

KidsGrow

Munch and Crunch Garden



Gardening that is purposeful, smart, connected and fun
Authentic food cycle learning experiences

I'm Gary

*I love measuring,
investigating plants,
and eating*

I'm Gabby

*I love planting,
weeding, harvesting
and cooking*



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



**Nursery & Garden Industry
Australia**

KidsGrow™ is an initiative of the nursery and garden industry of Australia

Supported by

Know-how for Horticulture™



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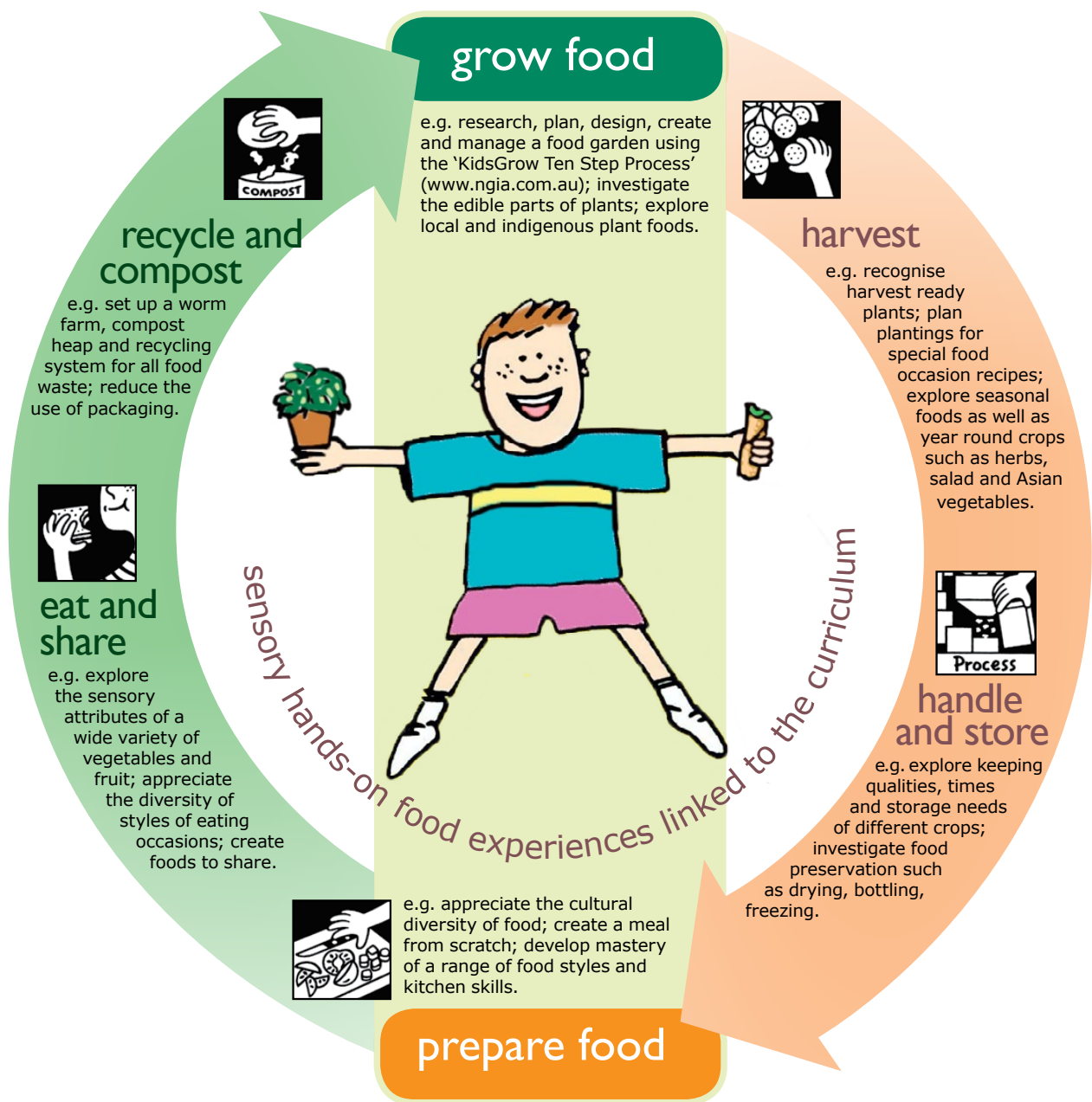
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Food cycle learning in the kitchen garden



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

KidsGrow Munch and Crunch Garden



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.

It's important to start at Step One in the KidsGrow Munch and Crunch ten step garden process.

Every food preparation experience should start in the garden to see what is ready to pick... and end with the left overs and kitchen scraps going into the compost heap or worm farm.

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*

Detailed student learning experiences are linked to each step and begin on page 6

Stages of the garden

Steps in the process

Researching, planning and designing the garden

STEP

1

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

STEP

2

Assess possible sites and select
the best place for your garden

STEP

3

Prepare your garden design
to draw it to scale



Creating and planting the garden

STEP

4

Measure and mark out
where your garden will be

STEP

5

Build the garden structures
or place the containers

STEP

6

Test and prepare the soil

STEP

7

Plant and label your garden



Maintaining, using and sharing the garden

STEP

8

Tend your garden and keep
records of the changes

STEP

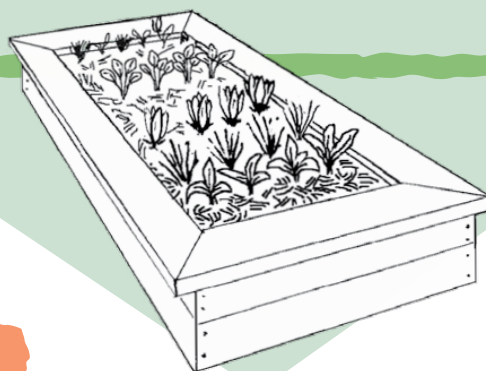
9

Harvest, celebrate and
share your garden produce

STEP

10

Keep your garden going
and use it for more learning



This weeks Roster duties				
PEST PATROL	WEEDING	ARTISTS	MULCHING	PHOTOGRAPHER
James	Robbie	Jemma	Adam	Grant
Susan	Elizabeth	Tarrad	Marisa	Sam
Ahmed	Toby		Brendan	
Hazel			Jamil	

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

KidsGrow Munch and Crunch Garden Process and student learning experiences



The more teacher-focused notes and activities on the left describe the necessary sequential process to creating a successful school garden.

The related sample student learning experiences on the right are more flexible and can be added to or changed within each step to suit your needs.

Researching, planning and designing the garden

START HERE, DON'T MISS A STEP!

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'.

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.

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.



Researching, planning and designing the garden



STEP

2

Assess possible sites and select the best place for your garden

Activities to be undertaken

Sample student learning experiences

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.

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

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.

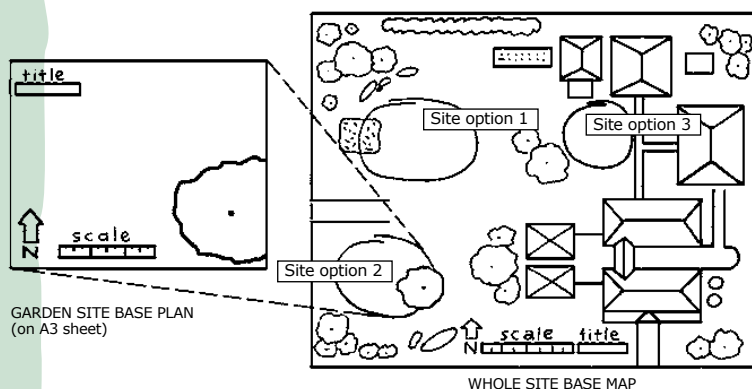
Go to each site and **imagine** how a garden could improve it.

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.



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



STEP

3

Create the garden design and draw it to scale

Activities to be undertaken

- Once the site is chosen, discuss and decide on the size and shape of the garden.
- 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.
- **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.
- **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.
- If possible orient the garden beds east to west to maximise available daily sunlight.
- Consider incorporating seating on the garden bed edges. Refer to 'Raised bed garden design and construction' for ideas.
- Check the elements on 'Munch and Crunch sample design' and ensure that they are included in your design.
- Walkways should be at least one metre wide for easy wheelbarrow and wheelchair access.
- Draw the final design to scale on a blank copy of the garden site base plan.
- Ensure the principal and ground staff are shown.

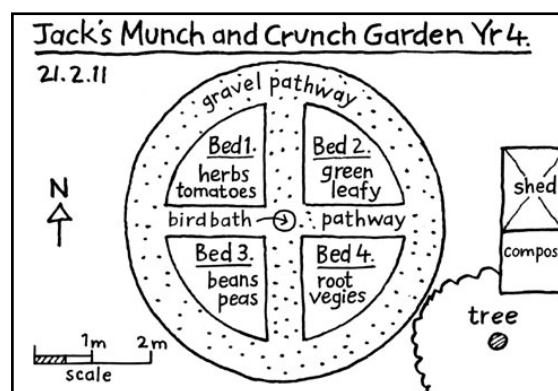
Step 3. Milestone checklist

- ☐ **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.

Sample student learning experiences

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. **Consider** an appropriate spot for a compost bin or worm farm. **Draw** your ideas and plans of what the garden may look like. **Share** and **compare** drawings and ideas with the whole group. **Choose** the most appealing ideas and **sketch** up a class design. **Consider** everyone's ideas when developing the garden design. **Research** which plant ingredients are needed for any planned cooking experiences and consider what is possible to grow. **Calculate** plant yields and the quantities required to be grown. **Seek** 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'. **Consider** and choose as a class what to plant and where. **Draw** the ideas for your planting layout onto a copy of the design. **Display** the final design for feedback from the school community. **Determine** the depth and dimensions of the raised garden beds or the size of chosen containers. **Estimate** and then **calculate** the area and volume of the beds or containers. **Determine** the amount of soil or potting mix and other materials needed. **Contact** your local nursery for advice and prices of seedlings. **Calculate** the cost of buying plants and the cost of materials. **Write** a request for donations of materials in school newsletter. **Write** letters with similar requests to local and regional suppliers.



Creating and planting the garden



STEP

4 Measure and mark out where your garden will be

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 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.

STEP

5 Build garden structures or place the containers

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.
- For raised beds:**
- Before digging make sure where electricity and other services are located. Remove any existing unsuitable plants, grass and weeds. Many weeds can be composted.
 - Use soil shovelled from the pathways to create raised garden beds. Shape the garden beds to form a level surface on top so water will stay on the bed and not run off.
 - Prevent soil erosion, especially if on sloping ground.
 - More permanent raised garden beds can be made with timber, stone or bricks.
 - Stay off the garden bed to prevent compaction.

Step 5. Milestone checklist

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



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.

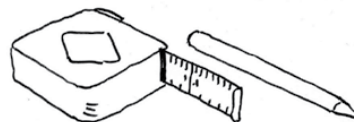
Measure and re-measure the location of the garden beds, pathways and other garden elements such as compost bins, worm farm, potting table. **Mark** them out as well.

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.



Sample student learning experiences

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.



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'.



STEP

6 Test and prepare the soil

Activities to be undertaken

Healthy soil is vital for plant health. Rich, well-drained soil with a pH of 6.5 is ideal for most vegetables.

For raised beds:

- 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.

Step 6. Milestone checklist

- ☐ **Soil** is tested and prepared ready for planting.

STEP

7 Plant and label the garden

BEFORE MOVING ON TO STEP 7 MAKE SURE THE MILESTONE CHECKLIST FOR STEPS 1-6 ARE COMPLETE

Activities to be undertaken

- Devise 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.
- **For seeds:** Each type will need a different sowing depth. Refer to the directions and then demonstrate how to plant them correctly.
- **For seedlings:** 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.

Step 7. Milestone checklist

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

Sample student learning experiences

Investigate safe gardening practices. Refer to 'Safety tips for learning outdoors' and 'School friendly gardening practices'.

Observe safety precautions when using gardening tools.

Check 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.

Test the pH level of the garden soil. A pH of 6.5 is ideal for most vegetables. **Adjust** the pH if necessary. Adding lime lowers the pH and adding sulphur raises it. Seek advice.

Loosen and aerate the soil to help the roots of plants grow well.

Remove any weeds, carefully selecting one species at a time.

Add organic matter to provide nutrients and assist with drainage.

Investigate how to attract earthworms to your garden. **Try** this.

Cover the whole garden area with mulch to a depth of 7-10cm.

Trial three types of mulch in different sections of the garden.

Set up a scientific study to assess the decomposition rate of each

Consider installing a perforated hose below the mulch so that roots are directly watered without wastage.

Draw a cross section diagram showing the layers in your garden.

Photograph 'soil preparation'. **Write** captions for the photos.

Sample student learning experiences

Investigate methods of growing vegies from seeds or seedlings.

Confirm 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'. **Match** plants soil types.

Predict and then **estimate** how many seedlings will be needed.

Order the seedlings you will require from your local nursery.

Design and make plant identity signs ready to put in the garden.

Invite someone with expertise to help on planting day.

Remove any weeds. **Rake** the soil surface so it is loose and flat.

Gather all required equipment - gloves, buckets, trowels, rulers.

Photograph 'planting the garden'. **Write** captions for the photos.

Record dates of plantings and expected harvest time to help plan for future cooking experiences. **Prepare** the soil by watering well. Wait until it is moist, not wet.

Water the seedlings in their punnets one hour before planting.

Read your seed packets or a planting guide. Follow directions.

Devise a way of using your hands to measure the distance to leave between each plant and set them out in the garden.

Observe demonstrations of how to plant seeds and /or seedlings.

Restate the instructions to a partner and confirm understanding.

Work with your partner to plant your seeds and/or seedlings.

Water each plant carefully with at least half a bucket of water applied in a gentle spray e.g. from a watering can.

Place markers. **Develop** signage for the different sections.

Research how to protect new seedlings. **Implement** your ideas.

Draw and write about your experience in your garden diary.

Maintaining, using and sharing the garden



STEP

8

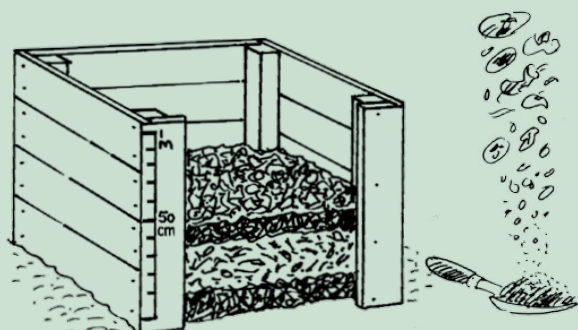
Tend your garden and keep records of the changes

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.

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.



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'.



Maintaining, using and sharing the garden



STEP

9

Harvest, celebrate and share your garden produce

Activities to be undertaken

- Continue to tend the garden.
- 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.
- Document development of the garden.
- Highlight a vegetable of the week to learn about and feature in a recipe.
- Introduce some basic cooking experiences including recipe reading, kitchen skills, cultural food styles and food preservation.
- Explore ways of using produce through the school canteen.
- Plan a harvest celebration. Include a portrayal by the students of the garden in all of its stages.
- Thank all helpers with appreciation certificates.
- Prepare a brief project report with photos and describe the benefits of edible gardens in the school

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.

Sample student learning experiences

Create a special sign for your garden. **Acknowledge** sponsors. **Prepare** a display about the garden. Include the plan, photos and captions, paintings, growth rate graphs and student diaries. **Record** in a class log book what has been grown, when it was planted, when and if it was harvested and how it was consumed. **Eat** the harvest. **Experiment** with raw and steamed herb and vegetable combinations and seasonings. **Select** a simple recipe to prepare using produce from the garden. **Explore** cultural variations in preparing a range of vegetables. **Record** comments from those tasting the food.



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 un diseased 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.

Step 10 milestones checklist

- ☐ **Plans** are made for the ongoing care of the garden.
- ☐ **The class garden journal**, planting log, recipes and any other records are ready to be continued or passed on to another class.
- ☐ **The garden program** is incorporated into curriculum plans, management plans and the school budget.

Sample student learning experiences

Support grounds staff by mulching and maintaining the garden.
Assess and revise the job roster. **Delegate** tasks according to interests.

This weeks Roster duties				
PEST PATROL • James • Susan • Ahmed • Hazel	WEEDING • Robbie • Elizabeth • Toby	ARTISTS • Gemma • Jarrod	MULCHING • Adam • Marisa • Brendan • Jamil	PHOTOGRAPHER • Grant • Sam

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.

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.

Plant bush tucker herbs and vegetables such as native basil, warrigal greens and bush tomatoes.

Research and create "Did you know?" signs to place beside growing plants.

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.

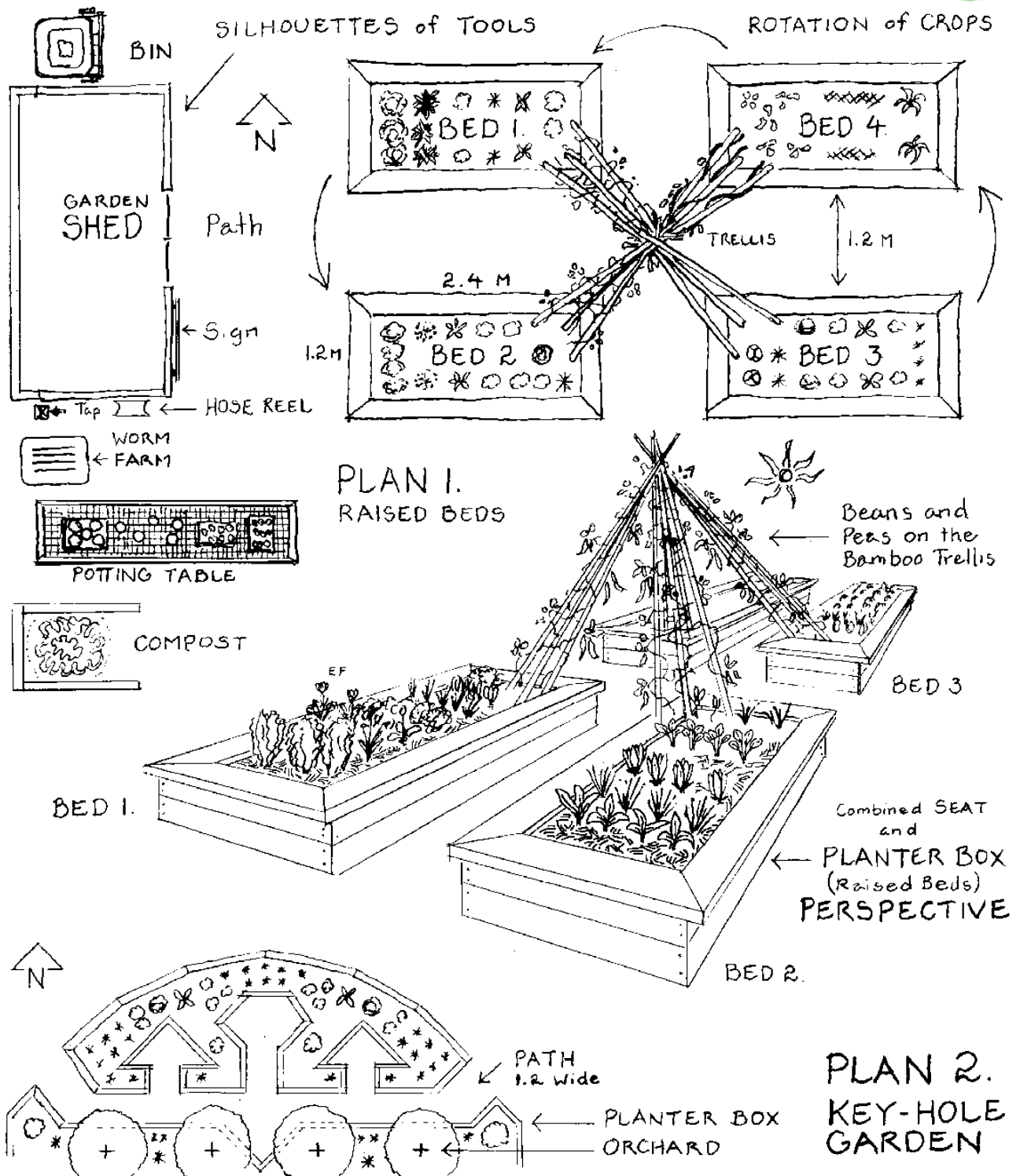
Plant heirloom varieties, miniature varieties, edible flowers and Asian vegetables. Ask your local garden centre to order them.

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.

Make "seed tapes" to ensure proper spacing of seedlings—using water soluble glue evenly space seeds along long strips of paper towels and then plant the strips in rows in the prepared soil.

Plant a teepee. Use two metre lengths of bamboo, string and climbing vegetables or vines.

Munch and Crunch sample design



Learnsapes Planning and Design™
 Helen Tyas Tungal and John Webber
www.learnsapes.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 with "keyholes" 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 e.g. broad beans beside lettuce.
- Try companion planting of vegetables with herbs and flowers to improve plant growth, encourage natural pest control and maximise the use of the garden space.

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 even 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.
- 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.

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.

<http://edibleschoolyard.org> US-based website with useful resources for kitchen garden learning.

www.abc.net.au/gardening

www.sgaonline.org.au

www.burkesbackyard.com.au

A four bed example of basic crop rotation

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

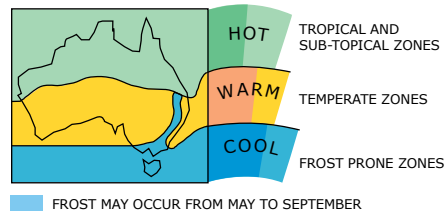
Ask your local garden centre for expert advice on seeds and seedlings suited to your school grounds. Ask about ordering in special or unusual varieties

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'



▲ 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

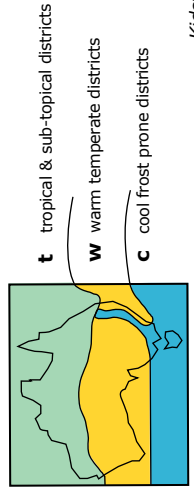


Different vegetables prefer different climates, and grow at different times of the year. Planting and harvesting times will vary from place to place. Your local retail nursery or garden centre can help you choose vegetables that suit your local conditions.

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.

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

* Not recommended for tropical regions



source: Yates Garden Guide, 2002 Harper Collins Australia.
Organic Vegetable Gardening, 2002 Annette McFarlane, ABC Books.



Other KidsGrow Support Resources

KidsGrow sustainable gardening principles

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



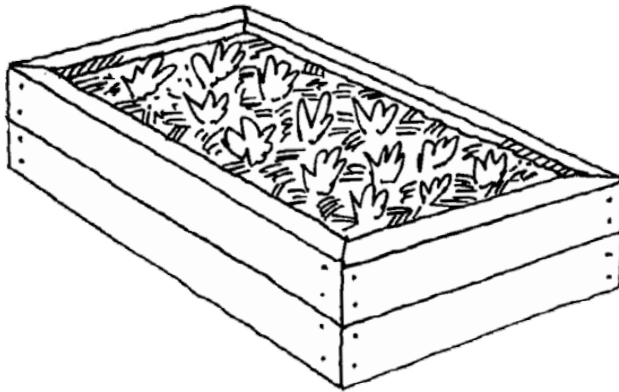


Raised bed design and construction

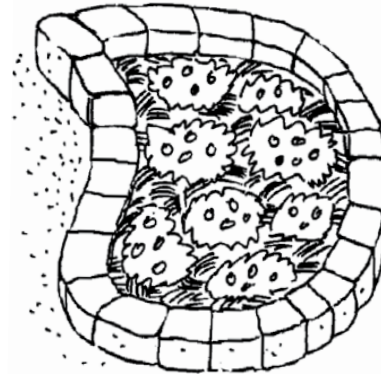
'Raised bed' refers to any gardening technique that raises the growing bed higher than the surrounding open ground. It may be as simple as mounding the soil or as complicated as constructing permanent walls to contain a quantity of imported soil. The maximum width should be an 'arms reach' from either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

Ask your local garden centre for expert advice

Example 1. Sleepers



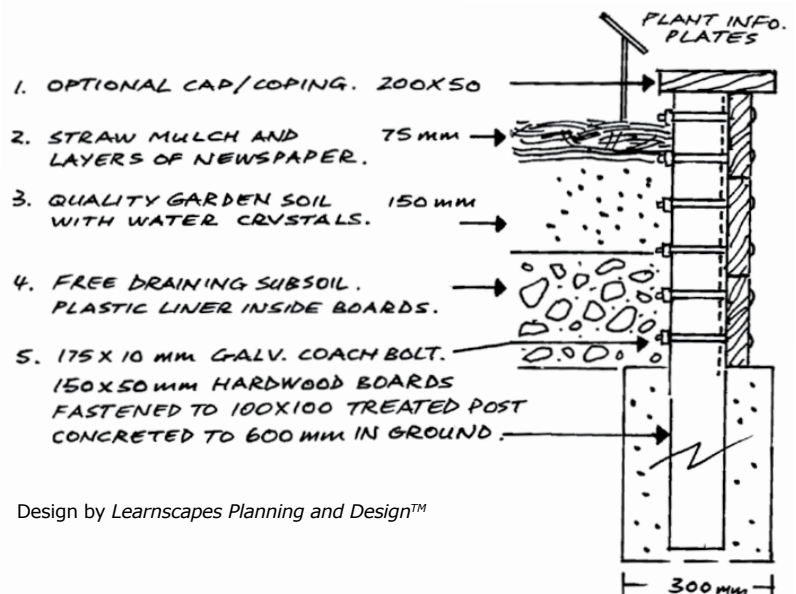
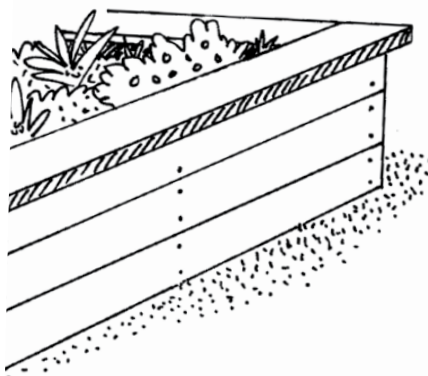
Example 2. Stone blocks



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 *Learnsapes Planning and Design™*



No-dig gardening and garden tools

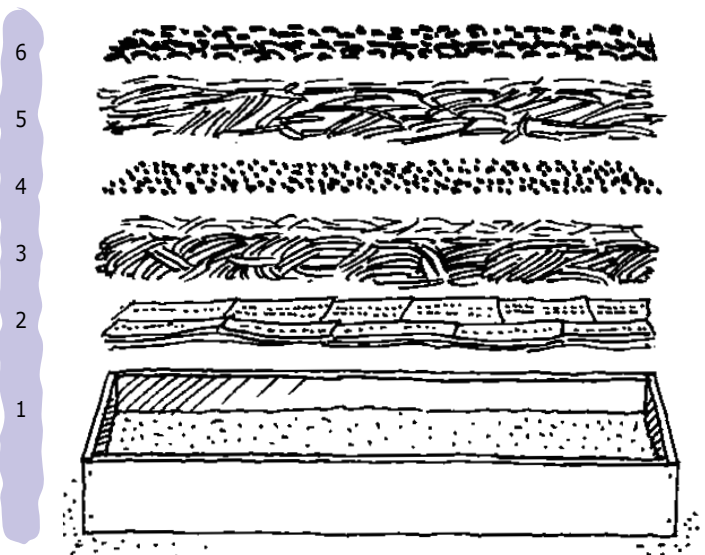
No-dig gardening is a great alternative to the traditional way of creating a garden bed and removes the need to dig. Instead it involves building the bed on the existing ground surface.

Ask your local
garden centre for
expert advice

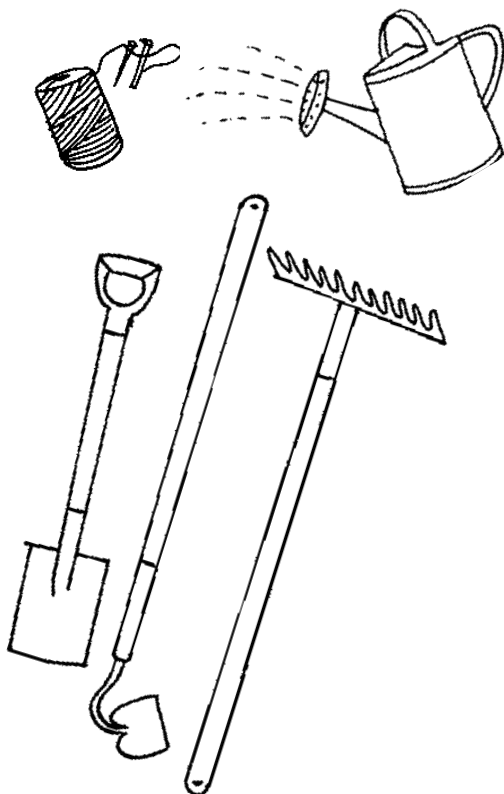
Constructing a no-dig garden

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 weeders
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.

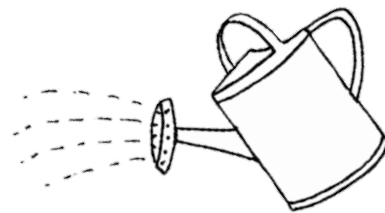
Outdoors

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



Feeding

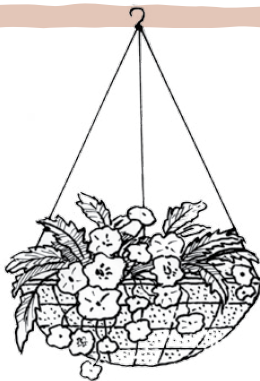
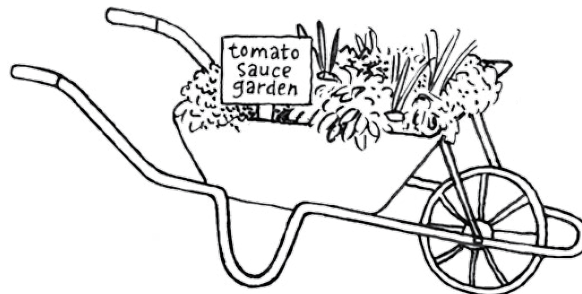
Provide mineral nutrients via a water-soluble fertiliser every couple of weeks. Consider using organic fertilisers such as compost or compost tea, fish emulsion, or liquid seaweed.



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 wheel barrow 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

'The Small Edible Garden. Growing organic fruit and vegetables at home',
Diana Anthony, 2008, David Bateman Ltd, NZ

'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.



- When talking to students outdoors make sure the sun is in your eyes rather than your students'. Move out of direct sun where possible and put the wind at your back so that the sound of your voice carries to your students.
- Plan for students to work in co-operative groups and set up 'stations' for rotating activities.

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 294*). 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

www.dpi.nsw.gov.au/agriculture/pest-weeds/weeds/publications/garden-plants-poisonous-to-people.pdf

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

Tool	Safety tip
Fork	Not to be raised above the knee
Chipping hoe	Not to be raised above the knee
Steel rake	Not to be raised above the knee
Shovel	Not to be used for digging
Spade	Place on surface first before applying force
Hammer	Only to be used with adult supervision
Pick	Not recommended
Mattock	Not recommended

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.

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.



Ask your local
garden centre for
expert advice

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

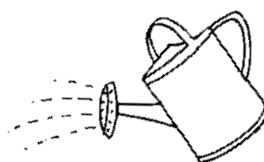
1. Identify the weed correctly.
For younger children focus on removing one type of weed at a time to avoid confusion.
2. Choose an appropriate and safe method of weed control. In small garden beds, hand pulling is often the best method. Mulching will also help to control weeds and maintain soil moisture.
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.



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.



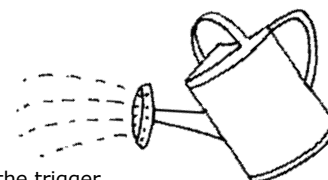
Watering tips

- 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
Wetting agents
Trigger nozzles
Rainwater diverter
Soil-moisture sensor
Drip irrigation line
Watering cans
Chunky mulch

retain water in the soil and release it as needed
improve water penetration in the soil
stop the water from the hose when you release the trigger
redirects water from the downpipe to the garden or water tank
probes the soil to give an accurate indication of a plant's water needs
applies water directly and evenly to plant roots where it is needed
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



Mulch and more mulch

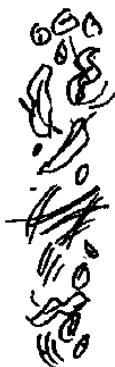
Mulch is a layer of material placed over the soil surface. It keeps soil moist, saves water, suppresses weeds, insulates roots against heat and cold and, if it is organic, adds nutrients to the soil. Using mulch reduces water loss through evaporation by up to 70%.

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.
Lucerne hay:	Ideal mulch, usually without weed seeds. High in nitrogen. Good for strawberries.
Grass clippings:	High in nitrogen and other nutrients. Should be dried before use. Use sparingly.
Gravel:	Doesn't break down. Used to provide drainage, colour and form. Good for paths.
Seaweed:	High in nutrients, rapidly enriches sandy soil. Wash first to remove salt.

Other mulches to investigate: newspaper, scoria, hessian, carpet underlay, geotextiles.



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 are essential to soil health; most caterpillars grow into pollinating butterflies and moths; leopard slugs are carnivorous and eat plant-eating slugs; some ladybirds eat plants but most eat pests such as aphids. Small numbers of most pests should be tolerated as a sign of a healthy, organic garden and to provide food for friendly wildlife.

- 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.
- Encourage natural allies/predators. (see www.goodbugs.org.au)
- Grow plants that are a source of food or habitat for predators; flowering and fragrant plants round the edge of the veggie 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 veggies in uniform or straight rows and experiment with companion planting.

Ask your local garden centre for expert advice on organic and non-toxic products

Pest	Characteristics	Barriers and Repellant	Removal	Trapping	Predators
SLUGS AND SNAILS	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.	<ul style="list-style-type: none"> • Around base of plant place wormwood tea, seashell 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 leafed plants and under rocks or logs. Follow their trail to find them. Place in bucket of soapy or salty water. (Squashing may leave mature eggs to hatch.)	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.
APHIDS	Often found on young growth, flower buds or under the leaves. Try to catch signs of them early because they breed very quickly.	<ul style="list-style-type: none"> • Garlic spray (see above) • <i>Natrasoap</i> 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. <i>Achillea</i> will attract ladybirds. To attract birds plant Grevilleas & Kangaroo paw.
CATERPILLARS	Often found on or beneath the foliage of plants, voraciously chewing their way through the leaves. Remember not all caterpillars are bad.	<ul style="list-style-type: none"> • Garlic spray (see above) • <i>Dipel</i>, a bio-insecticide (natural pest control) with low toxicity • <i>Success</i> is a non-toxic spray for controlling caterpillars. 	Remove by hand and squash. Be sure to wear gloves as some may sting. 		Plant native shrubs to attract birds.
SLATERS	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 bamboo sticks in the veggie garden.	Remove caterpillars by hand and squash. 		Plant annuals which attract moths to lay their eggs away from your veggies.

Useful resources

"Natural Control of Garden Pests" by Jackie French
www.abc.net.au/gardening www.burkesbackyard.com.au
www.sgaonline.org.au