Every school a garden
Every child a gardener
Every plant a learning experience

I’m Gary
I love measuring, investigating plants, and eating

I’m Gabby
I love planting, weeding, harvesting and cooking
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Food cycle learning in the kitchen garden

grow food
- e.g. research, plan, design, create and manage a food garden using the ‘KidsGrow Ten Step Process’ (www.ngia.com.au); investigate the edible parts of plants; explore local and indigenous plant foods.

harvest
- e.g. recognise harvest ready plants; plan plantings for special food occasion recipes; explore seasonal foods as well as year round crops such as herbs, salad and Asian vegetables.

prepare food
- e.g. appreciate the cultural diversity of food; create a meal from scratch; develop mastery of a range of food styles and kitchen skills.

handle and store
- e.g. explore keeping qualities, times and storage needs of different crops; investigate food preservation such as drying, bottling, freezing.

recycle and compost
- e.g. set up a worm farm, compost heap and recycling system for all food waste; reduce the use of packaging.

eat and share
- e.g. explore the sensory attributes of a wide variety of vegetables and fruit; appreciate the diversity of styles of eating occasions; create foods to share.

sensory hands-on food experiences linked to the curriculum

There is more to food than eating

Connecting children to plant food sources through gardening and cooking also connects them to each other, to food cultures and to the wider environment. Involving them in authentic food experiences while using and sharing produce they have grown themselves can develop a passion for fresh vegies and fruit and a deeper understanding of the food supply.

Integrated, sensory food learning experiences which encourage children to make choices at every stage of the food cycle can develop ‘food literacy’, for example:

- understanding of food cultures and the variety, origins and seasonality of plant food
- understanding of the connection between personal food choices and health
- positive attitudes to fresh vegetables and fruit
- awareness of the environmental impact of their food choices
- developing language and the vocabulary of food
- developing life skills as gardeners and cooks
Introduction

Through creating a food garden and preparing and eating the produce, children are connecting with the earth in real and positive ways. They can discover origins and seasonality of our food supply; explore the sensory delights of crunchy new snow peas; investigate the connectedness of lifecycles of plants and ourselves; and the fact that food scraps can go back into the earth to feed new plant growth. Children can learn that fresh food tastes great and that hard work and patience achieves results.

By implementing the KidsGrow Munch and Crunch Garden, schools can contribute to their school environmental management plan in all focus areas – management of resources, school grounds improvement and curriculum links.

This curriculum resource guides teachers and students through the KidsGrow ten step process for achieving a successful productive garden - either in containers or raised beds - so that vegetables, fruits and herbs can be harvested, prepared and shared. Resources are designed for a teacher and class and can be adapted for any learning stage.

**Student outcomes**

By actively participating in the creation of a Munch and Crunch Garden and related learning experiences, students will:

- discover interdependency between humans and natural environmental processes such as the water cycle, the nutrient cycle and the food cycle.
- represent key features of the school on a map and assess relevant aspects of the school site.
- develop and evaluate ideas using drawings, models and discussions at appropriate stages of the design process, then implement them.
- identify and describe basic aspects of caring for plants and through observation record ways in which living things grow and change.
- develop and implement simple plans to address environmental issues in the school such as waste recycling through composting and water efficient gardening practices.
- employ sustainable gardening practices and appreciate the satisfaction, accomplishment and value of growing, harvesting, preparing and eating fresh food.
- develop understandings about the need to protect the genetic diversity of our plant foods for the future.

**Compost** is nature’s way of recycling and will enrich your garden and make it grow. Almost any organic matter can be composted including leaves, straw, food scraps, lawn and garden clippings. You can build your own from timber, bricks or other materials or just make a heap. For factsheets go to www.abc.net.au/gardening and search for ‘compost’.

**Be Waterwise**

With simple planning and good plant selection you can create a water efficient garden right from the start. Check out www.ngia.com.au for detailed tips on reducing water use and links to other useful websites.
**KidsGrow Munch and Crunch Garden**

**Ten step process summary**

*Based on the successful LEARNSCAPES PLANNING & DESIGN™ process. www.learnscapes.org*

<table>
<thead>
<tr>
<th>Steps in the Process</th>
<th>Stages of the garden</th>
<th>Steps in the process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STEP 1</strong></td>
<td>Organise your team, research food plants and create a vision for your garden</td>
<td><strong>Researching, planning and designing the garden</strong></td>
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<tr>
<td><strong>STEP 2</strong></td>
<td>Assess possible sites and select the best place for your garden</td>
<td><strong>Creating and planting the garden</strong></td>
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<tr>
<td><strong>STEP 3</strong></td>
<td>Prepare your garden design to draw it to scale</td>
<td><strong>Maintaining, using and sharing the garden</strong></td>
</tr>
<tr>
<td><strong>STEP 4</strong></td>
<td>Measure and mark out where your garden will be</td>
<td><strong>Researching, planning and designing the garden</strong></td>
</tr>
<tr>
<td><strong>STEP 5</strong></td>
<td>Build the garden structures or place the containers</td>
<td><strong>Creating and planting the garden</strong></td>
</tr>
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<td><strong>STEP 6</strong></td>
<td>Test and prepare the soil</td>
<td><strong>Maintaining, using and sharing the garden</strong></td>
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<td><strong>STEP 7</strong></td>
<td>Plant and label your garden</td>
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<td><strong>STEP 8</strong></td>
<td>Tend your garden and keep records of the changes</td>
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<tr>
<td><strong>STEP 9</strong></td>
<td>Harvest, celebrate and share your garden produce</td>
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<tr>
<td><strong>STEP 10</strong></td>
<td>Keep your garden going and use it for more learning</td>
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Detailed student learning experiences are linked to each step and begin on page 6.

*Developed by Shelley Woodrow and Helen Tyas Tunggal. KidsGrow Munch and Crunch Garden © Nursery & Garden Industry Australia Limited 2011*
KidsGrow Munch and Crunch Garden
Process and student learning experiences

Researching, planning and designing the garden

START HERE, DON’T MISS A STEP!

1. Organise your team, research food plants and create a vision for your garden

Activities to be undertaken

- Start a class journal to record your garden research, ideas and activities (with a view to passing this on to the next class responsible for the care and development of the garden).
- Lead students to an increased understanding about edible plants. Discuss the health benefits of eating a range of types and different colours of vegies and fruit.
- Experiment to learn what seeds need to grow. Also consider planting different seedlings into boxes ready to test in different locations which will be identified and monitored in Step 2.
- Discuss the purpose and rationale for the garden.
- Provide information to parents about the value of student involvement in planning and caring for edible gardens. It is vital to enlist the support of parents, grounds staff and local gardening experts for your garden team.
- Identify and list essential elements needed to establish a food growing garden. Refer to ‘Munch and Crunch sample design’.
- Gather samples and resources about edible gardens to display and keep in an ideas folder.
- Research and seek advice to find which plants will best suit your garden purpose.
- Refer to ‘Munch and Crunch Garden yearly planner’ and ‘Planting guide for easy grow autumn/winter sown vegetables’.

Sample student learning experiences

- Brainstorm in small groups to identify as many edible plants as possible. Compile a class list. Classify according to edible leaf, fruit, flower, seed, stem or root. Cut open different fruits and vegetables and compare the seeds.
- Investigate what seeds require to grow into healthy plants. Set up and monitor an experiment growing bean seeds in small containers of soil under different conditions e.g. one receives no water, one no sunlight, one no drainage, and one without compost. Draw diagrams to record your results.
- Discuss and list reasons for creating an edible garden at school. Visit, if possible, examples of vegetable or permaculture gardens. Research which plant foods grow locally and their seasonal availability. Consider growing times in the context of school terms. Research local indigenous plant foods with the help of an elder. Identify and list the elements needed for an edible garden. Investigate the benefits of compost and how to make it. Research different types of containers and raised garden bed construction. Discuss different options.
- Brainstorm about who can help design and build the garden. Design an invitation and distribute it to possible helpers. Create a wish list for what you want and need in your garden. Collect photos, student drawings and magazine cuttings that reflect your wish list and display in an ideas folder or the class journal. Survey students to identify fruits and vegies they like and dislike. Survey also to identify those which have been tried or not tried. Research food styles (including cooking techniques and cultural cuisine) in preparation for planning and using the garden harvest. Brainstorm fundraising ideas for your garden. Act on these.

Step 1. Milestone checklist

- Garden vision and purpose has been discussed and developed collaboratively by the class.
- Food has been researched and preferences incorporated into planning for plant selection.
- Garden wish list including essential elements has been researched and prepared by students.
- Garden team is established with helpers and mentors briefed and committed to assist at appropriate stages.
- Class garden journal includes ideas, drawings, vision, wish list, and other records documenting the garden process.

KidsGrow Munch and Crunch Garden © Nursery & Garden Industry Australia Limited 2011

Developed by Shelley Woodrow and Helen Tyas Tunggal
Researching, planning and designing the garden

STEP 2
Assess possible sites and select the best place for your garden

Activities to be undertaken

Finding a suitable garden site will take some time, thought and consultation. It is important at this stage to identify possible sites and undertake a basic site assessment of each location. Even with an existing garden this is an opportunity for students to better understand why the garden is located where it is and to confirm that it is actually in the best location, especially if there is a desire to expand the gardens.

- Obtain a base map of the whole school site preferably including a scale and a north point and if possible an aerial photograph.
- Lead students through basic map reading and observation activities and update the base map if necessary. Make multiple copies of the updated base map to record site data.
- Discuss and identify possible sites for the edible garden and mark these on a copy of the base map. Then, before selecting a site, consider each factor listed on the following site assessment check list in the context of the essential elements needed for an edible garden.
- Record relevant site audit data for each factor on different site maps.

Hint: When recording site audit data on a base plan use a lead pencil and eraser to easily allow corrections and alterations.

Sample student learning experiences

Look at a plan of the whole school grounds that has a scale and compass points. Identify the main features and different areas in the North, South, East and West of the plan. Use trundle wheels, tape measures and a compass to check the plan for accuracy. Refer to the scale on the plan to estimate sizes of different areas. Delete (liquid paper) from the map features that no longer exist. Draw in to scale any buildings or significant features not shown. Investigate the grounds to look for potential edible garden sites, which could include either existing garden sites or unused spaces. Record possible sites for your garden on a copy of the base map. Refer to the essential elements and find possible places that are:
1) receiving at least six hours sunshine a day year round
2) easy to access and close to a water supply
3) not already native animal habitat
4) protected from strong winds
5) fairly flat but not prone to waterlogging
6) not needed for other uses now and in the future
7) not needed for vehicle access
8) not as likely to be damaged.

Determine areas that may need improving and consider these. Collect soil samples at each possible garden site. Test properties such as texture, pH, water and organic content. Graph results. Record all data on base maps and display it for the whole school. Place and monitor different plants in boxes in the different locations and then compare growth rates and ‘plant happiness’. Evaluate alternative garden sites using the information collected. Go to each site and imagine how a garden could improve it. Discuss, debate and vote if necessary to select the best site. Write an information report about your investigations and findings and share them with key stakeholders and the principal. Photograph your chosen site at different times and after rain. Observe water-flow and any ‘ponding’. Also continue to observe daily and seasonal changes in sun and shade.

Site Assessment Checklist

For assessment of potential sites consider

- Location of buildings and physical features
- Location of water, electric, gas, phone lines
- Existing vegetation including weeds
- Existing animals and evidence of habitat
- Sunlight and shade at different times
- Soil quality and type
- Prevailing winds and climatic influences
- Slope and drainage run-off patterns
- Current functions of areas and supervision
- Vehicle and pedestrian access
- Views and visual quality
- Hazards, safety and maintenance issues
- Environmentally degraded areas
- Imminent changes affecting the site

FOR CONTAINERS it may be possible to use an outdoor site temporarily or to find an indoor site that better meets the current needs.

Step 2. Milestone checklist

□ School whole site base map has been obtained, updated or created and possible garden sites recorded.
□ Site assessment checklist has been completed for each possible site.
□ Essential elements for an edible garden including a sustainable water supply have been considered.
□ An appropriate site has been chosen and approved by the principal.
□ Class garden journal now includes site assessment process, maps and photos.
Researching, planning and designing the garden

**S T E P 3**

Create the garden design and draw it to scale

<table>
<thead>
<tr>
<th>Activities to be undertaken</th>
<th>Sample student learning experiences</th>
</tr>
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<tbody>
<tr>
<td>• Once the site is chosen, discuss and decide on the size and shape of the garden.</td>
<td>In groups estimate the garden dimensions. Measure to check. Decide on the boundaries and measure accurately. Prepare to scale a garden site base plan of the proposed site as it is currently. Draw in any existing features carefully. Discuss possible shapes for the new garden beds or arrangement of receptacles for container gardens. Select items from your wish list to be included in the design. Discuss possible materials to build the garden and paths or suitable containers for the location and type of plants to be grown.</td>
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<td>• Prepare a garden site base plan ready for the design work. A good scale for students to draw their design ideas is 1:50 as this means that 2cm on the plan = 1 metre on ground. For a large area 1:100 may fit better on A4 or A3 paper.</td>
<td><strong>Select</strong> an appropriate spot for a compost bin or worm farm. <strong>Draw</strong> your ideas and plans of what the garden may look like. <strong>Share and compare</strong> drawings and ideas with the whole group. <strong>Choose</strong> the most appealing ideas and <strong>sketch</strong> up a class design. <strong>Consider</strong> everyone’s ideas when developing the garden design. <strong>Research</strong> which plant ingredients are needed for any planned cooking experiences and consider what is possible to grow. <strong>Calculate</strong> plant yields and the quantities required to be grown. <strong>Seek</strong> advice from mentors. Refer to ‘KidsGrow Munch and Crunch Garden tips and suggestions’, ‘Container gardening tips and suggestions’ and ‘Planting guide for easy grow autumn/winter sown vegetables’.</td>
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<td>• For container gardens: Students can plan individual or small group designs depending on the number of containers planned. Refer to ‘Container gardening tips and suggestions’ for ideas.</td>
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<td>• For garden beds: Consider designing either a large bed with various ‘keyhole’ accesses into it or individual beds linked with wide pathways. Plan garden beds no wider than 1.5m so that students can easily reach in to plant and tend the garden with access from either side.</td>
<td><strong>Consider</strong> incorporating seating on the garden bed edges. Refer to ‘Raised bed garden design and construction’ for ideas. <strong>Check</strong> the elements on ‘Munch and Crunch sample design’ and ensure that they are included in your design. <strong>Walkways</strong> should be at least one metre wide for easy wheelbarrow and wheelchair access. <strong>Draw</strong> the final design to scale on a blank copy of the garden site base plan. <strong>Ensure</strong> the principal and ground staff are shown.</td>
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<td>• If possible orient the garden beds east to west to maximise available daily sunlight.</td>
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**Step 3. Milestone checklist**

☐ Accurate garden site base map has been drawn up ready for design activities.

☐ Students’ research and ideas for the garden have been shared and discussed for incorporation into the design.

☐ Garden design including agreed items from the ‘Wish List’ has been drawn to scale and displayed for comment.

☐ Planned cooking experiences and seasonal availability have been considered in the selection of plants for the planting plan.

It is strongly advisable to design garden beds to be no wider than 1.5m so that students can easily reach in to plant and tend the garden.

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*Accurate garden site base map has been drawn up ready for design activities.*

*Students' research and ideas for the garden have been shared and discussed for incorporation into the design.*

*Garden design including agreed items from the 'Wish List' has been drawn to scale and displayed for comment.*

*Planned cooking experiences and seasonal availability have been considered in the selection of plants for the planting plan.*
### Creating and planting the garden

**Step 4. Milestone checklist**

- Proposed garden beds or containers, pathways and other garden features are measured and marked out on the ground in accordance with the design.

**Activities to be undertaken**

- It is important for students to lay out the design as closely as possible to the location decided on, before construction is undertaken.
  - With assistance from a grounds person or parent set out the garden beds, pathways and features from the garden design.
  - Ensure garden beds are no more than 1.5 metres wide. Provide paths wide enough for wheelchair and wheelbarrow access.
  - Have a symbolic site launch. Keep it simple.

**Step 5. Milestone checklist**

- Garden beds, containers and pathways are in place ready for the soil preparation phase.

**Activities to be undertaken**

- Consider whether to install underground drip irrigation during construction. Refer to ‘Waterwise gardening’.
- Consider constructing the garden beds in stages and making pathways initially with bare earth, sawdust or mulch to be replaced with decomposed granite, pavers or living ground covers.
- Ask your garden support team to help. Make sure volunteers understand and know how to do what is expected of them.

**Sample student learning experiences**

- Before laying out the garden examine the design carefully.
- Use a compass to orient the direction according to the design.
- Measure the garden boundaries with trundle wheels or long measuring tapes and then mark them out using pegs and string, witches hats, ropes, marking agents or sawdust.
- Calculate the area of the garden site. Check with the design.
- Measure and re-measure the location of the garden beds, pathways and other garden elements such as compost bins, worm farm, potting table. Mark them out as well.
- Re-assess the garden design ensuring it works well on the ground.
- Take photos of the marked out site and the students’ activities.
- Write photo captions to be used in a display or the class journal.
- Plan a simple celebration to acknowledge completion of this step.

**Step 5. Milestone checklist**

- Garden beds, containers and pathways are in place ready for the soil preparation phase.

**Activities to be undertaken**

- Research and decide how to efficiently water the garden.
- Confirm the size, shape and soil depth of the garden beds or containers. Confirm the volume of soil or potting mix required.
- Consider alternative materials, living and non-living, for pathways.
- In groups build models of your garden using assorted materials.
- Investigate if any cheap or free recycled materials are available.
- Compile a list of required materials and the quantities needed.
- Invite supporters to sponsor plants or materials for the project.
- Compile a list of jobs to be done and tools that will be needed.
- Organise a working bee. Invite helpers to assist build the garden.
- Refer to ‘Safety tips for learning outdoors’ and develop safety precautions for students and helpers.
- Develop different textured pathways and create handmade pavers that reflect an edible garden theme.
- Consider establishing a compost heap or worm farm.
- Design and construct a special entry sign to your garden area.
- Photograph the garden under construction. Write captions for the best photos and use them in the class garden journal.
- Incorporate measurement markings on garden bed structures.
- Design thankyou cards and post them to your helpers and donors.
- Publicise thanks for any donations in the school newsletter.
- Prepare a report or display about your project for parents.
### S T E P 6
**Test and prepare the soil**

<table>
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<tr>
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<th>Sample student learning experiences</th>
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<tbody>
<tr>
<td>Healthy soil is vital for plant health. Rich, well-drained soil with a pH of 6.5 is ideal for most vegetables. <strong>For raised beds:</strong> • Before digging make sure safety precautions are observed when using gardening tools. Refer to 'Safety tips for learning outdoors'. • Dig soil often enough to break up any clods. • Test and adjust soil properties if necessary. Refer to adjacent student learning activities. • It is extremely important to add well-rotted manure and other decomposed organic matter if required, to improve soil quality, drainage and moisture retention. • In an established bed first remove any coarse mulch, roots and stones. • Rake the surface over and cover in mulch. This is an excellent opportunity to experiment and test a variety of mulches in different sections of the garden.</td>
<td><strong>Investigate</strong> safe gardening practices. Refer to ‘Safety tips for learning outdoors’ and ‘School friendly gardening practices’. <strong>Observe</strong> safety precautions when using gardening tools. <strong>Check</strong> your soil type. Pick up a handful of moist soil and squeeze. Clay soil will form a tight sticky ball. Silt feels slippery. Sandy soil feels grainy and won’t hold its shape. Loamy soil will hold its shape but it crumbles easily. Seek advice about how to improve your soil. <strong>Test</strong> the pH level of the garden soil. A pH of 6.5 is ideal for most vegetables. <strong>Adjust</strong> the pH if necessary. Adding lime lowers the pH and adding sulphur raises it. Seek advice. <strong>Loosen</strong> and aerate the soil to help the roots of plants grow well. <strong>Remove</strong> any weeds, carefully selecting one species at a time. <strong>Add</strong> organic matter to provide nutrients and assist with drainage. <strong>Investigate</strong> how to attract earthworms to your garden. <strong>Try</strong> this. <strong>Cover</strong> the whole garden area with mulch to a depth of 7-10cm. <strong>Trial</strong> three types of mulch in different sections of the garden. <strong>Set up</strong> a scientific study to assess the decomposition rate of each. <strong>Consider</strong> installing a perforated hose below the mulch so that roots are directly watered without wastage. <strong>Draw</strong> a cross section diagram showing the layers in your garden. <strong>Photograph</strong> ‘soil preparation’. <strong>Write</strong> captions for the photos.</td>
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Step 6. **Milestone checklist**

- Soil is tested and prepared ready for planting.

### S T E P 7
**Plant and label the garden**

<table>
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<tr>
<td>• Devising a plan for planting. Consider planting in stages or successive plantings to ensure a longer harvest. • When ready to plant ensure that the soil is prepared and moist and that everything needed is on hand. • Demonstrate procedures to students. • <strong>For seeds:</strong> Each type will need a different sowing depth. Refer to the directions and then demonstrate how to plant them correctly. • <strong>For seedlings:</strong> Space them out on top of the mulch according to directions. Scrape away an area of mulch forming a hollow exposing the ground about 15cm in diameter. Use a trowel to dig a hole a little deeper than the pot without mixing the mulch with the soil. • Gently remove pre-watered seedlings from pots by squeezing and holding upside down. • Place the seedling in the hole and fill with soil to the same level as its original container. • Firm in the plant by hand to remove air pockets and create a saucer shaped depression which will act as a dam. Water plants in gently. • Update the class journal.</td>
<td><strong>Investigate</strong> methods of growing vegies from seeds or seedlings. <strong>Confirm</strong> what to plant, as well as where and when. Refer to ‘Planting guide for easy grow autumn/winter sown vegetables’ and ‘Munch and Crunch tips and suggestions’ or ‘Container gardening tips and suggestions’. <strong>Match</strong> plants soil types. <strong>Predict</strong> and then <strong>estimate</strong> how many seedlings will be needed. <strong>Order</strong> the seedlings you will require from your local nursery. <strong>Design</strong> and make plant identity signs ready to put in the garden. <strong>Invite</strong> someone with expertise to help on planting day. <strong>Remove</strong> any weeds. <strong>Rake</strong> the soil surface so it is loose and flat. <strong>Gather</strong> all required equipment - gloves, buckets, trowels, rulers. <strong>Photograph</strong> ‘planting the garden’. <strong>Write</strong> captions for the photos. <strong>Record</strong> dates of plantings and expected harvest time to <strong>Develop</strong> a plan for future growing and harvesting. <strong>Prepare</strong> the soil by watering well. Wait until it is moist, not wet. <strong>Water</strong> the seedlings in their punnets one hour before planting. <strong>Read</strong> your seed packets or a planting guide. Follow directions. <strong>Devising</strong> a way of using your hands to measure the distance to leave between each plant and set them out in the garden. <strong>Observe</strong> demonstrations of how to plant seeds and/or seedlings. <strong>Restate</strong> the instructions to a partner and confirm understanding. <strong>Work</strong> with your partner to plant your seeds and/or seedlings. <strong>Water</strong> each plant carefully with at least half a bucket of water applied in a gentle spray e.g. from a watering can. <strong>Place</strong> markers. <strong>Develop</strong> signage for the different sections. <strong>Research</strong> how to protect new seedlings. <strong>Implement</strong> your ideas. <strong>Draw</strong> and write about your experience in your garden diary.</td>
</tr>
</tbody>
</table>

Step 7. **Milestone checklist**

- Seeds or seedlings have been planted, watered, labelled and protected.

---

Different plants prefer different soil types so it is a good idea to test your soil. A pH test kit is inexpensive and available from your local retail nursery or garden centre. Do not dig a No-dig garden. The ‘No-dig gardening and garden tools’ resource has instructions. For container gardens: Soilless potting mix is best. Refer to ‘Container gardening tips and suggestions’.
Maintaining, using and sharing the garden

**STEP 8 Tend your garden and keep records of the changes**

### Activities to be undertaken

- Ensure garden boundaries are defined so that the area is protected during the growing period.
- Investigate chemical free care for the garden. Organic gardening involves creative ways of repelling, trapping or destroying harmful pests.
- Also refer to ‘School friendly gardening practices’ and ‘Safe ways to deal with common garden pests’.
- Create an ongoing maintenance and watering plan. Keep plants moist. See ‘Munch and Crunch tips and suggestions’ and ‘Waterwise gardening’.
- Thin out excess seedlings from the sown seeds and feed plants during the growing period with seaweed-based solution and soluble plant food. Seek advice.
- Maintain mulch preferably with different materials in different sections.
- Weed regularly and prune plants where necessary.
- Compost any garden material that is not diseased and also lunch scraps, plant and grass cuttings.
- Maintain garden edges and pathways.
- Prepare opportunities to develop skills needed for basic food preparation.
- Ensure healthy and safe kitchen practices are introduced and adhered to.
- Plan for students to have opportunities to report regularly on the garden progress.

### Sample student learning experiences

- Water seeds and seedlings lightly for two weeks before mulching. Take care if using a hose that it doesn’t harm the plants.
- Check each day that the seeds and seedlings are kept moist.
- Research organic gardening and environmentally friendly ways of controlling garden pests that are attracted to vegetables.
- Investigate what constitutes compost and identify sources.
- Establish a compost heap and/or a worm farm and care for it.
- List the jobs that need to be done to maintain the garden.
- Prepare a roster so that all students can share the garden jobs.
- Observe and measure new shoot and leaf growth once the seedlings emerge. Record observations in a class journal.
- Thin out plants if too crowded to leave room for plants to grow.
- Study the life cycle of selected plants from seed to maturity.
- Measure the growth rate of the plants each week and record on a class graph. Illustrate the different rates between species.
- Mulch 7-10cms deep two weeks after planting or build up mulch slowly by adding leaf litter.
- Spread mulch carefully - not too close to stems to avoid rotting.
- Experiment with different mulch types in different sections.
- Monitor moisture retention and watering needs of each section.
- Compare decomposition rates of the different types of mulch.
- Weed regularly using a hand fork or hoe to prevent weeds competing with plants for water and nutrients. Add to compost.
- Monitor insect damage. Solve problems by research and action.
- Collect any old vegies from under plants to prevent disease.
- Research scarecrows using the internet and make a scarecrow.
- Taste the edible parts of plants. Ensure that hands and harvested food are washed carefully before eating anything.
- Practise a range of basic cooking skills.
- Photograph ‘learning cooking skills’ and the ‘garden growing’.
- Write captions for the photos to include in the class journal.
- Write about ‘How looking after the garden makes me feel’.

**Step 8 milestones checklist**

- Roster has been devised to share and rotate jobs in the garden.
- Compost and recycling systems are in place.
- Garden journals are being used to record progress in the garden.
**Maintaining, using and sharing the garden**

**STEP 9**

**Harvest, celebrate and share your garden produce**

<table>
<thead>
<tr>
<th>Activities to be undertaken</th>
<th>Sample student learning experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Continue to tend the garden.</td>
<td>Create a special sign for your garden. <strong>Acknowledge</strong> sponsors.</td>
</tr>
<tr>
<td>• Prepare student-made signage for the garden. Most simply it can be painted on ply and coated with a clear lacquer to be replaced each year by a new class.</td>
<td><strong>Prepare</strong> a display about the garden. Include the plan, photos and captions, paintings, growth rate graphs and student diaries.</td>
</tr>
<tr>
<td>• Document development of the garden.</td>
<td><strong>Record</strong> in a class log book what has been grown, when it was planted, when and if it was harvested and how it was consumed.</td>
</tr>
<tr>
<td>• Highlight a vegetable of the week to learn about and feature in a recipe.</td>
<td><strong>Eat</strong> the harvest. <strong>Experiment</strong> with raw and steamed herb and vegetable combinations and seasonings.</td>
</tr>
<tr>
<td>• Introduce some basic cooking experiences including recipe reading, kitchen skills, cultural food styles and food preservation.</td>
<td><strong>Select</strong> a simple recipe to prepare using produce from the garden.</td>
</tr>
<tr>
<td>• Explore ways of using produce through the school canteen.</td>
<td><strong>Explore</strong> cultural variations in preparing a range of vegetables.</td>
</tr>
<tr>
<td>• Plan a harvest celebration. Include a portrayal by the students of the garden in all of its stages.</td>
<td><strong>Record</strong> comments from those tasting the food.</td>
</tr>
<tr>
<td>• Thank all helpers with appreciation certificates.</td>
<td>Create a recipe folder sorted by vegetable type or colour.</td>
</tr>
<tr>
<td>• Prepare a brief project report with photos and describe the benefits of edible gardens in the school.</td>
<td><strong>Explore</strong> methods for storing and preserving produce.</td>
</tr>
</tbody>
</table>

**Step 9 milestones checklist**

- **Students have grown and harvested** a variety of produce.
- **Students have prepared and shared food** as part of a harvest celebration.

Create a recipe folder sorted by vegetable type or colour. **Explore** methods for storing and preserving produce. **Celebrate** your harvest. **Invite** parents and school community to an assembly to thank helpers. **Devise** a dramatic or musical re-enactment of the creation of the garden to present at the ‘Harvest Celebration’. **Prepare** a press release about the progress of the edible garden and send it with photos to the local newspaper. **Revise** the job roster and **delegate** roles and responsibilities. **Visit** your garden daily. **Record** observations in a class journal. **Document** and **report** on the seasonal progress of your garden.
Maintaining, using and sharing the garden

**STEP 10** Keep your garden going and use it for more learning

### Activities to be undertaken

- Incorporate the maintenance activities into your curriculum plan. Devise a maintenance schedule.
- Continue to look after the garden: keep it tidy; monitor the garden and keep it weeded regularly; renew mulch; maintain watering systems, paths and labels; ensure overall environmental health; remove dead plants; add undiseased plants to the compost.
- Collect and store seeds for the next year if applicable.
- Plan additional garden beds once initial beds are established.
- Consider environmental impacts when making choices about growing and caring for plants.
- Explore the concept of increasing plant diversity.
- Prepare the garden beds for the summer holidays by mulching and, if needed, make a watering roster.
- When planning for next year, consider crop rotation to help minimise pests and disease and maintain healthy soil.
- Explore the possibilities for collecting rain water.
- Continually develop ways of linking the curriculum to students learning in the garden and kitchen.

### Sample student learning experiences

**Support** grounds staff by mulching and maintaining the garden.

**Assess** and revise the job roster. **Delegate** tasks according to interests.

**Conduct** ongoing field observations. Keep records of all garden changes and related food preparation and tasting activities.

**Reflect** on ways that plants support human health and wellbeing.

**Write** a regular garden report for the school newsletter.

**Compare** the sustainability and biodiversity of various sections.

**Compare** decomposition rates of the different mulch types

**Calculate** the cost over time of replacing different mulches.

**Compare** plant growth rates in the different sections. **Graph** results.

**Formulate** hypotheses from your findings and test over time.

**Explore** the biodiversity of plants between and within species.

**Plant** to encourage biodiversity and attract ‘good’ insects.

**Investigate** companion planting and crop rotation. Refer to ‘Munch and Crunch tips and suggestions’.

**Prepare** a presentation or report to help others to plan their own edible garden. **Include** reflections on best crops, gardening tips, food preparation activities, favourite recipes, etc.

**Make** a class ‘Edible Garden Big Book’ for the school library using selected the photos, graphs, selected paintings and diary entries.

**Research and consider** planting staples such as potatoes, sweet potato and pumpkins that can be harvested the following year.

**Plan** some procedures and **design** simple technological solutions for watering plants during holiday periods, if applicable.

**Cover** the garden bed with a thick layer of wet newspapers then cover with mulch or straw to help prevent weed growth over summer.

**Show** appreciation to those who have helped in the garden throughout the year.

**Share** successes, solutions for problems and interesting findings with the wider school community or to info@ngia.com.au.

**Hand your garden on** at the end of the year, with suggested improvements, supporting journals and records to the next class.

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**For Further Fun**

- If you can keep water up to them in the growing period plant some pumpkins. Carve your name in a pumpkin when it is small using a wooden skewer. Then watch your name grow.
- Plant a pizza themed garden with tomatoes, basil, capsicum, onion, garlic, oregano, spring onions.
- Research how growing food began ten to twelve thousand years ago.
- Research and create “Did you know?” signs to place beside growing plants.
- Plant bush Tucker herbs and vegetables such as native basil, warrigal greens and bush tomatoes.
- Using mustard seeds, plant a special message ready for a celebration. Use your finger to trace the letters in the ground and plants the seed along the furrows.
- Plant a tepee. Use two metre lengths of bamboo string and climbing vegetables or vines.
- Create ‘compost’ tea to feed your vegies. Almost fill a plastic garbage bin with weeds. Cover with water and replace the lid. Wait a few weeks for the plants to break down, then dilute the fertiliser 10:1 and use on the garden in the same way as liquid manure.
- Support the growth of other species by planting ‘companion’ plants.
- Make ‘seed tapes’ to ensure proper spacing of seedlings using water soluble glue evenly spaced seeds along long strips of paper towels and then plant the strips in rows in the prepared soil.
- Make “seed tapes” to ensure proper spacing of seedlings.
- Create ‘compost’ tea to feed your vegies: Almost fill a plastic garbage bin with weeds. Cover with water and replace the lid. Wait a few weeks for the plants to break down, then dilute the fertiliser 10:1 and use on the garden in the same way as liquid manure.
- **Plan a menu using healthy diet principals.** Plant the vegetables you will need.
- **Make “seed tapes” to ensure proper spacing of seedlings.**
Munch and Crunch sample design

Plan 1. Raised Beds

Plan 2. Key-Hole Garden

Key:
- 6 hours sunshine
- Raised Bed
- Rich Loamy Soil
- Water Source
- Vegies
- Edible Flowers
- Mulch
- Compost
- Seating Wall
- Sign
- Potting Table
- Bamboo Trellis

Learnscapes Planning and Design™
Helen Tyas Tunggal and John Webber
www.learnscapes.org
Munch and Crunch tips and suggestions

Essential Elements

- The sunniest and warmest spot available – north facing and at least six hours of sunshine.
- Well drained, rich loamy soil with lots of organic material or compost in raised garden beds.
- Container gardens need good quality potting mix and containers with adequate drainage holes.
- A soil pH between 6.0 and 7.0 is desirable. A pH of 6.5 is ideal for most vegetables.
- Access to a water supply. Trigger nozzles, watering cans or drip irrigation for watering.

Design tips

For raised beds:

- Provide easy access to either one large garden bed or to a variety of narrow garden beds surrounding a central garden or court and constructed over a period of years.
- Incorporate seating into raised garden beds with wide walkways/"wheel" ways in between.
- Locate a tool shed, shade area, potting table and compost and worm farm near the garden.
- Bamboo climbing frames can be simple or elaborate. Consider creating a living tunnel over a walkway.

For containers: see ‘Container gardening tips and suggestions’ page

Plant tips

- Always choose the right vegetable variety for the climate and the season. Late summer and autumn planted vegetables should be ready to harvest within the school year.
- Choose vegetables that students want to eat as well as introducing new or unfamiliar foods.
- For early success include some fast growing plants e.g. radishes (25 days from seed), cress (25 days from seed), salad greens such as mizuna, rocket and leaf lettuce.
- Use information from seed packets or the seedling punnet for suggested planting strategies.
- Consider single crop beds or containers using succession planting (every few weeks with the same) or mixed beds or containers growing diverse plants with multi-storey planting (every few weeks with the same) or mixed beds or containers growing diverse plants with multi-storey planting e.g. plant a root crop after a leaf crop - carrots and spring onions after spinach and rocket; plant a leaf crop after legumes - lettuce and silverbeet after peas and beans.
- A green manure crop is a seed-grown crop specifically for digging back into the soil to increase levels of organic matter. Use up old leftover packets of flower and vegetable seeds mixed together. When seedlings reach 30cm cut them off and dig them back into the garden.

Gardening Tips

- Compost is nature’s way of recycling and will enrich your garden and make it grow. Almost any organic matter can be composted including leaves, straw, food scraps, lawn and garden clippings. For fact sheets go to www.abc.net.au/gardening and search for ‘compost’.
- Mix small seeds like carrots with sand for a more evenly spread along a planting furrow.
- Water the roots and keep foliage dry to avoid disease. See ‘Waterwise gardening’ page.
- Mulch the garden well. Remove weeds regularly.
- Feed the plants regularly – for leaf and plant growth use fertiliser high in nitrogen (e.g. blood and bone, chicken manure); for fruiting and flowering - higher in potassium (e.g. sulphate of potash); and for roots and bulbs - higher phosphorous.
- Make the most of your harvest: repeated plantings every few weeks spread the harvest; harvest vegetables as soon as they are ripe; very young plants are also tasty and succulent. Don’t waste your thinnings - use in soups and salads.
- For improved soil fertility and natural control of pests and diseases, avoid planting anything in the same plant family year after year in the same garden bed. Consider rotating crops e.g. plant a root crop after a leaf crop - carrots and spring onions after spinach and rocket; plant a leaf crop after legumes - lettuce and silverbeet after peas and beans.

Useful web sites

www.yates.com.au This Australian website has useful video clips on how to set up a container or raised be vegie garden as well as a kids gardening section full of projects, fact sheets and interactive whiteboard lesson material.

www.kidsgardening.com While this is a northern hemisphere-oriented school gardening resource, it has a wealth of teacher-friendly gardening resources including fact sheets on container gardening.

http://dirtgirlworld.com Dirtgirl is a series of 52 eleven minute animations educating and inspiring young children to garden.


www.abc.net.au/gardening
www.sgaonline.org.au
www.kidsgardening.com While this is a northern hemisphere-oriented school gardening resource, it has a wealth of teacher-friendly gardening resources including fact sheets and interactive whiteboard lesson material.

A four bed example of basic crop rotation

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Autumn/Winter planted</th>
<th>vegetable</th>
<th>Soil needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed 1   fruit and seed crops</td>
<td>beans, peas, snow peas and snap peas</td>
<td></td>
<td>Potassium</td>
</tr>
<tr>
<td>Bed 2   green leafy crops</td>
<td>lettuce, spinach, cress, silverbeet, radicchio, endive, mizuna, rocket, Asian greens</td>
<td></td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Bed 3   root and bulb crops</td>
<td>carrots, radish, spring onion, Japanese turnip, beetroot</td>
<td></td>
<td>Phosphorus, potassium (low nitrogen)</td>
</tr>
<tr>
<td>Bed 4   green manure crop</td>
<td>broad beans, clover, mustard, unused vegetable and flower seed packets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Create a Garden Maintenance jobs roster. Garden jobs include:

Feeding plants, watering, thinning, staking, weeding, edging, sweeping paths, tending compost, tending worms, pest patrol, daily reporter, artist, poet, musician, diary keeper, photographer.

See related KidsGrow information pages

‘Raised bed design and construction’; ‘No-dig gardening and garden tools’; ‘Container gardening tips and suggestions’; ‘Planting guide for easy grow vegetables’; ‘Waterwise gardening’; ‘Safety tips for learning outdoors’; ‘School friendly gardening practices’; ‘Safe ways to deal with common garden pests’
Munch and Crunch Garden yearly planner

SCHOOL YEAR ENDS. PUT THE GARDEN TO BED FOR SUMMER

Remove all weeds. Fork over beds and cover with thick layers of mulch. Clean all gardens tools and store safely.

Plant green manure, crop and dig back into soil.

* Planning a new garden may take 6 months or more. Start the year before.

Note that school holiday periods change from year to year and state to state. Tasmania has 3 terms rather than 4.
**Planting guide for easy grow autumn/winter sown vegetables**

Different vegetables prefer different climates, and grow at different times of the year. Planning and harvesting times will vary from place to place. Your local retail nursery or garden centre can help you choose vegetables that suit your local conditions.

Listed here are vegetables that can produce a crop within the school year. The earlier they are planted the earlier they can be harvested. In the dry season in tropical areas many summer vegetables can also be grown such as tomatoes, beans, capsicum, cucumber, potatoes.

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Seed or seedling</th>
<th>Spacing</th>
<th>Time to harvest from seed (weeks)</th>
<th>Special note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad Bean*</td>
<td>c w</td>
<td>c w</td>
<td>c w t</td>
<td>c w t</td>
<td></td>
<td></td>
<td></td>
<td>seed</td>
<td>15-20cm</td>
<td>16 – 20</td>
<td>Best in mild and cool climates</td>
</tr>
<tr>
<td>Pea (snap/snow)</td>
<td>w</td>
<td>c w t</td>
<td>w t</td>
<td>w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>seed</td>
<td>15cm</td>
<td>10 – 16</td>
<td>Frost tender. Be sure to choose edible varieties When finished dig plant into soil to add nitrogen</td>
</tr>
<tr>
<td>Radish</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>seed</td>
<td>3-5cm</td>
<td>3 – 8</td>
<td>Cool weather produces mild tasting radishes</td>
</tr>
<tr>
<td>Japanese turnip</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td></td>
<td>seed</td>
<td>7-10cm</td>
<td>4 - 10</td>
<td>Green tops also edible. Harvest at 10cm diameter</td>
</tr>
<tr>
<td>Rocket/Mizuna</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>t t</td>
<td></td>
<td></td>
<td>seed or seedling</td>
<td>30-40cm</td>
<td>5 - 8</td>
<td>Fast growing. Prefers moist soil. Harvest regularly</td>
</tr>
<tr>
<td>Mustard/cress</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>seed</td>
<td>1-2cm</td>
<td>4 - 6</td>
<td>Make successive sowings as required</td>
</tr>
<tr>
<td>Broad Bean*</td>
<td>c w</td>
<td>w t</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>either</td>
<td>20-30cm</td>
<td>10 - 12</td>
</tr>
<tr>
<td>Spinach*</td>
<td>c c w c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c t</td>
<td>c t</td>
<td></td>
<td>seed or seedling</td>
<td>10cm</td>
<td>8 - 12</td>
<td>Pick outer leaves for continuous cropping.</td>
</tr>
<tr>
<td>Carrot</td>
<td>c w</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>t t</td>
<td></td>
<td></td>
<td>seed</td>
<td>3-5cm</td>
<td>10 – 16</td>
<td>Keep well watered. Start eating at 1 cm diameter</td>
</tr>
<tr>
<td>Spring onion</td>
<td>c w</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>t t</td>
<td>c w</td>
<td></td>
<td>seed</td>
<td>10cm</td>
<td>8 - 12</td>
<td>Make successive sowings as required</td>
</tr>
<tr>
<td>Lettuce</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>w t</td>
<td>c w t</td>
<td>seed or seedling</td>
<td>20-30cm</td>
<td>7 - 12</td>
<td></td>
</tr>
<tr>
<td>Radicchio</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>w t</td>
<td></td>
<td>seed</td>
<td>20-30cm</td>
<td>10 - 11</td>
<td>Choose sunny well drained spot</td>
</tr>
<tr>
<td>Endive*</td>
<td>c w</td>
<td>c w</td>
<td>c c</td>
<td>c c</td>
<td>c c</td>
<td></td>
<td></td>
<td>either</td>
<td>30cm</td>
<td>8 - 12</td>
<td>Cover with straw three weeks before cutting</td>
</tr>
<tr>
<td>Asian greens</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>seed or seedling</td>
<td>50-60cm</td>
<td>3 - 8</td>
<td>Plant crop every few weeks for continuous supply</td>
</tr>
<tr>
<td>Herbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>seed or seedling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parsley</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>seed</td>
<td>20-25cm</td>
<td>6 - 8</td>
<td>Best in fertile damp soil. Snails and slugs love it!</td>
</tr>
<tr>
<td>Garlic Chives</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>either</td>
<td>10cm</td>
<td>8</td>
<td>More hardy than common chives</td>
</tr>
<tr>
<td>Oregano</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>seed or seedling</td>
<td>30-40cm</td>
<td>8 - 12</td>
<td>Needs full sun</td>
</tr>
<tr>
<td>Marjoram</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>w t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>seed or seedling</td>
<td>20cm</td>
<td>8 - 12</td>
<td>Needs full sun</td>
</tr>
<tr>
<td>Other edibles to grow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>seed or seedling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strawberry</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td></td>
<td></td>
<td>seed or seedling</td>
<td>30cm</td>
<td>22 - 25</td>
<td>Mulch well. Snails and slugs love them!</td>
</tr>
<tr>
<td>Calendula</td>
<td>w</td>
<td>c w t</td>
<td>c w t</td>
<td>c w t</td>
<td>t</td>
<td></td>
<td></td>
<td>seed</td>
<td>30cm</td>
<td>10 - 12</td>
<td>Petals are edible and can be added to salads</td>
</tr>
</tbody>
</table>

* Not recommended for tropical regions

Other KidsGrow Support Resources
School gardens cultivate not only plants and animals but also the academic, personal and interpersonal skills of the students who tend them. The KidsGrow themed garden plans and ideas for teaching and learning encourage kids to engage in:

**Purposeful gardening**
- Supports active learning and development of lifelong skills
- Involves students in co-operative, real life endeavours
- Encourages outdoor recreation and improved visual amenity
- Builds communities and opportunities for service learning
- Promotes stewardship of the school grounds
- Develops self-esteem and pride in personal achievements and effort

**Smart gardening**
- Involves wise plant selection
  - Choosing the right plant for the right place
  - Choosing non-invasive plants
  - Choosing low allergenic and non-poisonous plants
- Incorporates sustainable gardening practices
  - Being waterwise – mulching, encouraging healthy soil, grouping plants according to water needs
  - Using organic gardening methods wherever possible
- Considers environmental impact
  - Optimising the nature friendliness of school grounds by nurturing habitats and encouraging biodiversity
  - Minimising negative environmental impact such as nutrient and water run-off

**Connected gardening**
- Connects students to nature and to each other
- Links garden learning to the whole curriculum
- Considers gardening activities as part of the School Environmental Management Plan
- Develops awareness of the school garden ecology as part of the wider environment beyond the school fence
- Involves families, the wider community and cultures

**Fun gardening**
- Stimulates exploration and imagination
- Encourages artistic and creative expression
- Provides a journey for the senses
- Inspires healthy outdoor activity and play
Raised bed design and construction

‘Raised bed’ refers to any gardening technique that raises the growing bed higher than the surrounding open ground. It may be as simple as mounding the soil or as complicated as constructing permanent walls to contain a quantity of imported soil. The maximum width should be an ‘arms reach’ from either side.

Benefits of raised bed gardens

- are easy to care for
- can be shaped to fit any design
- can be built from a variety of materials
- require minimal work after construction
- provide easy access for young and old, wheelchairs and wheelbarrows
- prevent trampling and compacting of garden topsoil aiding plants’ root development
- keeps soil loose and well-drained, optimising nutrient availability and food production
- help keep creeping weeds out
- support efficient use of compost
- allow intensive planting in clusters to help shade out the weeds and preserve ground moisture
- can be managed almost entirely with just one tool – the versatile chipping hoe
- are more water efficient using less water
- are not harmed by flooding rains
- provide protection for seedlings from sun, wind, insects, animals and balls
- using a suitable shade cover, offer a place to sit for class instruction or to relax and be inspired by nature
- keep gardening area neat and organised
- attractive appearance will last for many years

Example 3. Boards with seating

Design by Learnscapes Planning and Design™
No-dig gardening and garden tools

No-dig gardening is a great alternative to the traditional way of creating a garden bed and removes the need to dig. Instead it involves building the bed on the existing ground surface.

Constructing a no-dig garden

1. Build a box frame with boards, timbers or bricks.
2. Cover the bottom with a 50mm thick layer of newspaper.
3. Cover with pads of lucerne hay as they come off the bale.
4. Sprinkle on a dusting of organic fertiliser.
5. Cover with 20cm of loose straw and scatter some fertiliser onto this layer.
6. Tip a circle of rich compost 10cm deep and about 45cm in diameter where seeds are to be planted.

• If on rocky ground or concrete spread a layer of decaying leaves, small sticks and seaweed to a depth of 10cm underneath the layer of newspaper at the bottom.
• Start with shallow rooted plants until your no-dig garden bed’s soil depth has become established.
• A possible disadvantage of this method is that it does require additional materials which could increase the cost.

Garden tools

Measuring
Tape measure
Trundle wheels
String
Pegs

Watering
Hose
Spray nozzle
Buckets
Watering cans

Gardening Equipment
Gloves
Hand forks
Hand trowels
Hand weeder
Garden stakes
Spades
Chipping hoes
Garden rakes
Leaf rakes
Wheel barrow
Pruner
Secateurs

• Borrow from and return to the school garden shed.
• Request second hand donations from the school community.
• When buying tools for students the two most important factors are size and durability.
• Correct sized tools are easier and lighter to use.
• Quality tools will last longer and work better.
• Clean off and wipe down after each use and store them in a safe place.
Container gardening tips and suggestions

Just about anything can be used for a plant container as long as it has drainage holes so water doesn’t pool around roots. Plastic pots being generally inexpensive, reusable, and lightweight are the most common containers. For vegetables, consider making use of styrofoam vegetable boxes, buckets, half wooden barrels, crates, sinks and bathtubs - just be sure to punch drainage holes in the bottoms! Plants tend to grow better in a larger volume of soil rather than in small individual pots. One large container takes up less floor space than several small ones and doesn’t dry out as quickly.

Drainage

Containers need to have some way to drain water away from plant roots. If a container doesn’t already have drainage holes, it is advisable to put several 1cm holes at or near the bottom. If holes are at the bottom, make sure there’s space underneath for the water to drain out.

Planting containers can be raised up on bricks or blocks. If holes are large, line containers with newspaper or nylon mesh window screening to prevent soil loss.

Soil

Soilless potting mix is best to use in pots (see safety note below). It anchors the roots so the plants don’t fall over and serves as a reservoir for water, air, and nutrients taken up by the roots.

Safety note

How to handle potting mix
- Always read the label
- Wear a mask
- Dampen the soil before use
- Always wear gloves

Plants

To accommodate a school term growing season, select vegetable varieties with compact growth that mature from seed to harvest in 30 to 90 days.

Select for sunlight Most vegetable and herb plants need at least six hours of sunlight each day. Leafy vegetables such as spinach, cabbage, and lettuce can tolerate a bit more shade.

Group by nutrient and water needs Plan to put plants with similar needs e.g. sun, shade, water, or fertiliser in a given container.

Consider companion planting such a deep-rooted plants with shallow-rooted ones to make better use of nutrients and water e.g. tall pole beans surrounded by lettuce.

Think small - plant tiny, dwarf or miniature varieties.

Think tall - consider vining plants such as pole beans, cucumbers, pumpkins, tomatoes.

Consider life span and mature size
Generally, optimum vegetable production requires larger pots than ornamental annuals. e.g. Tomatoes grow well in 20 litre buckets (compact varieties have been bred to thrive in smaller confines); Capsicum and eggplant will thrive in 8 litre containers (about 20cm in diameter and 25cm tall); for root crops choose pots that can accommodate the mature size of the root. For instance, beetroot need 20cm of soil, but full-size carrots need 30cm.

Change plants seasonally When the plants begin to look tired and past their prime, pull them out and replace them with fresh ones.

Keep containers current with seasonal crops by growing a succession of plants.

Containers can be large or small and are a type of raised bed garden. Their smaller size and movability distinguishes them from most other raised beds.
**Location**

Container gardens can grow and thrive either in or outdoors provided key garden elements for light and water are considered.

**Indoors**
Place plants in windows that receive a decent amount of light - north and west facing are best and usually receive enough light to grow herbs and leaf and root vegetables e.g. lettuce, beetroot, carrots, onions and radishes.

**Outdoors**
Place containers on a level surface in a protected position with plenty of sunshine.

**Feeding**
Provide mineral nutrients via a water-soluble fertiliser every couple of weeks. Consider using organic fertilisers such as compost or compost tea, fish emulsion, or liquid seaweed.

**Going further**

Try these container garden ideas:

- A barrel full of salad with multiple colours of leaf lettuce, a bush cucumber, a dwarf patio tomato, and some herbs
- A tomato sauce wheelbarrow sporting a dwarf tomato plant in the centre, herbs such as oregano and basil on the sides, and onions between the herbs
- An edible flower hanging basket with nasturtiums, violas, calendula and pansies.
- A series of terra-cotta pots featuring an ethnic garden such as an Asian planting of greens, radishes, cucumbers and eggplants.

**Other useful resources**

www.kidsgardening.com
Although USA oriented, useful information and resources about school container gardens (and many other school garden topics) can be found here. This website has been useful in preparing this fact sheet.

**Books**


'Crops in Pots. 50 great container projects using vegetables, fruit and herbs', Bob Purnell, 2007, Octopus Publishing Group Ltd, UK
Safety tips for learning outdoors

Class Management

- Notify parents that students will be gardening. Ask them to provide information about allergies.
- Discuss safety procedures beforehand. Allow students to help determine expectations.
- Establish clear rules of behaviour for outdoor work and post them. Reward good behaviour.
- Know your agenda. Have clear assignments for the students to complete while outdoors.
- Have a clear signal for getting everyone’s attention and gathering together.
- Implement ‘Sun Safety’ strategies and wear a hat. Identify shade areas for rest and don’t garden in the hottest part of the day. Covered shoes, long sleeves and gloves are best when gardening.
- Keep a first-aid kit in the garden area and provide plenty of potable drinking water.

Awareness of potential poisons in the environment

- Teach students what they can and cannot eat from the garden. Remind them to wash everything first.
- Be aware of and avoid poisonous parts of plants (see Yates Garden Guide p 234). All parts of some plants are poisonous including datura, Lily of the Valley, rhododendrons, azaleas, oleander. Poisonous leaves: Rhubarb and tomato. Others have poisonous saps, flowers, seeds, fruits or bulbs.
- Test soils for poisons like lead and asbestos if likely. Avoid using things that may contain lead paint.
- Don’t use pressure-treated wood, timbers from packing cases, creosote-treated timber or railroad ties for building gardens.
- Garden organically and use natural pest control methods. www.kidsgrow.com.au

Useful website for poisonous plants


Safety near water

- Implement safety strategies when designing and building water features. See ‘Steps for making a native habitat pond’ at www.kidsgrow.com.au
- Test water for health contaminants. Supervise children and prohibit them from drinking it.

Safety with tools

- Provide the right size tools and teach kids how to use them. Hand forks and hand trowels are the most useful tools for young gardeners.
- Always wear protective footwear such as leather workboots.
- Hold tools with sharp edges down and walk not run when carrying them. Store with sharp edges down.
- Set up safety zones and appoint student safety officers to monitor use, care and storage of tools.
- Check condition of tools – metal parts secure, wood parts splinter free. Repair or replace as needed.

Abide by the following rules to help prevent accidents

<table>
<thead>
<tr>
<th>Tool</th>
<th>Safety tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fork</td>
<td>Not to be raised above the knee</td>
</tr>
<tr>
<td>Chipping hoe</td>
<td>Not to be raised above the knee</td>
</tr>
<tr>
<td>Steel rake</td>
<td>Not to be raised above the knee</td>
</tr>
<tr>
<td>Shovel</td>
<td>Not to be used for digging</td>
</tr>
<tr>
<td>Spade</td>
<td>Place on surface first before applying force</td>
</tr>
<tr>
<td>Hammer</td>
<td>Only to be used with adult supervision</td>
</tr>
<tr>
<td>Pick</td>
<td>Not recommended</td>
</tr>
<tr>
<td>Mattock</td>
<td>Not recommended</td>
</tr>
</tbody>
</table>

Other potential risks

- Take care when handling potting soil: always read the label; wear a mask: dampen soil before use; always wear gloves.
- Look before you feel inside empty pots, gloves etc which may be potential hiding spots for spiders.
- Discourage snakes and spiders in the garden by controlling weeds and keeping the garden clear of rubbish, building materials and other potential hiding spots. Always look before moving anything.
- Provide water, soap and a towel so everyone can wash and dry their hands when finished in the garden.
School friendly gardening practices

Top tips for healthy plants

Start with quality plants. Always choose robust, healthy-looking plants with no sign of pests or disease.

Build and continuously nourish the soil by adding organic matter. Poor soils can be brought back to life with organic matter. Sandy soils will benefit from a good dose of organic matter such as compost, well-rotted manure and leaf mould to improve their ability to hold water and nutrients.

Add organic matter and gypsum to clay soils to help improve soil structure and drainage. Use well-rotted organic matter from your own compost heap. Almost any organic matter can be composted including leaves, straw, food scraps, lawn and garden clippings. Ask your local garden centre for help!

Mulch helps to conserve moisture in the soil and keep weeds down. There are organic and inorganic mulches. Inorganic mulches such as pebbles or crushed glass don’t break down, whereas organic mulches like pea straw or lucerne, will eventually break down and nourish the soil. A layer about 7-10 cm thick is all that’s needed. Organic mulches will need to be topped up each year in spring. Mulches with particles greater than 5mm are the most water efficient.

Always choose plants that suit the conditions your garden has to offer and consider their need for water, light and fertiliser. Your plants are less likely to experience problems with pest and disease if they are looked after with care.

There is no mystery to growing healthy plants. It’s all about good plant selection and practical gardening skills

Weeds

A weed is a plant growing in the wrong place. Weeds can be both plants introduced from overseas or native plants which have spread outside their natural range.

Weeds compete with plants for water and nutrients. Be sure to avoid, or at least contain, any plants that might have the potential to become a problem beyond your school boundary e.g. plant in pots. Check with local plant experts when choosing plants for your school grounds.

Before removing weeds consider whether they are providing important habitat for wildlife or whether the weeds are stabilising soil.

Weed control

1. Identify the weed correctly. For younger children focus on removing one type of weed at a time to avoid confusion.
2. Choose an appropriate and safe method of weed control. In small garden beds, hand pulling is often the best method. Mulching will also help to control weeds and maintain soil moisture.
3. Carefully remove weeds to avoid re-infesting garden beds.
4. Time your weed control treatments carefully to obtain the best results. Remove before weeds flower and drop their seed.
5. Concentrate on growing plants rather than killing weeds! Weeds are quick growing and will occupy any vacant soil. Make sure soil is either mulched or growing something that you do want.

Pest and disease

Some plants are more prone to pest and disease than others, so where possible choose more resistant varieties.

Seaweed and fish-based solutions can help protect plants against pest and disease attack.

Take a wander through the garden every day and keep an eye out for signs of pest and disease – they’re much easier to treat if you catch them early. See ‘Safe ways to deal with common garden pests’ on the KidsGrow website.

Watering

1. Give your garden a good soak twice a week, rather than a light sprinkle every day. This encourages the roots of plants to grow deeper into the soil, improving their tolerance to dry periods. Water more frequently in dry weather if needed but always comply with local watering restrictions.
2. Water the roots of your plants not the foliage, to prevent water from blowing away in the wind and being lost through evaporation. The roots are where the plant needs water.
3. Water in the cooler part of the day.
4. In the design of your garden group plants with similar watering needs together.
5. Water saving products like wetting agents and water storing crystals help to ensure that the water is getting to your plants.

KidsGrow Munch and Crunch Garden © Nursery & Garden Industry Australia Limited 2011 Developed by Shelley Woodrow and Helen Tyas Tunggal
Waterwise gardening

About mounding

This gardening technique raises the growing bed higher than the surrounding open ground. Mound gardens are able to be shaped to fit any design and are easy to construct and care for. The design discourages trampling and compacting, helping to keep the soil loose and well drained. Mounded garden beds should be formed with a level surface on top to help retain water and mulch.

Watering tips

- Design your garden so that plants with similar watering needs are grouped together.
- Choose plants which are appropriate for the local climate and water availability.
- When planting use water saving products like wetting agents and water storing crystals.
- Water plants in the cooler part of the day and only water plants when they need it.
- Water the roots of the plant not the foliage to help prevent water loss through evaporation.
- Drought proof plants by watering them longer and less often to encourage deep root growth.

Did you know?

- Water crystals: retain water in the soil and release it as needed
- Wetting agents: improve water penetration in the soil
- Trigger nozzles: stop the water from the hose when you release the trigger
- Rainwater diverter: redirects water from the downpipe to the garden or water tank
- Soil-moisture sensor: probes the soil to give an accurate indication of a plant’s water needs
- Drip irrigation line: applies water directly and evenly to plant roots where it is needed
- Watering cans: with two handles and a screw on rose or nozzle are the easiest to use with particles > 5 mm conserves water better than finer mulches
- Water crystals retain water in the soil and release it as needed
- Wetting agents improve water penetration in the soil
- Trigger nozzles stop the water from the hose when you release the trigger
- Rainwater diverter redirects water from the downpipe to the garden or water tank
- Soil-moisture sensor probes the soil to give an accurate indication of a plant’s water needs
- Drip irrigation line applies water directly and evenly to plant roots where it is needed
- Watering cans with two handles and a screw on rose or nozzle are the easiest to use

Mulch and more mulch

Mulch is a layer of material placed over the soil surface. It keeps soil moist, saves water, suppresses weeds, insulates roots against heat and cold and, if it is organic, adds nutrients to the soil. Using mulch reduces water loss through evaporation by up to 70%.

Mulches can be laid down 7-10cms deep or they can be built up slowly, week by week. Be careful not to mulch too close to the stems of plants to avoid their stems rotting. Recent trials by Yates* suggest that some fine mulches absorb water and actually prevent water reaching the soil and should only be spread thinly.

There are organic and inorganic mulches. Inorganic mulches such as pebbles or crushed glass don't break down, whereas organic mulches like pea straw or lucerne hay will eventually break down and nourish the soil. Organic mulches will need to be topped up each year in spring.

Experiment by using different mulches in different sections of the garden. Keep records over time regarding initial cost, availability, break down rate, size of mulch particles and effect on plant growth and replacement cost.

The following list provides a starting point for research.

Mulch (organic and inorganic)

- Compost: Adds humus to the soil, improves soil structure, good moisture penetration.
- Pine bark: Low nutrient, dense, acidic mulch. Slow to rot - it is good for paths.
- Leaf litter: Quick to break down into rich humus. Shred before use.
- Woodchips: Long lasting but does not add many nutrients to the soil. Allow to age before use.
- Pea straw: Breaks down quickly. Will contain some pea seeds that may self germinate.
- Grass clippings: High in nitrogen and other nutrients. Should be dried before use. Use sparingly.
- Seaweed: High in nutrients, rapidly enriches sandy soil. Wash first to remove salt.
- Gravel: Doesn’t break down. Used to provide drainage, colour and form. Good for paths.
- Other mulches to investigate: newspaper, scoria, hessian, carpet underlay, geotextiles.

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Safe ways to deal with common garden pests

Take a wander through the garden every day and keep an eye out for signs of pest and disease - they're much easier to treat if you catch them early.

Not all bugs are bad. Many are natural predators, which help to keep garden pests under control.

Target pests not all bugs. Get to know which bugs are friend and which are foe - for example worms and to provide food for friendly wildlife.

Useful resources

www.sgaonline.org.au
www.abc.net.au/gardening
www.burkesbackyard.com.au

and to provide food for friendly wildlife.

tolerated as a sign of a healthy, organic garden.

Target pests not all bugs. Get to know which bugs are朋友 and which are foe - for example worms and to provide food for friendly wildlife.

Not all bugs are bad. Many are natural predators, which help to keep garden pests under control.

To catch signs of them early because they breed very quickly.

Some plants are more prone to pest and disease than others, so where possible choose more resistant varieties.

Seaweed and fish-based solutions can help protect plants against pest and disease attacks.

Encourage natural allies/predators. (see www.goodbugs.org.au.au)

Grow plants that are a source of food or habitat for predators; flowering and fragrant plants round the edge of the vegie patch will attract good bugs;

spraying plants with “compost tea” will encourage helpful bacteria and fungi which protect against disease.

• Use traps and barriers that do not harm friendly wildlife around vulnerable plants.

• Protect seedlings as they are particularly vulnerable and remove weeds which provide unwanted habitat for pests.

• Grow a wide variety of plants and mix varieties together to confuse pests. Don’t plant vegies in uniform or straight rows and experiment with companion planting.

Pest Characteristics | Barriers and Repellant | Removal | Trapping | Predators
--- | --- | --- | --- | ---
**Snails and slugs**
Snails and slugs feed on the leaves of a wide variety of plants. They love leafy vegetables and can quickly devour young seedlings.
Native snails and slugs are not usually pests and can be identified by their single set of tentacles.

• Around base of plant place wormwood tea, seaweed grit, crushed egg shells, sawdust, kitty litter, hair, ash, mulched garlic plants.
• Crush garlic into warm water and splash over snail-prone plants.
• Cut out the base of a large plastic juice bottle and place over seedling.

Go on a snail hunt at night or after rain! They like hiding in cool moist places, like beneath the foliage of low-growing plants, tucked away amongst strappy leaved plants and under rocks or logs. Follow their trail to find them. Place in bucket of soapy or salty water. (Squashing may leave a hole for the growth, flower buds or under the leaves. Try to catch signs of them early because they breed very quickly.

• Garlic spray (see above)
• Natrasoap is an all natural control for aphids.

Remove by hand and squash. Alternatively, hose them off.

Fill small container with soapy water and a few drops of yellow food colouring (nature’s attractant colour). Place under aphid-prone plants.

Snails are attracted to yeast. Half fill a small container such as the shell of half a grapefruit with a mixture of vegemite and water and bury up to top edge in the garden.

Beetles, centipedes, frogs and toads, lizards, hens, ducks, other birds.

**Caterpillars**
Often found on or beneath the foliage of plants, voraciously chewing their way through the leaves. Remember not all caterpillars are bad.

• Garlic spray (see above)
• Dipel, a bio-insecticide (natural pest control) with low toxicity
• Success is a non-toxic spray for controlling caterpillars.

Remove by hand and squash. Be sure to wear gloves as some may sting.

**Slugs**
Chew on tender young seedlings. Only a problem in large numbers.

Cut top and bottom off a milk carton, place over seedling and push into soil.

Cut a potato in half and scoop out a hole in the centre. Then partly bury it in the soil, with the hole up.

**Cabbage Moths**
Attracted to the brassica family of crops. Lay eggs on leaves then caterpillar eats leaves and vegetables.

Scatter eggshells around plants. Cut butterfly shapes from white ice cream containers and place on veggie sticks in the veggie garden.

Remove caterpillars by hand and squash. (Mature eggs to hatch.)

**Aphids**
Often found on young growth, flower buds or under the leaves. Try to catch signs of them early because they breed very quickly.

• Garlic spray (see above)
• Natrasoap is an all natural control for aphids.

Remove by hand and squash. Alternatively, hose them off.

Fill small container with soapy water and a few drops of yellow food colouring (nature’s attractant colour). Place under aphid-prone plants.

Ladybirds, praying mantises, lacewings, birds. Achillea will attract ladybirds. To attract birds plant Grevilleas & Kangaroo paw.

**Beetles, centipedes, frogs and toads, lizards, hens, ducks, other birds.**

**Useful resources**

“Natural Control of Garden Pests” by Jackie French


www.sgaonline.org.au

Developed by Shelley Woodrow and Helen Tyas Tunggal

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