/en/2015/5/the_ultimate_guidet.html>. Other products that can be used include insecticidal soap spray, milk, espresso coffee, vinegar, garlic spray, beer, onions, baking soda.  | NYCity Pest Control – *Pest Controlling your Garden* <http://nycitypestcontrol.com/diy-garden-pest-control-infographic/>  |
| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* make observations and pose questions based on these observations
* identify strategies that can be used to solve a problem https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit
* use primary data or secondary information when exploring a problem https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* recognise and use problem-solving skills, eg questioning, collaboration, planning https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL https://lh5.googleusercontent.com/WVSnRyGnrqlCrqSS5v-anrdJeyEAzrmzIiGCgHA5OJdUeM-cCS7sZ7L1q4KU1DJHGVnzOB3HSZxQawqPOH2MDWicptTdg2Aj316dtBVlxMBzJCmuKPz_ZlS8HaFKfik1Fzg9rcXa
* use strategies to solve problems https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit

*Impact of human activity on garden habitats** explore a garden or model of a garden to recognise the physical characteristics and diversity of plants and animal species Difference and diversity icon
 | **Inquiry question: What are the benefits of maintaining a garden?**Before students design, plant and maintain their garden, students can explore the benefits of gardening which include improving communication and social skills, fitness, wellbeing, nutrition and enjoyment.Students watch the video *Teenagers create a community garden maintenance project in Dublin* to explore the benefits students have gained from designing, planting and maintaining a garden. Students respond to questions such as:* Why did the students take up gardening? – ‘To make their area look better’.
* What happened to their first garden? – ‘It didn’t work out’; ‘All the plants died’; ‘The snow killed the plants’.
* It doesn’t snow here but what other issues could we have with our garden? – ‘It gets really hot’; ‘It might be hard getting the soil and plants’; ‘There’s a lot of clay about’; ‘Where can we put the compost heap?’
* Who’s Jack? – ‘A boy’; ‘A boy in a wheelchair’; ‘He’s got a disability’.
* What did they do for Jack? – ‘They made a garden for him’; ‘They planted flowers’; ‘They made a space for him’.
* What did Jack’s mum think of the students? – ‘She said they were great’; ‘They were amazing’.
* What skills did the students demonstrate when making the garden? – ‘They were pruning’; ‘They were planting and raking’.
* How were they being safe in the garden? – ‘They had gloves on’; ‘They had shoes’.
* Who can we make a garden for? – ‘Our school’; ‘Our elderly neighbours’; ‘The special school down the road’.
 | Better Health Channel – *Gardening - people with disabilities*<https://www.betterhealth.vic.gov.au/health/healthyliving/gardening-people-with-disabilities>Foroige Channel –*Teenagers create a community garden maintenance project in Dublin 1*<https://www.youtube.com/watch?v=XnGn9o-8xm8> |
| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* use digital technologies to create or represent qualitative information or quantitative data  Information and communication technology capability icon https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv
* relate collected information and data to questions or hypotheses https://lh6.googleusercontent.com/EdvWh_GyIWeWkoGzdGdG9BqJEgLeSCWG-ycm_Ma_NHT-SdquLmMhWNsXEBePNJdnyi80i2boeVBa6HKHOXPlb8dY9U3FQdu17gGxh2NIB93Ce9_NblFf7MPQ2sow38VEV8vn-tit
* use digital, visual, written or oral forms of communication as appropriate  Information and communication technology capability icon Literacy icon
 | **Inquiry question: Why are plants significant to Aboriginal and Torres Strait Islander Peoples and their cultural heritage?**Plants and gardens are not only an attractive feature but also have significance to our Australian heritage. Explore the *Australian National Botanic Gardens* website to gain an understanding of Aboriginal People’s use of plants.Students select three plants and answer questions such as:* What is the plant’s English name?
* Where is the plant found (state/territory)?
* What is the plant used for?

Students create a song, poem, artwork or digital image of one of the plants described in the website, describing the significance of this plant for Aboriginal Peoples.  | Australian National Botanic Gardens – *Aboriginal Plant Use Trail*<https://www.anbg.gov.au/gardens/visiting/exploring/aboriginal-trail/index.html>  |
| Students:*Working scientifically** participate in making decisions about how to test questions or hypotheses
* work individually and/or collaboratively to design a scientific investigation to test a question or hypothesis
* use digital, visual, written or oral forms of communication as appropriate  Information and communication technology capability icon Literacy icon

*Impact of human activity on garden habitats** explore a garden or model of a garden to recognise the physical characteristics and diversity of plants and animal species Difference and diversity icon
 | **Inquiry question: How can we design, plant and maintain a garden?**Students collaborate in planning for the ongoing care of their class garden. Students explore a range of household or community gardens to develop an understanding of common plant species and features of gardens (this may be done by visiting local gardens, or viewing videos or images of gardens).If planting a new garden, students discuss the most suitable location for the garden, using the knowledge and understanding gained from their investigations. Students nominate a location and provide reasons for why this is a suitable location. The class may then vote or elect a ‘head gardener’ to make the final decision. Using digital technology as appropriate, students design a visual representation of their garden, identifying what they will plant and other aesthetic features they might like to include.If caring for an existing garden, students contribute to creating a visual representation of the garden, using digital technology as appropriate and including plants and features they might like to add to the garden. In planning their garden, students consider:* how to make the garden accessible
* the tools and equipment required
* equipment and materials they might need to enhance the safe management of their garden.

As a class, students collaboratively determine a roster of duties for caring for the garden. Duties are distributed among the class. Students can produce a video to illustrate how the class designs, plants and cares for their garden. | City of Sydney – *Community Garden Profiles* <http://www.cityofsydney.nsw.gov.au/community/participation/community-gardens/community-garden-profiles> *Australian City Farms and Community Gardens Network*<http://communitygarden.org.au/2010/01/09/safety/>  |
| Students:*Working scientifically** ask questions about the world around them https://lh5.googleusercontent.com/Rxtd35_bD9NYVAYTpCQ-l7NjzMfiyFajA_6a4YcahraxXOTfH4tnHYhUexf1uMPSXbOwgmNnpyg5qdPeM0mzCxt4kZSRo3k71lpcoUKMsqqj_fEDdSEoLDDRM41ErrQUfCaz07YL
* make observations and pose questions based on these observations
* recognise that data and information can come from a range of sources, eg observations and measurements
* recognise qualitative information, eg observations, descriptions https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* locate information in a secondary source https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* describe data and information collected https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX https://lh3.googleusercontent.com/n0zZlSUFWK-J6GiESmY6WriA-shkYJBglOW__p2rVBSswIeZV2ZgXkgHfyAPUHp8N0ohVVjNKAp4vtPO5kEPci1V_HjvoDLaFjeVM_hd9j7rFh6RuokHdn0lvv4CAJPUHP-6eqqv
* communicate ideas related to an investigation https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
* use digital, visual, written or oral forms of communication as appropriate https://lh6.googleusercontent.com/WSefKq_SVlkCAk8JjIg-pKyEHoJ9mbq8vmhjNlaSXq0PM2NXsYXw6HhprbvvU0SC_O7S7pZxOTygyLn98r1oPNm-O5E79mQsI6M1JEU8xlv8c6iKp1oIe6_2wgLfuojrK4cfjYe5 https://lh5.googleusercontent.com/BaJe4_V7hOW-x1HTRBokL9dorYjTQQgjMCbVGhKlu6CWHO5webOqzPU3bIjnWKgc3mzujAsVntcPnKGg-HNd2P-f3MAD774pepFCOCtzf75c-reGcSd0KVsUdipv0YdLCTfxlVKX
 | **Inquiry question: What careers involve working with plants?**If an interest in this field of science is generated, students may explore career options, study alternatives and training options in the gardening industry. Teacher directed questioning may be:* How can we find out about (occupation)?
* What websites can we search?
* What magazines are there?
* Do you know anyone who works with plants?
* Do you like working outside?
* What skills do you need and do you have those skills? How can we develop those skills?

Students search for careers in the industry using the internet, trade and gardening magazines. They create a table, chart or multimedia presentation highlighting the associated jobs, qualities and skills needed, duties and responsibilities, characteristics of the job, such as full time or casual, weekly earnings, training opportunities, what further study is available and vacancies. The resources listed provide useful websites for students to use in this investigation.Students can also undertake fieldwork by visiting a variety of workplaces in the gardening industry, eg garden centres, farms, landscape businesses, horticulture businesses, sporting grounds or public gardens (for groundsperson, greenkeeper). Students design and conduct an interview with a person employed in this industry. Possible interview questions include:* What are the terms and conditions under which you are employed in the workplace? – Starting, finishing times, breaks
* What days are you expected to work?
* Who do you call if you are unwell and will not be able to come into work?
* Do you need to bring in a medical certificate?
* Do you know how to sign in/out if necessary?
* What do you hear or see in the workplace to tell you that you need to evacuate?
* How do you exit the workplace in an emergency?
* Where do you assemble after you evacuate the workplace?
* Are there any other terms and conditions specific to the workplace?
* Do you need to wear any protective clothing and/or shoes at your workplace?
* Do you work with chemicals? What are they used for? What are some of the dangers and how do you use and store them safely?
* Do you use alternatives to chemicals to control pests?
* What occupational health and safety signs do you notice in the workplace?
* How has your learning in Science assisted you when working and caring for plants?
* Did you undertake any work experience in this industry and does your business take work experience students?

Students represent their findings, eg: * create a mind map to represent the information from the visit
* use a graphic organiser to represent the similarities and differences between careers
* create playing cards of job characteristics for games such as *Snap* or *Memory*
* create an digital album or video of images from the workplace
* prepare a visual sequence of the activities undertaken by the employee on a typical day at their workplace.
 | Australian Government – *Job Outlook*<http://joboutlook.gov.au/>Gardening Australia – *Fact Sheet: A Growing Career* <http://www.abc.net.au/gardening/stories/s3832373.htm>*Grow your own Career in Horticulture* <http://www.growcareers.info/> (UK website with a list of jobs in the industry, videos and links to articles and interviews with those working in the industry) |

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| **Reflection and Evaluation** |