Growing food

Years R–2

Growing food: Sustainability

Waste matters

Understands the need for sustainability including water consumption and recycling wastes.

Prior knowledge and lesson preparation

- In groups of 3, children create a mind map of and discuss conditions plants need to grow (eg sunlight, water, nutrients, air, soil) and how each element helps plants to grow.
- Children then consider the impact if one of these elements were missing. Children consider the importance of water in plant growth and identify factors that impact water supply (eg drought, extreme weather). Share with the class.
- In groups of 3, children discuss and list ways to conserve water in the garden and display (eg water plants in the cooler part of the day, mulch soil, use captured water, compost the soil. Emphasise the importance of mulching and composting as examples of recycling and helping to save water and provide nutrients for the living things in the garden).

Focus inquiry

Make a simple wire compost bin

- With a partner, children make a simple wire bin using 150cm wide fence wire. Using a 3 metre long piece, simply join the ends of the fencing together to form a circle.
- Any organic waste matter can be thrown into the wire bin which will become food for helpful bacteria, fungi and earthworms. This can then become a source of nutrients in the soil for the plants to use and flourish.

Do not put meat, bones, fish, fats and dairy products in the wire bin as these will rot, smell and could attract animals.

- It is important to keep the compost heap moist but not too wet. Turn the compost heap twice a week to aerate it and speed up the decomposition process.

Appetiser!

School gardening activities provide teachers with the opportunity to reinforce the concept of sustainability. Growing herbs is a wonderful way for children to:

> learn about gardening
> develop a positive attitude towards the environment
> reinforce a sense of ownership and responsibility
> enjoy the different aromatic scents emanating from their garden.

With increasing concern over environmental issues such as overflowing landfills, we look for ways to reduce the use of natural resources and to re-use and recycle materials. We should all participate in composting. In doing so we can:

> take organic wastes such as kitchen scraps and lawn clippings and turn them into organic matter that can be used to fertilize plants
> provide plants with nutrients
> improve soil quality
> add organic matter to the soil to increase the amount of air available to plant roots and improve the soil's ability to absorb water.

Always wear gloves when composting, wash hands thoroughly afterwards and avoid breathing in air-borne particles.

(Continued on page 59)

Australian Curriculum exemplar links

English: ***Literacy:*** Creating texts, Interacting with others [ACELY1651, ACELY1656, ACELY1788, ACELY1666] ***Language:*** Language for interaction [ACELA1446]

Maths: ***Measurement and Geometry:*** Shape [ACMMG043]

Science: ***Science Understanding:*** Biological sciences [ACSSU002] ***Science as a Human Endeavour:*** Nature and development of science, Use and influence of science [ACSHE022, ACSHE035] ***Science Inquiry Skills:*** Planning and conducting, Communicating, Evaluation, [ACSIS011, ACSIS012, ACSIS025, ACSIS029]

General Capabilities

Literacy, Critical and creative thinking, Personal and social competence, Numeracy

Cross Curriculum Priorities

Sustainability

Websites to support inquiry

How to prepare a garden plot
www.garden.org/howtos/index.php?q=show&id=1316

Kid's Gardening
www.kidsgardening.org

Community Gardens–Refer SA Health website

www.sahealth.sa.gov.au

Reducing food waste
www.lovefoodhatewaste.nsw.gov.au

Waste matters *continued*

Further inquiry

- Children choose different herb seeds and plant in egg cartons. Seeds need to be kept moist in a warm place. When plants are mature enough, they can be transferred into a garden plot.
- In groups, children gather information and develop an action plan to assist with preparation of a school garden plot.
- Children identify a safe, sunny spot at school and prepare the herb garden plot. If space isn't available, planter boxes or barrel halves will do.
- Children identify and assign daily tasks to ensure the herbs grow successfully.
- Upon harvesting, use the herbs in a healthy dish (eg pasta, stir fry, salad).
- Plants could be used as a school fundraiser.
- Children may create their own herb fragrances (eg making potpourri sachets by placing completely dried herbs in fabric pouches and tying with a bow).
- Children could rub, smell and describe the fragrances and attempt to match the fragrances to the herbs whilst blindfolded.

Healthy take-away!

Parents and grandparents are great gardening assistants and could be a great resource to talk to the class about mulching and composting.

Years R–2

Growing food: School garden – The science

Our own beanstalk

Develops a positive attitude towards eating fresh produce that they have helped to grow and investigates the life cycle of edible plants and observes the natural influences on their growth.

Prior knowledge and lesson preparation

- Create a class mind map on the topic of *seeds*. Use the mind map to facilitate discussion about what children know about seeds.
- Children identify conditions needed for seed germination (eg moisture, temperature, light, soil and, in some cases, fire). Children then create a *word wall* and make a list of *growing words* (eg germination, roots, shoots, stems, seeds, water, sunlight, soil, photosynthesis. The teacher could add interesting words like Phototropism and Geotropism, Cotyledons to arouse curiosity).

Focus inquiry

Growing broad beans

- In groups of 3–4, children investigate and discuss the life cycle of the broad bean (ie seed germinates – the first root grows downward – root continues to grow – shoot pokes out of the seed and becomes the stem – secondary roots form – the first real leaves emerge from between the cotyledons – stem straightens out and the shoot sprouts leaves – flowers appear – and when the flowers start to wither, the ovary of the flower turns into bean pods).

Suggestion: Plant the seeds in glass jars so that observations can be made beneath the soil.

- In pairs, children make their own poster of the life cycle of a broad bean and draw conclusions about the accuracy of their drawings and notes by comparing them to the actual growing activity.

Further inquiry

Class activity

- > Children gather information to assist with the preparation of a school garden plot (eg from parents, grandparents, internet, printed resources).
- > Collate the information and develop an action plan to assist with the task (eg children keep a journal to record their activities and share with others).
- > Find a safe sunny spot at school and prepare the garden plot to grow your broad beans (if space isn't available, planter boxes, barrel halves or an old wheel barrow will do).
- > Children are assigned daily tasks to ensure the beans grow successfully.
- Involve parents, grandparents and other helpers to assist with the project.
- Whilst the broad beans are growing in the garden plot, children pose scientific inquiry questions related to their growth based on the table below.

Scientific inquiry question	eg Does fertiliser make a plant grow biggger?
What I change *(independent variable)*	eg Amount of liquid fertiliser measured in (mL)
What I observe *(dependent variable)*	eg Growth of plant measured in number of leaves.
What I keep the same *(dependent variable)*	eg Type of fertiliser, size of pot, type and amount of soil, amount of water and light, time of day.

*Refer **Primary Connections–Biological Sciences/ Plants in Action** section for more examples of scientific investigations using broad beans.*
www.primaryconnections.org.au/shop/2PC401-BK

Appetiser!

There is real magic—and it can be found in gardens, in parks, in pots, in planters, in wheel barrows, anywhere where you get the special combination of water, soil, sunlight and seeds. Watching dormant seeds suddenly burst into life is truly magical and wondrous. Children are immediately captivated and their curiosity stimulated. Growing things is an excellent vehicle for teaching the curriculum in context.

Broad beans are a very fast growing plant and, like all legumes, are highly nutritious. Legumes are a valuable source of protein, fibre, potassium, folate, B vitamins, magnesium and iron.

Australian Curriculum exemplar links

English: ***Literacy:*** Interacting with others, Creating texts [ACELY1784, ACELY1656] ***Literature:*** Examining literature, Creating literature [ACELT1584, ACELT1586]

Maths: ***Statistics and Probability:*** Data representation and interpretation [ACMSP049]

Science: ***Science Understanding:*** Biological sciences [ACSSU002] ***Science Inquiry Skills:*** Processing and analysing data and information, Communicating, Planning and conducting, Evaluating [ACSIS233, ACSIS012, ACSIS025, ACSIS213] ***Science as a Human Endeavour:*** Nature and development of science, Use and influence of science [ACSHE021, ACSHE022]

General Capabilities

Literacy, Critical and creative thinking, Personal and social competence

Years R–2

Growing food: School gardens – The science

Broad bean bruschetta!

Develops a positive attitude towards eating fresh produce that they have helped to grow and investigates the life cycle of edible plants and observes the natural influences on their growth.

Prior knowledge and lesson preparation

- Review and discuss with the class a scientific investigation developed within the previous lesson focus on *Our own beanstalk* (refer page 60).

Focus inquiry

- In groups of 3, children conduct internet research to discover straight forward recipes using broad beans in preparation for a class cooking activity upon harvesting the broad beans.
- When the broad beans mature, harvest the crop and prepare to cook with class. Ask children to find broad bean recipes. Select one and enjoy cooking your own produce. Invite parents to a tasting.

Recipe example: Broad bean bruschetta

Ingredients:

300gm broad beans, 4 slices of rustic bread, 3 tablespoons of olive oil, 1 garlic clove, juice of 1 lemon, parmesan cheese shaved with a peeler, handful of mint leaves.

Method:

1) Cook broad beans in boiling water for 2 minutes.
2) Refresh the beans under cold water.
3) Use a masher to roughly crush the broad beans.
4) Add olive oil and lemon juice.
5) Stir through the mint.
6) Toast bread on both sides.
7) Rub bread with garlic (optional).
8) Spoon some of the bean mixture on the bread.
9) Scatter parmesan shavings on top.
10) Enjoy!

Further inquiry

- Challenge other classes to a broad bean race. Students establish guidelines for the challenge (eg which class can grow the tallest broad bean plant in 5 weeks?) Classes then conduct scientific investigations to determine the best growing conditions for broad beans.
- Children perform a play loosely based on the fairy tale *Jack and the Beanstalk* (eg the story begins with *Jack* going to market to sell the family cow. On the way he meets an old man who gives him a magic bean for his cow. After the exchange, *Jack* heads home with his new prized possession. On the way he meets 3 characters *Ms Soil, Mr Water* and *Mrs Sun* who explain their role in growing beans. Later he meets *Ms Germy Nation* and *Mr Photo Synthesis*. *Mr Photo Synthesis* explains his role. *Jack's mum* becomes angry and throws the bean away, which germinates and grows into the giant beanstalk and so on).
- Children workshop the dialogue for the play and perform it for the class.

Australian Curriculum exemplar links

English: ***Literacy:*** Interpreting, analysing, evaluating, Interacting with others, Creating texts [ACELY1784, ACELY1656, ACELY1661] ***Literature:*** Examining literature, Creating literature [ACELT1584, ACELT1586]

Maths: ***Statistics and Probability:*** Data representation and interpretation [ACMSP049]

Science: ***Science Understanding:*** Biological sciences [ACSSU002] ***Science Inquiry Skills:*** Processing and analysing data and information, Communicating, Planning and conducting, Evaluating [ACSIS233, ACSIS012, ACSIS025, ACSIS213] ***Science as a Human Endeavour:*** Nature and development of science, Use and influence of science [ACSHE021, ACSHE022]

General Capabilities

Literacy, Critical and creative thinking, Numeracy, Personal and social competence

Websites to support inquiry

Primary Science Connections
www.primaryconnections.org.au/

Stephanie Alexander Kitchen Garden Foundation Tools for Teachers
www.kitchengardenfoundation.org.au/shop

Years 3–5

Growing food: Seasonal, local availability

Planting the seeds

Participates in the selection of edible plants to be grown in the garden, taking seasonal considerations into account.

Prior knowledge and lesson preparation

- Preparing and designing a class or school garden is a fun and exciting experience for all participants. Allowing children to participate in the planning process and have direct input into the selection of plants will encourage sustained interest and engagement.
- In groups of 4, children create a mind map on the topic *Growing a garden* and share key elements with the class.
- In groups of 4, children identify and discuss key considerations when selecting plants to grow in an edible garden (eg space, seasonal aspects, soil type, personal tastes).
- Children then focus on the seasons in which fruit and vegetables grow (eg tomatoes, melons, cucumbers, sweet corn grow in warmer months, onions, broccoli, broad beans grow in cooler months).
- Children then discuss reasons why tomatoes can be eaten all year round. This provides a great opportunity to discuss the importation of food from interstate, overseas and the *greenhouse effect* for glass house tomatoes.

Appetiser!

Gardening and its associated activities provide many benefits for children.

> **Positive social skills.** Primary school students who participated in a one year gardening program showed considerable development in self-understanding and the ability to work cooperatively in groups. *(Robinson & Zajicek, 2005)*

> **Influencing healthy diet choices.** Studies provide overwhelming evidence that children who have the opportunity to grow their own food are more likely to eat fresh fruits and vegetables *(Libman, 2007; McAleese & Rankin, 2007; Pothukuchi, 2004)* or show a preference for these foods. *(Lineberger & Zajicek, 2000; Morris & Zidenberg-Cherr, 2002)*

> **Environmental stewardship.** Studies have found that primary school students participating in school gardening programs show more positive attitudes towards the environment. This was shown to grow in line with an increase in outdoor learning experiences. *(Skelly & Zajicek, 1998)*

> **School pride.** Gardening can help to foster school pride and spirit and offers schools a way of helping children to identify with their school and feel proud of their own contribution.

> **Family.** What a fantastic activity to involve all family members, including grandparents. Imagine the conversations around the dinner table.

> **Fast food.** This means a quick trip to the vegetable patch, for the best fast food nature can provide.

(Continued on page 63)

Australian Curriculum exemplar links

English: ***Literacy:*** Interpreting, analysing, evaluating, Interacting with others [ACELY1703, ACELY1687]

Maths: ***Statistics and Probability:*** Data representation and interpretation [ACMSP119, ACMSP069]

Science: ***Science Understanding:*** Biological sciences [ACSSU073] ***Science as a Human Endeavour:*** Use and influence of science [ACSHE051]

General Capabilities

Literacy, Critical and creative thinking, Personal and social competence

Cross Curriculum Priorities

Sustainability

Websites to support inquiry

Gardening Australia
www.abc.net.au/gardening

How to prepare a garden plot
www.garden.org/howtos/index.php?q=show&id=1316

Kid's Gardening
www.kidsgardening.org

Community gardens – Refer SA Health website
www.sahealth.sa.gov.au

Stephanie Alexander Kitchen Garden
www.kitchengardenfoundation.org.au/shop

Planting the seeds *continued*

Focus inquiry

- In groups of 4, children examine the *Vegie Planting Guide for South Australia* on the Gardening Australia website†: www.abc.net.au/gardening/vegieguide
- Children then consider how the *Guide* would be different for the Northern Territory and why.
- Using the *Guide*, children suggest plants that they would like to grow in their garden and add to a class spreadsheet. The class identifies most popular plants from the data collected to grow in the available garden space.
- Groups are then allocated to consider key organisational and planning aspects eg *site selection, garden design and layout, organising support, site preparation, tools, equipment and structures, resources, sustainability factors (eg watering, mulching, composting) and uses of the end product (eg cooking, selling, sharing).*

Further inquiry

Let's go conga

- In conga lines of 6, children's movements represent places fruit and vegetables grow.
- Reach high in the air for fruit that grows on trees, reach side to side for fruit or vegetables that grow in bushes, vines (medium height) and squat down and reach low for fruit or vegetables that grow low to the ground.
- Children place their hands on the shoulders of the person in front of them and listen for the name of a fruit or vegetable that is called out. They then do the action, keeping one hand on the shoulder of the person in front of them.

Healthy take-away!

Remember to roster parents and friends to look after the garden during the school holidays.

Use the learning gained at school to help create a home garden. Compare rates of growth, quality of produce and yields per crop.

Promote your school garden in creative ways (eg through class and school newsletters or in the local community newspaper). Challenge other classrooms at school. Investigate what other classes and schools are doing in relation to gardening. Share garden tips on line.

Involve the whole school community by setting up a *Garden market* at school where interested people swap seeds, plants, ideas and sell produce.

† Thanks to Gardening Australia ABC1

Years 3–5

Growing food: Source to consumer

The food journey

Gains an understanding of the journey fruit and vegetables go through to reach the consumer.

Prior knowledge and lesson preparation

- In groups of 4, children discuss and list fruits and vegetables that can be purchased at a local supermarket or store and suggest how the produce may have been sourced. Share in a class discussion.

Focus inquiry

- This activity involves an excursion to the local supermarket or fruit and veg shop.
- Prior to the excursion, contact the manager to arrange someone from the fruit and vegetable department to speak to the children about the origin of the produce and how it found its way to the store, with a focus on South Australian and Australian fruit and vegetables in season.
- In groups of 4, children discuss the role, purpose and layout of a store and report to the class. Groups then pose relevant questions to ask the store representative about the *journey* of the fruit and vegetables to the supermarket (eg local versus imported produce, packaging, storage).
- After the store visit, with a partner, children choose a fruit or vegetable for follow up inquiry mapping its *journey* from grower to consumer. Children will need to develop inquiry questions, interpret and analyse information and make generalisations from a variety of print and internet sources. Guidance questions may be based on:
  - > origin of produce (source)
  - > growing and harvesting
  - > packaging and transport
  - > storage at the shop.
- Depending on the time of the year, a trip to a local producer or farm to observe growing or harvesting activities in action may be considered.
- Children should take photos to add to their presentation and present their completed inquiry using multi-media.

Further inquiry

This content provides an excellent opportunity for children to develop a historical and geographical perspective eg:

- > How have changes in technology shaped how fruit and vegetables are transported from source to consumer? (eg growing, harvesting, effect of weather, refrigeration, packaging, transport-road, air, sea, farming techniques, food miles/kilometres).
- > Consider the effect of a change in weather or a natural disaster on the supply of a fruit or vegetable eg the impact of Cyclone Yasi on bananas. Refer to www.theaustralian.com.au/archive/business-old/cyclone-yasi-to-see-banana-prices-stay-high-till-midwinter/story-e6frg95o-1226032922362
- > Investigate the history of how the use of spices has influenced food practices and eating experiences over time.

Healthy take-away!

Interview a grandparent or a senior citizen. Find out how they sourced their fruit and vegetables, before supermarkets were introduced.

Australian Curriculum exemplar links

English: ***Literacy:*** Interpreting, analysing, evaluating, Interacting with others, Creating texts [ACELY1677, ACELY1700, ACELY1703, ACELY1707]

Maths: ***Measurement and Geometry:*** Location and transformation [ACMMG065, ACMMG090, ACMMG113]

History: ***Historical Knowledge and Understanding:*** The past in the present [ACHHK046] ***Historical Skills:*** Analysis and use of sources, Explanation and communication, Historical questions and research [ACHHS051, ACHHS053, ACHHS067]

General Capabilities

Literacy, Critical and creative thinking

Cross Curriculum Priorities

Sustainability

Years 6–7

Growing food: School gardens – The science

How does your garden grow?

Investigates and reports on factors that influence the growth of plants in a school garden.

Prior knowledge and lesson preparation

- In 6 class learning teams, students discuss and list conditions plants need to grow in a school garden including speculating on what might happen if the conditions are changed in some way and how these assumptions can be proven or disproven.

Focus inquiry

- Each learning team plans a scientific investigation of the conditions that influence the growth of plants (focus on *sunlight, water, nutrients*). Two groups are assigned to each element. Each group is provided two similar seedlings to set up their investigation (seedling punnets can be purchased from garden centres).
- The *Primary Connections in the Biological Science/Plants in Action* section includes an excellent *Plant growth investigation planner*. This resource will assist students with their investigation.
- The investigation pathway required includes:
  1) What are you going to investigate?
  2) What do you predict will happen? Why?
  3) Which variables will you change?
  4) Which variables will you measure?
  5) Which variables will you keep the same?
  6) Describe how you will set up your investigations.
  7) Write and draw your observations.
  8) Explain your results.
  9) Evaluate your investigations.
- Each learning team uses multi-media to prepare and present a summary of their results and factors affecting plant growth. Groups that investigated the same conditions compare their results and decide if the outcomes matched.

Case study

All hands on deck at Nailsworth Primary School

Gardening has become widely introduced at Nailsworth Primary School with many classes involved in planning and planting their own fruit and vegetable crops.

Children have looked at aspects of farming, sustainability, recycling and composting with *Bokashi* bins used throughout the school.

Australian Curriculum exemplar links

English: ***Literacy:*** Interpreting, analysing, evaluating, Creating texts [ACELY1713, ACELY1725, ACELY1723]

Maths: ***Statistics and Probability:*** Data representation and interpretation [ACMSP169]

Science: ***Science Understanding:*** Biological sciences [ACSSU094] ***Science as a Human Endeavour:*** Nature and Development of science, Use and influence of science [ACSHE098, ACSHE220] ***Science Inquiry Skills:*** Questioning and predicting, Planning and conducting, Processing and analysing Data and information, Communicating, Evaluation [ACSIS104, ACSIS107, ACSIS221, ACSIS110, ACSIS126, ACSIS130]

General Capabilities

Literacy, Critical and creative thinking, Personal and social competence, Numeracy

Cross Curriculum Priorities

Sustainability

Website to support inquiry

Primary Science Connections
www.primaryconnections.org.au

Case Study

Gardening at The Pines C–7 School

Year 6/7 students at the Pines Primary School decided to set up their own garden in front of their class.

The preparation and gardening activities that followed were integrated into all areas of the curriculum making learning more meaningful.

This gave the teacher a wonderful opportunity to promote positive attitudes towards eating fresh produce.

Students who were reluctant vegetable eaters were generally prepared to try vegetables they had grown themselves. Most students transferred their new interest for gardening by setting up garden plots at home with their family.

The class also saw this as a wonderful opportunity to develop their entrepreneural skills by selling their excess produce to the school community and by having a Potato bake day.

The food cooked that day was very popular with all students and the proceeds ensured the year 6/7 class had a wonderful end of year celebration.

It was also interesting to note that although the garden was not fenced, no damage occurred to any of the plants or vegetables during the year.