

Edible Garden Resource

A 10 step guide to growing an edible garden in your own home, for beginners and those new to growing food.

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Supported by



Welcome to Our Food Network's Edible Garden Resource



www.ourfoodnetwork.org.nz

ABOUT OUR FOOD NETWORK (OFN) DUNEDIN

OFN is an incorporated society based in Dunedin. Its aim is to stimulate the production, distribution and consumption of local food and in that way contribute to the building of a resilient and prosperous community.

OFN's PRINCIPLES:

Openness

OFN is open to anyone with any kind of interest in local food. Although it is based in Dunedin, it sets no physical "boundaries" for its operation. OFN encourages informed debate and discussion about the many issues – social, technological, environmental, political, economic and ethical – concerning local food provision in our communities.

Sustainability

Like similar groups around the world, OFN sees itself as having a crucial part to play as we strive to adapt to the multiple challenges we face in the twenty-first century. OFN is committed to the belief that a strong local food system is essential to our continued well-being in an increasingly uncertain world.

Community

OFN is dedicated to the promotion of community as the basis for a resilient society. It is a grass roots organisation which embodies the idea of a responsible citizenry.

Food Rights

OFN believes all people have the right to decide what they eat and that everyone should have access to healthy food that is locally produced.

A 10 Step Guide to Designing, Preparing and Using Your Garden

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1 BEFORE YOU START

*Decide what your vision is for your edible garden.
What do you want to be able to grow, harvest and eat?*

If you have whānau living with you, begin conversations, share your ideas.

Having a planning session with your whānau enables you to dream and consider what you all want and need from your garden. It might help engage kids in the whole process of growing and eating vegetables from the garden.

Here are some questions you might want to consider when creating your food garden vision or goal:

- Why do you want a food garden?
- What are your priorities for your garden? Do you want a health, educational, environmental, cultural focus or to add a spiritual dimension?
- What specific objectives or targets need to be achieved for your vision?
- What time frames might be required to meet your vision?
- What type of food will grow in your area? What food do you want to grow?
- How big a food garden do you need and how much space do you have?
- Where can it be located and where can't it be located - what are the pros and cons of each potential location (see **Step 2: Find a Location** for more details)?
- Are you renting? do you need permission before you build any structures?
- If you are renting and don't have permission to build raised beds, could you create a garden that you can take with you when you leave?
- Or do you have any older neighbours who might not be as able to dig in their own garden but they have space that you could use and share the produce grown?

Are you renting or unable to work at ground level?

If you rent and can't change the garden, if you are unsure of the soil quality or if you have difficulty in bending that low to work at ground level, then you need to get creative! The no dig garden (**Step 5: Prepare a Patch**) can be started on bare soil, lawn or concrete. If created on a firm base (like concrete), it is easy enough to scrape up the soil and take it with you when you leave your rental. Alternatively, consider building or buying a vegetable bed on legs - highly movable and requires less working at ground level. If you build a free standing vegetable bed, then ensure you use non-treated but weather proof timber (such as macrocarpa or FSC* certified cedar).



*Examples of moveable or free standing garden beds (from 20 litres to 130 litres)
Left: 20 litre second hand metal office rubbish bin (free, also household bucket works just as well).
Centre: 120 litre 'Easy Growing Planter' from www.Mitre10.co.nz (\$199**).
Right: 130 litre 'Raised Planter Bed' from www.gubba.co.nz (\$230**).*

* FSC is Forest Stewardship Council and ensure timber products are grown sustainably.

** This was the price at time of printing (June 2021)

For inspiration

The image below is of Charles Dowding's home and small commercial garden. Whilst we are not encouraging you to recreate this, it is a great example of what can be done in a large backyard. Charles has a great Youtube channel that can be used as a really good education resource:

<https://www.youtube.com/channel/UCB1J6siDdmhwah7q002WJBg>



An example of a very productive home and small commercial garden: www.charlesdowding.co.uk

Create a realistic vision based on your time and resources

Sometimes it can feel overwhelming when you see what other people can do (such as in the photo above). We can grow a wonderful array of delicious fruit and vegetables in Dunedin, see photos below. So, just get stuck in and see what you can do.







Example of a home garden in North East Valley



Example of vegetables grown in the garden on the left

Suggested activities with kids:

-  Talk to neighbours to learn from their knowledge about gardening, especially how to garden in your part of Dunedin.
-  Learn about different gardening methods (raised beds, no dig, organic, Māori or Pasifika gardening) and different garden designs (eg. permaculture, food forest, market garden and / or potager). Create your vision based on the resources you can access, you will likely need lots of good quality compost as a start.
-  Learn about your bioregion and microclimate and what grows well in your area.
-  Find and visit your local community garden.

2 FIND A LOCATION

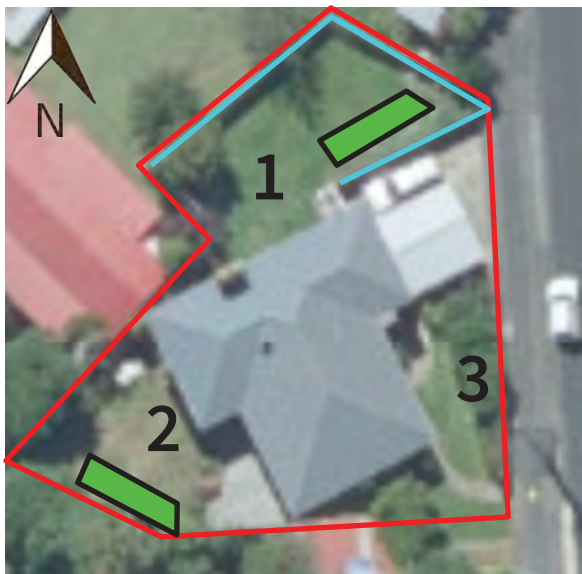
Consider different environmental conditions of different sites around your section.

There are some important things to consider when choosing the site for growing a food garden:

Aspect, sunshine and wind

Ideally place the garden in a location that is open and facing north to maximise available sunshine. The garden is best placed on a flat surface and most people choose to run the beds running North to South.

Ideally, keep the garden out of the worst winds, especially cold winds (Southerlies). If this is unavoidable, it may be necessary to construct a windcloth perimeter initially, whilst making provisions for a planted shelter.



The image on the left is an example property map with potential site marked. The red line shows the property boundary. The blue line shows high fencing. Green box shows two potential sites. There are three grassed areas on the example property around the house.

1. A good north facing slope but with very high fence blocking out sun at northern edge. Southern part of section would need retaining walls. Close to main outdoor tap. Has good potential.
2. Has some north facing aspects, slightly more shaded by house and neighbour's tall trees. Good potential at south edge.
3. Potentially too shaded by house and other trees. Not really suitable.

Slope and drainage

Good drainage is preferable but not essential. Any area that frequently has standing water after rain is best avoided.

Although flat land is ideal, gently sloping land can be safely gardened with pathways and beds following the contour. If the land is steep, a retaining edge will be needed to avoid erosion.



Gently sloping land with beds following the contours
(Image: www.permaculturenews.org)



Steep sloping land with retainer wall edges
(Image: www.flamingpetal.co.nz)

Proximity to water, people and vehicles

Position the garden close to a water supply (tap) and/or install a fixed line water feed, sprinkler or find other ways to ensure your garden gets water. (See **Step 9: Garden Care** for more details).

Try to place the garden in an area where people can see it everyday and engage with it, so it is less likely to be neglected.

If you want a large garden, choose a site where there is easy access for vehicle and trailer deliveries of compost, wood chip and other bulk materials.



Strawberries planted around a fixed line water supply (or drip feed). Photo from www.growveg.com.au



Salad drip feed hose. Photo from www.growveg.com.au



Commercial delivery of wood chips from Nichols in Dunedin



Mushroom Compost (available from Nichols, can be delivered)

Prior and future use of land

Consider what has happened on the land prior to you using it for gardening.

Avoid gardening within 2 metres of a weatherboard house that predates the 1970s, as old paint and house maintenance can leave traces of lead in the soil. A soil test may be required to check whether there is soil contamination from DDT, from previous gardeners using pesticides. You can get a **FREE soil test** by visiting Soilsafe Aotearoa Kia mōhio ki o oneone (<https://soilsafe.auckland.ac.nz/soil-testing>). They provide detailed instructions of how to collect soil samples. If you receive bad news then raised beds are an option if your soil has contamination.

Remember to try to plan for future garden evolution and expansion - start small now and if you enjoy this, you want to have enough space to expand your garden beds.

Suggested activities with kids:

- 🍷 Look at your property on google maps, identify north, and mark potential food growing spaces.
- 🍷 Work with the scale of the image/map to visualise the possible actual garden size.
- 🍷 Lay out some string to work out where the plots will go, then measure and calculate the area of each bed.
- 🍷 Write a 'pros and cons' list for each potential site to help you decide which location will be the best.

3 CHECKLIST of materials and equipment

Many resources to build your garden can be gathered for free. Depending on your garden design, you will need to consider the cost of edging.

Bulk materials for establishment of garden bed

- Cardboard for sunlight exclusion (the larger the better, needs to be free of tape). Cardboard can be collected for free from furniture and bike shops.
- Mature organic compost (ideally certified organic or free of amino-pyralid*), you can also make your own compost (see **Step 8: Feed the Soil - Compost 101**).
- Wood chips for pathways and making compost (delivered from arborists and/or make it yourself by hiring a wood chipper and chip your own pruned branches).
- Other free sources of material for making compost includes straw/ dried leaves, seaweed, food scraps, small branches, old coffee sacks (check they do not have polypropylene in them).

Edging options

- **Untreated wood** for making compost bays or edging such as heat treated pallets or 20cm thick macrocarpa boards.
- Avoid irregular edge materials (such as driftwood, bricks or rocks) because they are much more work down the track!

NOTE: Old tyres or treated timber can be used but be aware there could be some toxins leaching from these into the soil - use them for flowers instead.



Personal protection

- Gardening gloves.
- **Face masks** (use face masks when dealing with potting mix, soil and compost. This prevents you from inhaling dust that contains harmful legionella bacteria that can lead to Legionnaires' disease, an acute atypical pneumonia). See www.southernhealth.nz/legionnaires for details.
- **Old clothes** for all weather.
- **Sunhat & sunscreen.**



N95 mask

Garden tools wishlist

- Spade, shovel, trowel
- Fork, hand fork, rake
- Wheelbarrow
- Dibber (or an old knife)
- Hoes (collinear / niwashi / stirrup)



Wheelbarrow



Dibber

Spade, fork, trowel & handfork



Hoes (from left to right) Collinear / Niwashi / Stirrup

* *Amino-pyralid* is a broadleaf *herbicide* commonly found in grass clippings and hay. Very small amounts can severely stunt growth in many vegetables and fruits, often persisting in compost and soil for several years.

Propagation equipment

- A range of sizes of **seedling trays** - ask your community for unused 6 packs/punnets and trays that hold 6x6 packs.
- A **propagation station** - including benches or an old table, reused hand held spray bottles, seeds and seedlings, seed raising mix.
- **Ice cream sticks** and **permanent marker** for labelling.



6 pack seedling tray (punnets)



Seedling tray that holds 6x6 pack

Irrigation

Access to water is essential, the size of your garden will dictate the type of watering system you will need.

- Long **hose** or fixed line **water pipe**.
- A **sprinkler** (a ground mounted small round sprinkler), **sprayer** or **dripper**.
- **Watering can** with a **rose head**.



Watering can with a rose head



Drip irrigation (from Mitre 10)



Cloche grow tunnel (from Mitre 10)



Bamboo and string to create a teepee

Did you know:

Raising your own plants is very cost effective: for example 6 x 6 packs = 36 plants, this uses \$1.60 of organic potting mix (4.5 cents per plant).

Raising your own plants allows you to grow a much wider range of plants and to have them ready right when you need them.



Seedlings growing in a 6x6 punnet

Other useful things

- Protection from birds, e.g. **cloche** or **netting** for a grow tunnel, **no.8 wire** for hoops.
- Support for climbing plants, e.g. **bamboo canes** and **string** to build teepee. Or use **chicken wire**, **timber**, or **twigs** to build wall mounted trellis.



Suggested activities with kids:

- 🔗 Write out a simple plan of equipment needed, and how much it will cost from different places, create a budget allowance to spend and then as you tick items off your list the kids can be the accountants and manage the budgets.
- 🔗 Learn about using appropriate equipment and technology, e.g. select the correct tool for the job.
- 🔗 Design and build planter boxes, gardening tools and structures or design and make watering cans, rainwater collection systems or irrigation systems.

4 PLAN YOUR EDIBLE GARDEN

Gardens can take a range of forms from a multi layered food forest (untidy but like nature), to a highly organised, tidy, weed free form, like a market garden.

Your garden design

The design of your garden and the type of gardening method you choose will be determined by your vision (created in Step 1) and what is most important to you. This might change over time, so start with what you think will help you get into the garden the most. Some questions you might want to consider:

- What kind of food do you like to eat and want to grow?
- Do you want an efficient productive market garden design?
- How much time will you have to put into maintaining your garden? (If just a little time, then create a small garden).
- Do you want to incorporate different dimensions to your food garden, e.g. a sensory garden with herbs or one that will encourage all sorts of other biodiversity such as log stacks for insects, flowers for bees and butterflies or a garden that is full of colour?
- Do you want a garden that supports and enhances wildlife, biodiversity and your whole ecosystem?
- How important is the garden's visual appearance, does it need to be neat and tidy or can it be a little more natural? (Thus aiding biodiversity).



Old pallet used to grow lettuce



Soft edges: where soil meets woodchip pathway

What to grow and when

With this resource we have included a **Vegetable Growing Calendar for Coastal Otago and Southland** created by local expert, Jason Ross (www.habitat.co.nz).



Choose what you want to plant in the different seasons. There are lots of delicious and interesting vegetables that you can grow that aren't always available at the supermarket.

Get excited looking through seed catalogs, will the plants grow well in our region? (Check against Jason's chart).

Observe other gardens, garden stores and visit Otago Farmers Market to look at what you could grow and ask the experts there for advice.

Garden edges

Gardens work best with no edges but 20cm high edges may be used if clarity is needed. 2.5cm-5cm x 20cm macrocarpa is best, using waratahs as stakes.

The not so good side of hard edges:

Something not often considered with hard edging is that it is expensive, provides slug refuge and is often an ineffective barrier against grass and weeds over time.



Hard edges: wooden edging with wood chip pathway

Market garden design

Standardised rectangular shaped design of beds are used in market gardens. The shape assists with weed control and succession planning, keeps pathways clear, provides consistent spacing for plants and irrigation, as well as a standard size for covers and structures.

A common width is between 75cm and 120cm beds with 45cm wide wood chip paths. You should be able to reach across the beds and avoid standing on the garden. It is most practical to minimise the amount of edge the garden shares with grass and other weedy areas.



Pleasant River market garden - soft edges



Local Dunedin home garden - soft edges

Raised garden beds

Gardens work best with soft edges. However, 60cm high raised beds with a seat top can be good for older gardeners who need to sit and garden but should be minimised as they are resource intensive. Macrocarpa sleepers are often used (as they are untreated and don't rot as quickly as pine), but it is more costly. Treated timber beds can be lined.

Raised beds need filling with a lot of material. Soil can dry out more quickly and require more watering; regularly adding compost can keep moisture in.



Example of raised beds (at Musselburgh School)

Suggested activities with kids:

- 🍷 *Research types of gardens and designs, what would work best for you.*
- 🍷 *Design and draw plans, create models of potential garden design.*
- 🍷 *Calculate the garden edges and total garden area for different designs.*
- 🍷 *Calculate the volume of compost required to deeply cover all beds, or how much volume would be needed to fill raised beds. Can you access this amount of material? Change your plans and start with just one bed if access to good compost is hard. Note: It is better to start with one small manageable bed, then as you gain confidence you can expand (using your own compost).*
- 🍷 *Estimate the number of plants required for the different types of garden beds that might work for you on your section. Each plant requires its own spacing, see **Step 7: Plant your Crops** for help on spacing).*

5 PREPARE A PATCH

Once you have decided on your location and garden design you can start preparing the garden bed.

There is no difference in preparing ground for either raised beds or for gardens with no raised edges. In both cases, success of the garden (e.g. the eradication of perennial weeds and quick production of food) is largely dependent on the depth and quality of the compost. If a raised bed is made 20cm deep on couch / twitch grass (a common weed), there will probably be trouble; the wood is no help at all. If a soft-edge no dig garden is made 20cm deep on weak lawn grass, it will probably be fine.



Left & centre: 'No Dig Garden' examples with soft edges. Right: Layers of a no dig garden (image: www.deepgreenpermaculture.com)

How to make a No Dig Garden

The no dig method is the best at maintaining soil structure and improving soil health, and it is so easy. It does not disturb microbial life in the soil and it requires very little weeding, watering AND you don't have to dig up the existing grass!

1. Prepare the site by mowing the grass short or just flatten it if it is really long. If the soil has been compacted (maybe because vehicles have driven on the grass) you may wish to gently loosen the soil with a garden fork (BUT do not turn soil).
2. Create an outline of your new garden (using rope or a hose pipe) (optional).
3. Overlap sheets of thick cardboard (no tape) or lots of newspaper (30-50 pages thick) and fill in your new garden bed shape (we recommend a simple rectangle as this is easy to access from all sides). The cardboard / newspaper layer prevents weed growth and eventually rots down. If you want wood chip paths between your beds, put cardboard down on these areas also.
4. If you are using edging (we recommend non-treated timber), place on top of the cardboard / newspaper and mark out your new garden beds (optional).
5. Place 10cm of firmly packed composted material on top to exclude sunlight and kill/deter most weeds. Don't use soil, it contains too many weed seeds. If you have more invasive weeds (like convolvulus, couch grass, etc.) thicker cardboard and more compost will be needed. If you can only access a small amount of compost then plan your garden accordingly, start small and expand as you build your own compost reserves. A small garden with a thick layer of cardboard/newspaper and compost will do better than a larger one where resources are spread out much thinner.
6. An additional mulch layer can be added at this time, e.g. pea straw, or dry leaves but isn't essential especially if your compost is weed free.
7. When it is time to plant your seedlings or seeds, **don't** dig through the cardboard/paper layer, just plant directly into the top layers (see image above).
8. Over time keep adding mulch/compost, best practice is a 5cm layer of compost every year, or if not possible, a variety of other mulch material.

This is just one simple idea. Get creative and try different methods.

Another idea is the lasagne method (especially good if you don't have any good quality compost) where you compost materials in layers in situ on top of the cardboard and then cover with coffee sacks and leave for about 2 months until the worms and microbes do their magic and then you plant it out.

Garden tikanga and rules

Now is an ideal time to create some garden tikanga or garden rules together with your whānau to ensure that plants are cared for and respected by all. You could create a roster for weeding, watering and pest control.

Garden structures and children's sculptures

If you want to grow climbing plants like beans and peas you may need to build teepees or climbing frames. See www.whanauliving.co.nz/posts/how-to-make-your-own-harakeke-teepee/. A garden can be a great place to show off kids 3D creations.



Square mesh tied to bamboo for beans / peas to grow up



Three canes tied together to create teepee for beans/ peas



Twigs tied together and wall mounted for beans/ peas

Increasing backyard biodiversity

There's a huge amount of beneficial insects willing to help your garden grow, from managing pests, to pollination and recycling of debris. These include bees, bumble bees, ladybirds, parasitic wasps and hoverflies, praying mantis, spiders, dragonflies, assassin bugs, lacewings, beetles, frogs and even earwigs.

Densely planted perennial/ native areas that are largely undisturbed provide the perfect home. Build a bug hotel or pile up some logs or even leave bits of wood tucked beneath trees or shrubs around your property.

Don't spray chemicals or on contact killers like pyrethrum.



Bug hotel (for details on how to build see www.thisnzlife.co.nz)

Suggested activities with kids:

- 🍷 *If you can source lots of straw bales, why not grow potatoes inside the bales? Or research Hugelkultur garden beds, especially if you have lots of wood available.*
- 🍷 *Do a whole backyard bioblitz, or 5 minute bird survey, set a pepeha moth net trap, dig in the soil and see what you can find.*
- 🍷 *Build a bug hotel and take notes of what you see in there.*
- 🍷 *Learn what a weed is: What growth strategies do weeds usually show? Or learn about microbes, soil minibeasts and worms and how they make soil.*
- 🍷 *Build garden structures, make a bean teepee ready for when you plant beans or peas, measure lengths and widths of seedlings as they grow, measure distances from poles and angles, build and secure a frame for peas or beans to grow up.*
- 🍷 *Create a mosaic tile pathway, create Oamaru stone sculptures, study and draw the seedlings as they grow.*

6 PROPAGATION

Growing your own plants from seed is much more economic than buying seedlings. It is also much more satisfying as a gardener.

Whole life cycle of seedlings

Where possible, propagating seedlings to plant out in the garden is more successful and productive than direct sowing of seeds straight into the soil. Once this skill is learnt, the next step is to explore saving your own seed and observe the whole life cycle of a plant from your garden. This allows you to select the best seed for your specific growing conditions.

Benefits of growing from seed (propagating seedlings)

- Sowing seeds indoors is a great bad weather job!
- Growing seedlings indoors in a controlled environment decreases stress on plants, allows you to keep seeds moist, and minimises damage from pests allowing better germination and healthier plants to grow.
- Having seedlings allows you to arrange the plants at correct spacings in the bed.
- You can harvest food and then plant out a new garden all in one day!
- Everything except carrots and parsnip can be transplanted. Some people choose to sow their mesclun mix/rocket directly too (or transplant 15cm apart).

How to propagate seedlings

Reusing 6 pack seedling punnets works well, especially for larger seeds. Use large seed trays for finer/small seeds. To grow from seed, follow these simple instructions:

1. Pack good quality seed raising mix or potting mix into the punnet or tray firmly with your fingers and fill to the top.
2. Moisten the mix thoroughly (so soil is damp but no water puddles are visible).
3. Sow the seeds:
 - With small seeds, sow on the surface.
 - With large seeds - put two seeds into each cell of the punnets by creating a small depression, drop the seeds in and cover with a thin layer of potting mix to a depth of approximately 1 + 1/2 times the size of the seed you are covering.
4. Keep the newly planted seeds somewhere warm but out of direct sun. Water, if necessary. Check daily until shoots emerge then immediately place in full sun, ideally in a greenhouse or north facing window. Keep off the ground and away from slugs. As soon as first leaves are up, simply pinch (not pull) one off at the base to leave one new shoot per cell.
5. Water regularly until ready to plant, use the hand held spray bottles filled with water. Harden off plants for a couple of days in an outside, sheltered environment.

See: www.whanauliving.co.nz/posts/clever-tips-for-planting-seedlings for an easy to follow video and some different tips on how to grow seedlings.



Packing seed raising mix into a tray (for large seeds)



Sowing tiny seeds on surface of potting mix

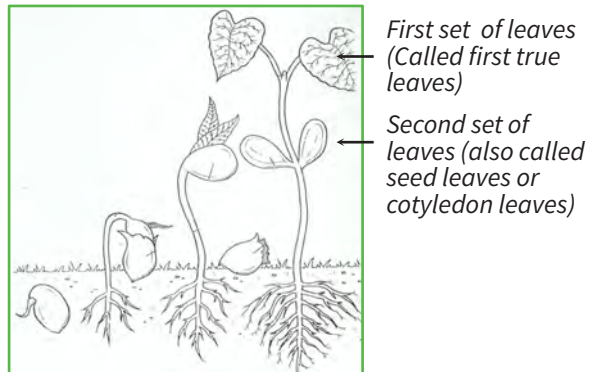
Pricking out seedlings - Try this once when you get more confident

This stage is hard, so only try it once you get better at handling your seedlings.

When small seeds germinate, the seedlings often end up too close together and competing for resources. So it can be useful to 'prick out' once the second set of leaves have appeared and they are strong enough to handle. 'Pricking out' means separating them and giving them their own space. It aims to result in healthier plants that are easier to plant out, although it can be a bit of work and initially may stress the seedlings.

How to prick out seedlings

1. Prepare a deep punnet/tray with seed raising mix and press down firmly and evenly.
2. Water the soil so that it's just moist and using a dibber/old knife, make a hole that's wide and deep enough to accommodate the new plant.
3. Choose the strongest seedlings from your tray of germinated seeds, and gently hold onto the seed leaves, use a dibber or pencil to ease the plant out of soil, retaining as much root as possible. Always lift your seedlings one at a time and never hold by the stem or roots, as you can easily damage the plant.
4. Resting the roots on your dibber, transfer your seedling to its new position.
5. Lightly firm in the soil around the plant with your dibber, making sure the seed leaves are just above the level of the soil.
6. Transplanted seedlings should be placed at least 4cm apart.
7. When you have finished pricking out your seedlings, water them in using a fine watering rose and place them where they will keep warm and receive adequate sunlight, such as on a windowsill.



A seed germinating: a seedling is ready to 'prick out' when it has the second set of leaves



Prick out seedlings: hold by leaf; rest roots on dibber

Saving Seed

Peas, beans, lettuce, spinach and silverbeet are easy to save the seed from as they mostly self pollinate and don't need too many plants to maintain their genetic diversity. Once seeds from a healthy plant are mature, collect, dry and keep in a container for future use!

Suggested activities with kids:

- 🍷 Carry out germination experiments with broad beans - you can test different theories on growing conditions by germinating seeds in different recycled mediums - an old tea bag, egg carton, single use coffee cup, etc. Or just plant them in the garden and watch them grow!
- 🍷 Learn about the life cycle of flowering plants and different methods of reproducing.
- 🍷 Learn the names of vegetables and fruit in Te Reo Māori. Write these names on seed labelling, or signage in the garden.
- 🍷 Research what plants were gardened in Aotearoa, pre and post colonialism, e.g. How did colonialism impact the eating habits of Māori?

7 PLANT YOUR CROPS

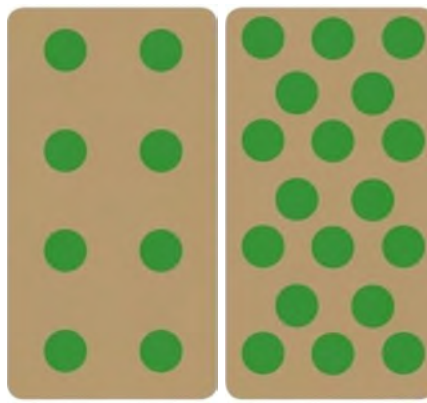
Once your seedlings are ready to go, you can plant them out into your pre-prepared garden.

Transplanting guide

- Prepare a planting hole with a dibber or small trowel, disturbing the soil as little as possible. Plant your seedlings in a regular pattern, according to spacing requirements of each crop (diagonal spacing/ zig zag planting helps with weeding later on).
- When handling the seedling try not to hold the stem or the roots, as you can easily damage its structure, hold a leaf or the soil around the roots.
- Most crops benefit from being planted quite deeply - up to the first true leaves - this helps stabilise the young plants in the wind and minimises the chance of the roots drying out.
- Water thoroughly as soon as possible and regularly for the first week or so, especially if the weather is dry (use a watering can with a rose to start, so damage isn't caused).



Holding seedling correctly, by leaf and not stem



*Left: Traditional planting in rows
Right: Diagonal spacing / zig zag rows*



Space seedlings out when planting into rows

Single crop or mixed planting (intercropping)

It is generally best to plant crops in separate blocks moving along a bed, as opposed to mixed across the bed. This means that plants with the same growth rate and requirement for sun and water are located together. This also makes for ease of maintenance, netting and harvesting.

After harvesting, you can plant out a whole new crop immediately. However, there are many opportunities for intercropping. For example, larger and longer season crops (tomatoes, courgettes, runner beans, etc.) should be planted in the middle of the bed. While these are still filling out the space, plant quicker and smaller crops (salad, radishes etc.) around them. When the larger crops are beginning to die, or whenever it looks like there is space, underplant with a crop for winter and simply cut off the finished crop at the soil level or just below.



Example of crops planted in separate blocks



Example of intercropping

Benefits of growing flowers

Often gardeners will grow flowers alongside their edible garden (e.g. phacelia or calendula) for many different reasons. Flowers attract bees for pollination and they attract hover-flies or ladybirds which are great for pest control.

Sunflowers are great to grow beans up. Some flowers you can eat the petals (they really brighten up a green salad) whilst other flowers are just grown to add colour to the garden. Some non-edibles are used as medicine. Sometimes gardeners will grow a greencrop (**green manure** - next page), especially over winter, that can capture nutrients for the compost.



Calendula planted in front of silverbeet



Phacelia is a great companion plant for attracting bees



Calendula petals are edible and look great in a salad



Sunflowers are great for growing beans up



Comfrey helps cycle nutrients through the soil

Suggested activities with kids:

- 🍷 *Make labels for each crop in the garden to remind yourself of what you planted, where and when. Date the labels so you can work out how long different vegetables take to grow.*
- 🍷 *Create botanical sketches of plants and learn all of the names of different plant parts, if you already know them, try learning them in Te Reo Māori.*
- 🍷 *Trial growing plants from different places in the world and learn how people from different cultures use them.*

8 FEED THE SOIL

Growing plants takes nutrients out of the soil. It is important to replace those nutrients as you go or after you have harvested.

How to make great compost

There are many ways to make compost. For all styles of compost, a good rule of thumb is to add at least the same volume of high carbon material (brown things) for each addition of high nitrogen material (green things).

Brown things: High in Carbon

- General garden waste (leaves, small branches).
- Autumn leaves (have a pile next to your compost and gradually add them in).
- Mulched trees, bark chips.
- Straw, peastraw, hay, pine needles.
- Shredded paper.
- Ripped up cardboard, toilet roll inners.

Green things: High in Nitrogen

- Unsprayed grass clippings (just a little).
- Leguminous plants (such as alfalfa, clover, beans, peas, lupins).
- Coffee grinds.
- Seaweed.
- Animal manure (NOT dog or cat poop).
- Kitchen scraps (NOT meat).

The Dunedin City Council has produced an easy to follow Guide to Home Compost leaflet, as for it at DCC reception or find a .pdf at www.dunedin.govt.nz/composting.

WhanauLiving have made a short video on 'How to make good compost', search for it on You Tube or go to: www.whanauliving.co.nz/posts/how-to-make-good-compost/

Mulch as you grow

Best practice is to add 5cm of weed free compost per year, this acts as a feed and mulch. Raw materials on vegetable gardens lead to problems and need composting first. Mulches like pea straw or sawdust can be applied directly.



Pea straw can be bought in bales



Pea straw suppresses weeds



Garlic growing in sawdust from www.growveg.co.uk

Mulch after harvesting

Remember to feed the soil each year by adding a few centimetres of compost to the surface as a mulch. This replenishes the fuel the soil life depends on. The microbes, worms and plants will draw the nutrients downward.

Green manure

Gardeners don't like to leave the garden empty for long as it's not good for soil health, if you happen to have an empty vegetable bed (usually over winter) you may want to grow a 'green manure' crop (e.g. lupins, mustard or rye) by simply scattering the seed across the surface of the soil. Dig it back into the soil when the stems are still green and soft, but before the cover crop reaches approximately 50cm. This is done approximately four to six weeks prior to planting your vegetable garden.



Lupin



Mustard



Rye

Liquid fertilisers

Make your own liquid fertilisers from seaweed (it can be smelly!) or by using worms.



Sea lettuce makes great fertiliser

Seaweed fertilisers

A seaweed fertiliser offers a cheap alternative to store purchased fertiliser, especially handy considering Dunedin is surrounded by beaches. Sea lettuce can be found on most of our harbour shores.

Directions:

1. Fill a drum half full of seaweed and the rest water.
2. Add a rotten banana, it helps with decomposing.
3. Wait until it has turned to liquid.
4. Dilute 1 cup into a bucket of water (a ratio of 1:10).
5. Pour around the base of your plants to fertilise.

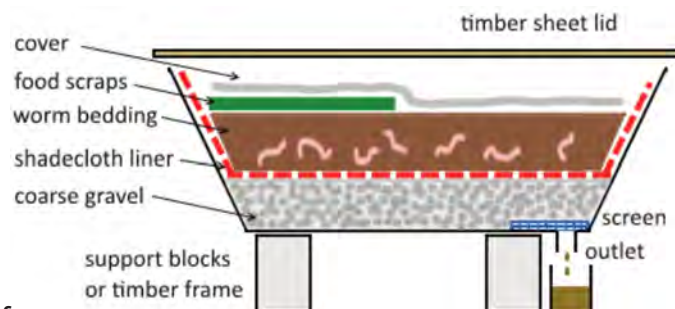
Worm wee fertilisers

A worm farm can help your garden flourish and grow because the worms eat fruit and vegetable scraps and turn it into rich nutrient dense compost. The best part though is the worm juice.... yum yum!

There are many different ways to create a worm farm. A bathtub worm farm has a capacity of around 200L, and as you'd expect, it is as big as a bathtub! A wheelie-bin worm farm can have a capacity of 140L, 240L or 360L and occupies very little space on the ground. It has the advantage of being moveable because it has wheels.

Bath tub worm farm

Here is a simple "how to" diagram for creating a bath tub worm farm. It clearly shows the different layers required and how to access the liquid.



Bath tub worm farm from www.deepgreenpermaculture.com

Directions:

1. Collect 1 cup of liquid from a worm farm.
2. Dilute the 1 cup in a bucket of water (a ratio of 1:10).
3. Pour around the base of your plants to fertilise.

TAKE CARE not to get liquid directly onto leaves.

Suggested activities with kids:

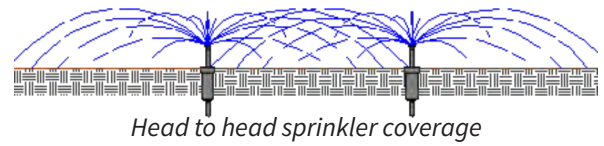
- 🍷 Find out about the 'carbon cycle' or 'nitrogen cycle', what is their role for soil and the environment?
- 🍷 Learn about worms, why are they so important? Are there different types of worms? Have you ever seen a native worm?
- 🍷 What micronutrients do plants need?
- 🍷 Measure the temperature of the compost - how hot is it? Measure the temperature daily after a fresh compost has been made and create a graph of the results.
- 🍷 Experiment with grass clippings and different organic matter - how hot can you make the compost? Can you cook a raw egg in the compost?

9 GARDEN CARE

Make a plan for watering, weeding and keeping pests under control.

Watering

During dry weeks, especially in late summer, it is really important to ensure the garden is watered. Freshly transplanted seedlings will need regular watering at any time of year. Mulching can greatly reduce the need for watering. If you use any round sprinkler, be sure to use a 'head to head coverage' pattern to ensure an even water distribution (see image on top right). This means the water from one sprinkler goes all the way to the next sprinkler. Alternatively, use a soaker hose. Mitre10.co.nz has a great *How to install an irrigation system* video.



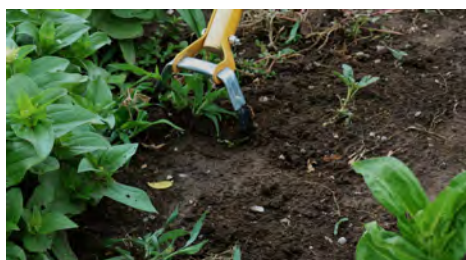
*(image from How to Irrigate a Veggie Garden
www.irrigationexpress.co.nz)*

Weeding

Weeds are any unwanted plant. They are often fast growing and can shade and outcompete your seedlings. Weeds are greatly reduced when the soil is not dug or turned over. Digging brings weed seeds to the surface where they germinate and so stirring up the soil encourages the conditions that weeds thrive in. Beware that homemade compost can often contain weed seeds as it is unlikely to have got hot enough to kill all weed seeds (commercial compost gets very hot). One helpful technique to reduce this is to drown seedy material in a barrel of water for a number of weeks and then add to the compost later.

In any case, you will have some weeds, even if they fly in on the wind. If you let your crops go to seed then these can become your weeds! In a forest garden environment this can be great but in a vegetable garden environment these can be just as annoying as wild weeds. Here are some tips for reducing the labour of weeding:

- 1. Don't let weeds go to seed.**
2. Minimise problematic edges (see *Step 4: Plan your Edible Garden*).
3. Make compost as weed free as possible (drown weedy seeds).
4. Create chunky wood chip pathways and top up once a year with a fresh sprinkle.
5. Ideally, apply compost in autumn either around plants, or over an empty bed. Give it a light rake a couple of times over winter and just before spring plantings. Many weeds will have germinated and died through this process.
6. Plant in clear rows to allow easy hoeing whilst standing. You may want to try plant the second row in diagonal spacing/zig zag (see page 13) to maximise production.
- 7. Do not wait until you can see weeds** - they are more effectively killed at the 'thread stage'. Hand weed only those that cannot be safely done with a hoe.



Using a stirrup hoe between rows to remove weeds at 'thread stage'

What to do when weeds invade

Smother the young weeds with a fresh application of compost and plant seedlings immediately. Or, delay planting seedlings and let weeds germinate first, then hoe them in. Another option is to water well and cover with cardboard or tarpaulin for a few weeks. The weed seeds will germinate but die from lack of light; remove the cover and plant seedlings disturbing the ground as little as possible.

Pest Control

Biodiversity in your garden is really important, unfortunately some little critters make it onto our unwanted list. Slugs and snails are common in our climate, aphids and caterpillars are found on brassicas, and rabbits can be a pest too.

Companion planting

Planting different flowers at the end of your garden beds can deter some pests or attract beneficial insects (such as hover fly or ladybirds) that will help you control your aphids. Marigolds are said to repel whiteflies or kill nematodes.

Create a barrier

Create a barrier around a newly planted seedlings with materials slugs and snails don't like, e.g. sand, sawdust, wood ash.

Traps for slugs and snails

Here's some of our ideas:

- Use a small container of old beer or juice - it attracts and drowns slugs (or mix of $\frac{1}{2}$ tsp of baker's yeast, 1 tbsp of sugar and 1 cup of water)
- Purposely lay out cabbage leaves, or large pieces of orange peel, upside down in containers - to attract slugs and then remove (before the sun hits otherwise they will be hiding).
- Roll up wet newspapers around your garden creating the perfect damp dark habitat, then remove.
- Go on a slug hunt early in the morning. To dispose of them, simply squash them or use an old jar filled with salt and drop them in, this also quickly kills them.
- Or collect them for hen food.



Left: Hoverfly (by Phil Bendie)
Right: NZ Ladybirds (inaturalist)

Prevention

In our climate slugs and snails are the major pest. The best way to deal with them is by not providing them with habitat in the first place. This means maintaining a 'clean' soil surface: use mature compost as mulch and remove fallen, dead and decaying lower leaves of crops (especially big juicy brassica leaves!) to the compost. Minimise structures such as wooden edges and rocks that may provide hiding places. Slugs don't like woodchip pathways, so the wider pathways can be, the further insulated vegetables will be from slugs.

Use wire cloche or floating row covers (or support with number 8 wire hoops) as needed for white butterfly, leafminer, carrot root fly, aphids, birds, etc. Uniformity of bed dimensions will give maximum flexibility for these covers. As much as possible, plan your crops to avoid the worst times for particular pests. For example, leafminer is especially bad for growing asian greens in summer, or growing brassicas during butterfly season.

Suggested activities with kids:

- 🍷 *Design and make your own watering cans with rose heads (a plastic milk bottle with holes in the lid is an easy watering can that little kids can use).*
- 🍷 *Research different irrigation systems and rainwater collection systems. Create a self managed irrigation system in case you go away over summer.*
- 🍷 *Create your own irrigation experiment: Lay down three, 2L ice-cream containers in the centre, middle and periphery of a water sprinkler to measure the irrigation rate. Are the amounts collected equal? How could they modify watering to get the most even coverage across the garden? Time how long they need to water for to get the ideal amount. Ideally they will use enough to thoroughly soak the rooting zone, whilst avoiding drowning (excessive watering that leaches nutrients downwards and obviously wastes water).*
- 🍷 *Research what weeds are edible. Are weeds nutritious? See if you can find some recipes and give it a go.*
- 🍷 *Test effectiveness of different mulches in terms of maintaining soil moisture.*

10 HARVEST, PRESERVE AND STORE

Harvest your vegetables and have fun cooking and sharing your recipes with friends and whānau.

Harvesting tips

- Make the harvest feel special, have a special basket to gather what you've grown.
- For an extended harvest of leaf crops, especially lettuce and brassicas, pick individual leaves starting with the lower outer leaves first.
- Regularly harvest salad greens (such as sorrel) and herbs (such as parsley) and nip off any seed heads before they flower.
- Walk around with a second bucket, and collect the fallen worthless leaves for the compost as you go, decreasing places for slugs to hide.
- When digging or pulling root crops such as carrots or bulbs like garlic, take care not to invert the soil layers too much. Use a fork to gently loosen the soil if needed and slide them out.
- Some crops, such as beetroot, can be twisted until most of the roots break off.
- When you are finished with a plant, always leave the roots in the ground. They add valuable carbon and structure to the soil. Cut the plant off at or just below the soil level. Sometimes they may regrow if cut too high, in which case you might get another harvest. Compost any unwanted above-ground parts of the plant.



Parsley



Sorrel

How to stretch out the harvest

Once you have got the hang of growing your own food, you might want to experiment with different ways of growing. For example, Spring inspires us to plant a lot of seeds but this means mass harvesting and gaps throughout the rest of the year. The best way to even out harvesting is to plant seedlings in small quantities but more often than just in Spring.

The benefits of stretching out your planting means that if you do have more than you need at harvest time, you have little and often preserving sessions (as opposed to one massive autumn mission), it also means you will have a greater variety of pickles and and preserving becomes a quick and easy job.

If you buy in seedlings, share them out with your friends and whānau so they can plant their gardens too. If you are propagating yourself, you will have much more control over how many seedlings you grow and can control the amount you plant better.

Try, once a month from September until December, to plant one zucchini, cucumber, tomato and a row of beans (runner, bush or broad). Sow a new row of corn and sunflowers every fortnight from September until December. Sow salads on a monthly basis, and every other month a new row of beetroot and basil. Create a planting plan around what you love to eat and of course what your climate dictates (use Jason's chart to help with this planning).

Preserve and storage tips

If you have excess food ready to harvest at the same time, then either share your bounty with friends and family, or preserve and store it to eat at a later date.

Freezing is an easy way to preserve and excess vegetables for winter. Freezing works with lots of different vegetables (but not cabbage or potatoes). Blanch vegetables first - so place clean and prepared vegetables into a pot of boiling water until water boils again and then bring them out. Immediately dunk the hot vegetables into iced water to cool them quickly. Pack into plastic containers or freezer bags.

Drying can be done in an electric food dryer, or you can also dry vegetables in the oven. Peppers (which needs a glass house to grow in Dunedin), can be hung on a string and allowed to dry in a cool, well-ventilated room.

Pickling cucumbers or zucchini are common, but you can also pickle beetroot, carrots, cabbage (try making your own kimchi or sauerkraut), asparagus, beans, peppers or tomatoes. Firmer foods, such as beetroot and carrots, may need a short blanching period to make them tender. **What to do:** Carefully arrange the vegetables in sterilized glass jars with your choice of seasonings (try celery seeds, cumin, dill, jalapeno peppers, mustard seeds, oregano or turmeric - not all together). Next pour a boiling brine consisting of vinegar, salt and pepper over the vegetables. Seal jars once brine is cool. Vegetables pickled in this way will last up to a month in the fridge.

Make sauce, chutney, relish or pickle with beetroot, zucchini, cauliflowers or green tomatoes. Tomato plants can sometimes fruit plentifully but don't ripen because they don't get enough sun. See www.otagofarmersmarket.org.nz/green-tomato-chutney for a great recipe from Mark and Lynley Hunter at Waikouaiti Gardens.

Preserving in oil is also a good way to keep a large harvest of vegetables for a long time. This option is more complicated and you need to cook all the vegetables first before preserving them in sterilized glass jars. Look for recipes online to help.

Other forms of storage for some vegetables include keeping in a cool dark environment. This is a good option for squash, pumpkins, potatoes, and dry onions but if any light gets in potatoes will send shoots out towards it and this will ruin the potatoes. In our cool climate, root crops can be left in the ground through the winter months. Cover them with a 31cm-46cm layer of mulch as harvest as needed.



Garlic is planted between May and July only (rule of thumb is to plant on the shortest day and harvest on the longest). Harvest it all at once, remove any soil, cut off the roots to a neat end and then space out and leave to dry. Once dry, plait and hang up in a cool dry location.

Suggested activities with kids:

- 🍷 Have a 'make your own pesto' competition with whānau and friends.
- 🍷 Find out why eating 5+ a day, or a 'rainbow diet' is important for our health.
- 🍷 What are the minerals and vitamins of various fruit and vegetables and why are they important for our bodies?
- 🍷 Experiment with drying different vegetables or fruit in the sun.
- 🍷 How does establishing a garden contribute to the four areas for hauora?

SOME ADDITIONAL RESOURCES:

Watch videos

Nicola Kawana from Whānau Living has a number of easy to follow videos on gardening. Find her here: www.whanauliving.co.nz/posts/category/gardening

Simple Health & Safety

Health and safety (H&S) is everyone's concern. Here are a few suggestions as to what to include in your own H&S plan.

Area of Risk	Possible Hazards	Possible Solutions
Environment	Slip, trip and fall hazards	Familiarise any helpers to slip, trip and fall hazards in the garden.
	Weather exposure (sunstroke to hypothermia)	Have drinking water on hand in summer, "Slip, slop, slap" in summer, Have hot drinks available in winter, Have warm clothing in winter.
	Insects bites and stings	First Aid kit on hand.
People	Hygiene	Use gloves and wash hands thoroughly, Use a facemask when working with compost.
	Muscular stresses	Do a wee bit of stretching exercise before starting work.
	Fatigue	Recognise when feeling tired, Stop work, rest.
Equipment	Incorrect tool use	Use the right tool for the right job Learn how to use the tool properly.
	Badly maintained tools	Maintain tools, set a date to review and maintain all tools.
	Powered equipment	Use PPE (Personal Protection Equipment) where needed (earmuffs, safety glasses, gloves, reinforced footwear and hi-vis vest, etc).
Emergency Situations		Ring 111.
Near misses		Keep an incident record.

Now you have a basic H&S plan for your garden, consider reviewing it every year to help keep it relevant.

Thank you

This document is based on Our Food Network's School Garden Resource, Version 2 printed in July 2020.

The School Garden Resource is designed to help schools connect food gardening to the curriculum and encourage students to get their hands dirty in the garden. It was put together with the help of many people and supported by Enviroschools, Garden to Table and the Dunedin City Council's Good Food Dunedin. We would specifically like to thank Ruth Zeinert (the Good Food Dunedin Coordinator at the time of printing the original School Garden Resource) who was instrumental in getting the School Garden Project off the ground. With Ruth's help (and Good Food Dunedin) we have turned it into this Edible Garden Resource for anyone to use.

A big thank you to Rory Harding for his help, and to KJ Davie and Niki Bould for their work on turning the school resource into this public resource.

Thank you to Jason Ross for providing us with his Vegetable Growing Calendar for Coastal Otago and Southland (www.habitate.co.nz) and for providing valuable feedback on this resource.

Thank you reader for taking the time to read this guide, we hope you have a bountiful and enjoyable food garden.

Please contact us at ourfoodnetwork@gmail.com with any feedback or questions.



ourfoodnetwork@gmail.com

MAKE YOUR OWN NOTES HERE:



**This Edible Resource has been produced
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Good Food Dunedin and
Dunedin City Council.**



DUNEDIN | kaunihera
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Ōtepoti