



Agriculture in Education: an educational resource for the Year 7 Science Curriculum

Digging into science – where science fits in paddock to plate



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Resource: Digging into science – where science fits in paddock to plate

Content Descriptor:

Science	Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.	ACSHE121
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Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), downloaded from the Australian Curriculum website on 2nd December 2104.



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Learning Outcome/s

- Students are able to describe situations where scientific knowledge from different scientific principles have influenced practices in agriculture.

Description

This resource explores the scientific roles that connect the series of steps in the paddock to plate process.

Students are provided with the opportunity to explore the considerations when producing food and think about ways these could be monitored.



discuss

Setting the scene

In the past in Australia, we used the land without great understanding of it at a scientific level. This led to poor land and water management, poor soils and average crops. Now we have become smarter about the way we farm and produce food. Australia now recognises the need for science at every stage of producing food.



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The following video outlines the current issues that Australia faces in producing food and how we are addressing these issues. The simple graphics illustrate and explanations should help students understand that producing food in Australia is technical and scientific.

The Global Food Crisis - Australia <http://riaus.tv/videos/food-security>

Pause the video at times to discuss its content. For example:

- Ask the students to list the 5 main issues spoken about: Is there enough food to feed everyone? Does everyone have access to enough food, every day? Does the food meet cultural requirements? Is the food of good quality? Is the food always available?
- Ask the students about the 3 main reasons for concern: Availability – e.g. extreme weather ruining crops. More people living in cities – e.g. less understanding of how food is grown. Producing enough food to share with other countries.
- Have students think about understanding how food is grown, the importance of increasing yield in terms of the amount that we successfully grow
- Have students view Video – [Food Security Researcher](https://www.youtube.com/channel/UCuBA0F-d8sXgIZ0x1Wltlog) – from AgriFood Skills Australia's YouTube Channel <https://www.youtube.com/channel/UCuBA0F-d8sXgIZ0x1Wltlog>

Student discussion in pairs

Engage students through discussions about why science is so important in facing the challenges of growing enough food for everyone.

Ask students what they would need to think about when growing their own vegetables.

- What tests could you do when growing vegetables?
 - Why do you think it would be important to test the soil?
 - How could you ensure the plants were getting enough water?
 - What two things would you look at in the weather?

Students should consider the challenges mentioned in 'Global Food Crisis'. They should think about the weather and the growing conditions of the ground.



Work task 1: What are the scientific roles involved in the journey of food from the farm to the supermarket?

You are a company wishing to create a muesli bar. You need to be involved in each step of the process from the farm to the supermarket. To ensure you create a high quality product you wish to employ different scientists at each step.

You could have your students view the Video [Lunchbox Legends](https://www.youtube.com/channel/UCuBA0F-d8sXglZ0x1Wltlog) (4:41 ses)
<https://www.youtube.com/channel/UCuBA0F-d8sXglZ0x1Wltlog>

- Step 1. Research the following types of Scientists and prepare a definition and provide 3 key points about what they do:
 - An Agronomist
 - Food Scientist
 - Sensory Scientist
 - Agricultural Scientist
- Step 2. Read and consider the information on Type of Science “Oats to Muesli Bar” (Work Task 1 found on page 3) which involves the steps to creating a muesli bar from oats to the making of a muesli bar.
- Step 3. Decide where each type of science would be used in each Step of growing oats to making a muesli bar. Draw a line from the scientist to the step in the process.
- Step 4. Next, and based on your research, think about what kind of jobs each scientist would have to complete.
 - Circle and draw a line between each or use different coloured pencils to show which type of scientist belongs to which roles.
- Step 5. Compare and discuss your ideas with a group or the class.

On completing this activity students should have gained an understanding of the role scientists play in both the growing and processing (manufacturing) of food.

Work task 1: Step 1

Research the following types of Scientists and prepare a definition and provide 3 key points about what they do:

Scientist	Definition	Three key points about what they do
An Agronomist		
Food Scientist		
Sensory Scientist		
Agricultural Scientist		



Work task 1: Step 2 and 3

Draw a line from the scientist to the step in the process.

Oats to Muesli Bar



Food Science

A food scientist is involved in testing foods for quality and safety. They develop new foods and chose packaging that will keep food fresh.

Agronomy

An agronomist is a scientist interested in plants. They look at the conditions of a farm and can decide what type of plant will grow best.

Sensory science

A sensory analyser is a scientist who ensures that food tastes and smells good and has a nice texture.

Agriculture science

A farmer will have lots of knowledge about growing and harvesting plants. They will need to carefully watch the growth and health of their plants and will often use technology to help them do this.



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Work task 1: Step 4

Draw a line between each or use different coloured pencils to show which type of scientist belongs to which roles.

Type of Scientist



Role of scientist

- Checks grain is good quality
- Decide what to plant
- In charge of watering
- Makes sure it tastes nice
- Monitors weather
- Designs packaging
- Decides when to harvest
- Provides fertiliser (plant food)
- Tests that the muesli bar has good crunch
- Tests the soil



Work task 2: Being a scientist on your own land – digging in.

Prior to this work task you will need the following items:

- A soil pH probe or testing kit.
- Students will need to have brought soil samples to class or you may need to provide them for the students.

Students will be working in small groups to identify the type of soil they have on their land to determine what fruit or vegetables would grow the best on their land.

Students will use their soil samples to undertake a soil analysis to gain an understanding of the differences between soil types.

Discuss the differences between soils with your students.

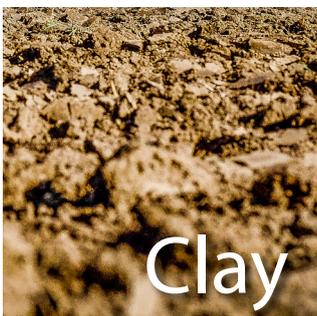
- What does it feel like?
- If you add a few drops of water does it sink in or roll off?
- What type of soil is it likely to be?

Explain the following soil types

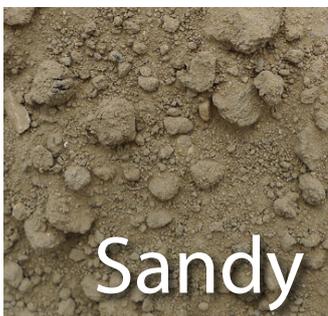
Clay Particles of dirt are fine and stick together. The soil can feel thick when dug. Moisture holds well in the soil.

Sandy Particles of dirt are coarse and gritty. The soil can feel loose. Moisture poorly soaks into this soil and if very dry, can even run off it.

Loamy Particles of dirt are both fine and coarse. It lies somewhere between clay and sandy soils.



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This work is a derivative of [Sandy Suffolk soil 2](#) by [Nick Saltmarsh](#) on Flickr (CC BY 2.0)



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Work task 2: Using a soil pH probe or testing kit test your soils pH

Is it an acidic soil or an alkaline soil? Have students record their results.

Look at the following table. Using your pH reading, choose two plants that will grow well in your land.



Best Soil for Fruit and Vegetables

Tick	Fruit or Vegetable	pH Reading
<input type="checkbox"/>	Apple	pH 5.0 – 6.5
<input type="checkbox"/>	Potato	pH 4
<input type="checkbox"/>	Lettuce	pH 6.0 – 7.5
<input type="checkbox"/>	Mint	pH 6.0 – 8.0
<input type="checkbox"/>	Pumpkin	pH 5.0 – 7.5
<input type="checkbox"/>	Watermelon	pH 5.0-6.5
<input type="checkbox"/>	Avocado	pH 6.0 – 8.0
<input type="checkbox"/>	Carrots	pH 5.0 – 7.5
<input type="checkbox"/>	Mushroom	pH 6.0 – 7.5
<input type="checkbox"/>	Cucumber	pH 5.0-7.5
<input type="checkbox"/>	Mango	pH 5.0 – 6.0
<input type="checkbox"/>	Ginger	pH 6.0 – 8.0



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- Teacher support resources
- Fruit and Vegetable Preferences for pH
- <http://www.agriweb.org/education.aapg/invest/preferencesforpH.PDF>
- pH Soil Probes and kits can be found from hardware shops. If unavailable select a pH reading for each group to work with.



assess

- Assessment option
- Work task 2: Being a scientist on your own land – digging in
- In your groups, discuss other factors that you will need to think about when growing your crops.
- Design a science investigation which tests one of these factors. Your investigation should be planned so that you would be able to do it at home or school. Remember to include:
 - Aim
 - Hypothesis
 - Equipment list
 - Method
 - Safety considerations
- Science investigation also includes:
 - Observations and record data
 - Review
 - Summarise
 - Conclusion about your findings
- Suggested criteria
 - Illustrates an understanding of scientific application through aim
 - Can describe a factor that can be tested and develops a hypothesis
 - Identifies the type of relevant information needed
 - Method clear and logical
 - Communication between peers in planning and successful communication of plan to teacher

Teachers support resources.

[Scootle - Doing Science Investigations: teacher guide](#)



web

- Sources:
- Fruit and Vegetable Preferences for pH
- <http://www.agriweb.org/education/aapg/invest/PreferencesforpH.pdf>
- Planting a Vegie Patch - ABC Splash
- <http://splash.abc.net.au/media/-/m/106432>
- The Global Food Crisis - Australia
- <http://riaus.tv/videos/food-security>
- Scootle - Doing Science Investigations: teacher guide

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