

# Introduction to HORTICULTURE



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# Section 1 Introduction to Growing



# Section 1

## What is an allotment?

As defined by Part 9 of the Community Empowerment (Scotland) Act 2015 an allotment (plot) is land that is owned or leased by a local authority and is leased or intended for lease by a person from the authority and is used or intended for use wholly or mainly for the cultivation of vegetables, fruit, herbs and otherwise than with a view to making a profit.

They are places that, when nurtured and properly cared for, can have a positive impact on an individual's health and well-being however new growers can be taken by surprise (and daunted) with the amount of work that is required to manage an allotment to a decent standard, perhaps it's a little more involved than how simply it is presented by many gardening programmes.

This guide aims to provide an overview of what is required to manage a plot and stresses the value of being prepared. It's beneficial to gather as much information as you can before you put a spade in the ground, read up on the subject, watch videos, visit allotment sites, speak with local growers and/or practice at home. Ensure you have an understanding of what challenges and opportunities arise from having a plot as this can make the difference between looking after an allotment and accessing the subsequent benefits this can bring or having a poor experience and walking away.

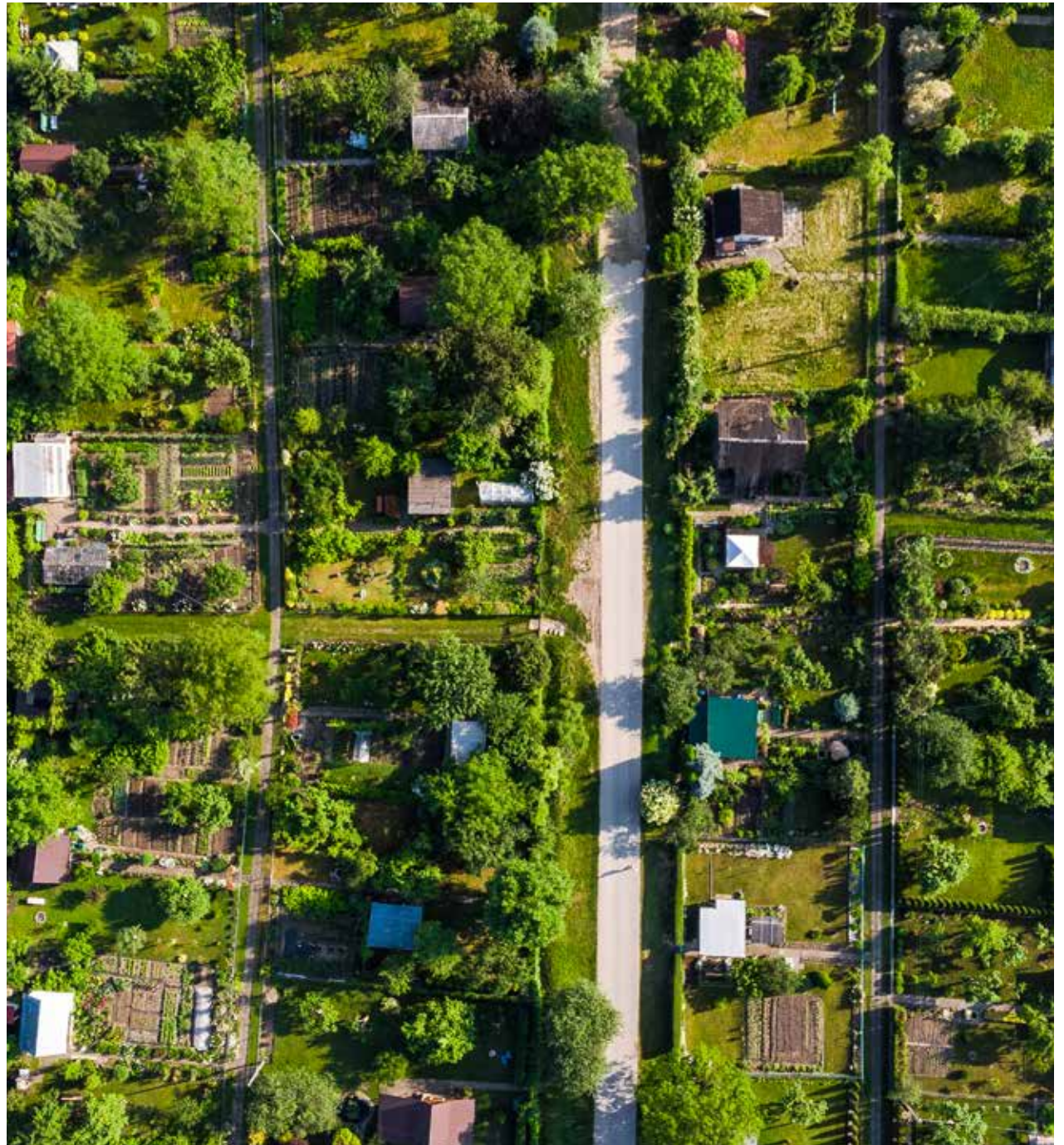


## Benefits of Growing

Social Capital Gardening (growing on allotment can easily be regarded as this) is good for you and allotment gardening offers additional benefits that help to enable citizens to contribute to society.

Hundreds of allotment holders volunteer on their association committee and give up precious time, helping to manage and maintain sites. Even on a site with no allotment association plot-holders are part of a community of like-minded people, many of whom are eager to share their knowledge and spare produce.

The social contact offered by gardening in an allotment environment helps to combat the lack of social capital embodied by loneliness, which has the equivalent risk to health as consuming 15 cigarettes daily and is twice as harmful as obesity.



### Contact with Nature

Working a plot year- round means that allotment holders experience the seasons, witness the behaviour of birds, insects and other animals and gain an understanding of the eco-system. This appreciation of the natural world also has the potential to inspire more environmentally aware behaviour by plotholders and their children.

In 2018 the UK Government produced a 25 Year Environment Plan, which acknowledges that connecting people to their environment will also improve their health and well-being. A study in the Netherlands showed that every 10 per cent increase in exposure to green space translated into an improvement in health equivalent to being five years younger, with similar benefits found by studies in Canada and Japan.

(See the undernoted link for further info)

[www.nsalg.org.uk/allotment-info/benefits-of-allotment-gardening/](http://www.nsalg.org.uk/allotment-info/benefits-of-allotment-gardening/)



### **Mental Well Being**

There is a growing awareness of the role that gardening plays in both preventing and alleviating mental ill-health. Many allotment gardeners will tell you that a spell on the plot nurturing plants and contemplating nature makes them feel calmer and more hopeful and there have been recent studies that have measured this benefit (See link to “A case-control study of the health and well-being benefits of allotment gardening” below) [www.nsalg.org.uk/wp-content/uploads/2012/05/health-and-well-being-allotments.pdf](http://www.nsalg.org.uk/wp-content/uploads/2012/05/health-and-well-being-allotments.pdf)

### **Sense of achievement**

As many new plot-holders discover, growing vegetables requires acquiring new knowledge and skills and the satisfaction gained from eating their first home grown tomato or new potato makes them taste even more delicious!



### Healthy Activity

The physical benefits of regular spells of gardening help plot-holders to keep fit even if they have sedentary jobs, the physical exercise also contributes to their mental well-being. Gardening can also help to maintain good gait and balance in older gardeners and help with cognitive decline.

Spending as little as 15 minutes a day out in the summer sunshine can build up your levels of vitamin D, if you are fair skinned. And for those whose skin is naturally darker, anywhere up to 90 minutes of sun exposures will help your vitamin levels. However, gardeners do need to be aware of skin cancer risks, especially on very hot, sunny days and dress appropriately.





### **Fresh, local, seasonal produce**

If managed properly, an allotment can produce enough food to supplement a family's weekly shop, with fresh fruit and vegetables through the year. Allotment gardeners can choose to garden organically and take control of what they put into their bodies.

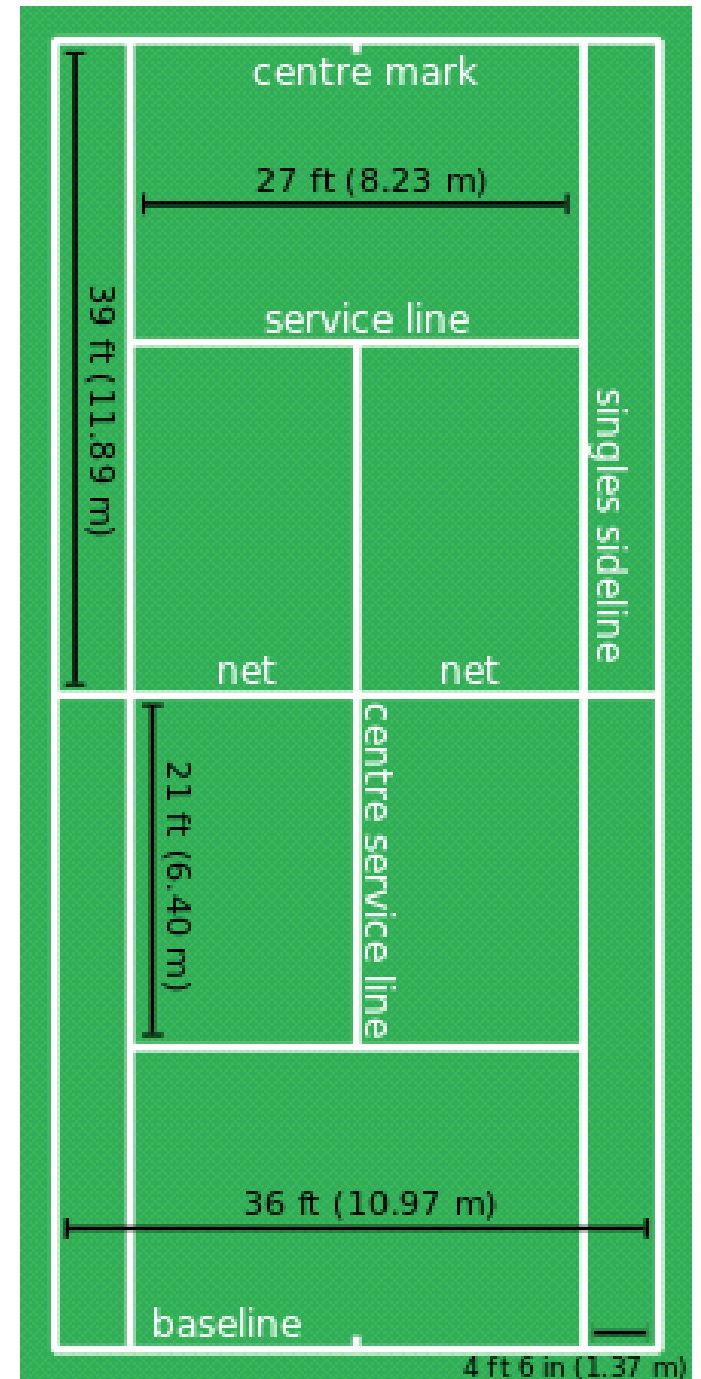
In a survey of National Allotment Society members nearly every person said their love of allotment gardening comes from the fresh air, home grown produce, healthy lifestyle and like-minded people this activity offers



### What size is an allotment?

The standard allotment plot size is regarded as 250m<sup>2</sup> (+/-5%), which might not seem a lot however would it surprise you to know that 250m<sup>2</sup> is the equivalent of just under 22 standard car parking spaces in the UK just about equivalent to a Doubles match tennis court.

Doubles match tennis court.



# Section 2

## Preparation



# Section 2

## Preparing your plot for growing

While it is exciting taking on a new allotment, it can also be very daunting, especially if you inherit a neglected, overgrown plot.

Before you take on a plot, check out the following factors:

- A full allotment plot is approximately 250 sq m/300 sq yd.
- Most, but not all, sites have water; but look into what other facilities are available, such as storage sheds, compost and toilets.
- Check also if there are any limitations which, for instance, prevents fruit tree planting or the erection of structures such as greenhouses, polytunnels or sheds, and if there are problems such as theft and vandalism.
- Clear the plot of unwanted materials and debris. You may be able to get help with this from the allotment association committee.
- Trees, shrubs and other woody plants such as brambles are best cut down and dug out; woody waste can be shredded and composted. Before felling any trees, you must check with the relevant local authority officer to see if any trees on your plot are subject to any Tree Preservation Orders before felling. Failing to do so may lead to action being raised against you.
- Vegetation can be buried during digging after removing the roots of perennial weeds such as bindweed, couch grass, ground elder and nettles. Do not compost these.
- Smothering weeds with opaque mulches (carpet is not permitted) requires at least one growing season to work well. This can be an effective way of dealing with parts of a plot that are not intended to be planted for that season (it's easy to overdo it with a new allotment so take your time and don't worry if it takes several seasons to fully bring an overgrown plot into cultivation).
- Gardeners wishing to grow organically should employ non-chemical weed control measures only. Please see the undernoted links for further advice.

[www.rhs.org.uk/advice/profile?pid=822](http://www.rhs.org.uk/advice/profile?pid=822)  
[www.rhs.org.uk/advice/profile?pid=343](http://www.rhs.org.uk/advice/profile?pid=343)

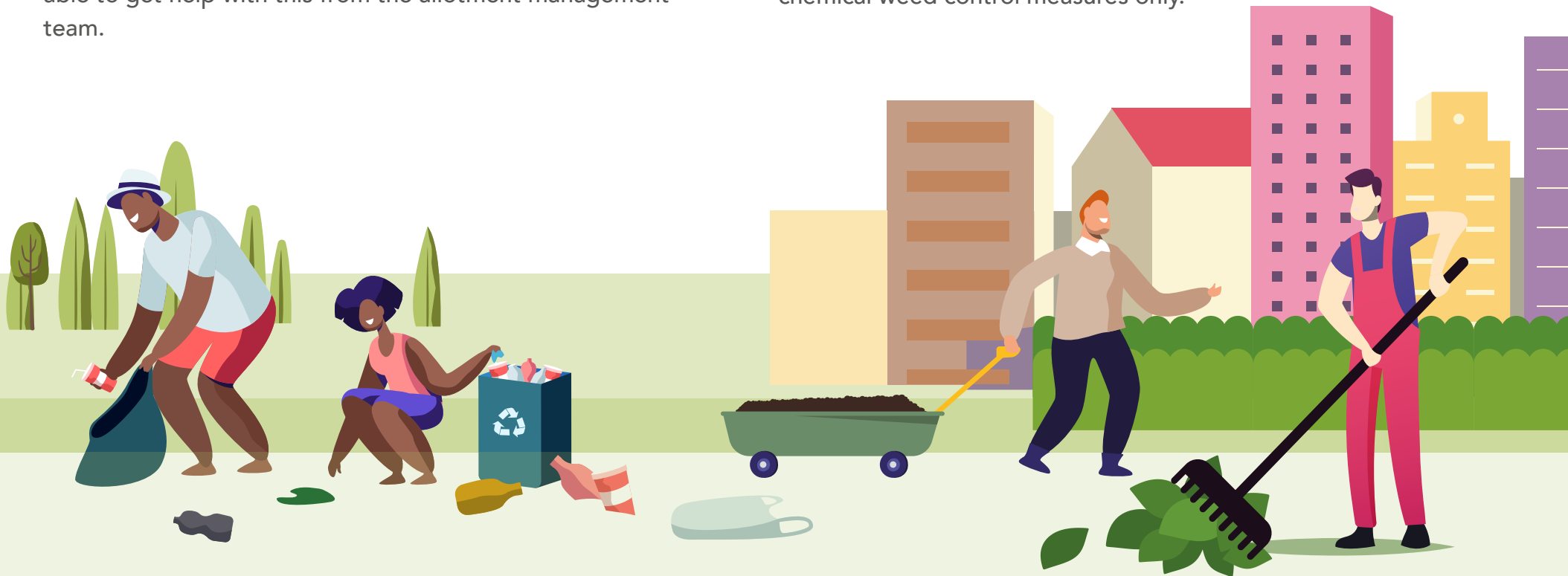
### When to start your allotment.

If cleared by early spring, in time for early planting and sowing, a plot can give its full potential from the outset. In cases of severe neglect this won't be possible. If this is the case, make a realistic plan of what you can achieve in year one, year two and so on. It might be better to clear half the plot in the first year, then at least you can start growing.

This plan should be shared and agreed with your association to avoid any issues at plot inspections.

- Clear the plot of unwanted materials and debris. You may be able to get help with this from the allotment management team.

- Trees, shrubs and other woody plants such as brambles are best cut down and dug out; woody waste can be shredded and composted.
- Vegetation can be buried during digging after removing the roots of perennial weeds. Do not compost these.
- Smothering weeds with opaque mulches (carpet is not allowed) requires at least one growing season to work well. This can be an effective way of dealing with parts of a plot that are not intended to be planted for that season (it's easy to overdo it with a new allotment so take your time, ensure your association is made aware of your plans as it can take several seasons to fully bring an overgrown plot into cultivation).
- Gardeners wishing to grow organically should employ non-chemical weed control measures only.



### **Working Your Plot.**

When clear of weeds the soil can be broken up and ideally add organic matter by digging or rotovating, or while building raised beds.

Take a soil test to find out the soil pH and whether it is lacking in any nutrients. This will help plan any lime or fertiliser application.

Outfit the plot with compost bins, a shed (where permitted) and other useful items. Now you are ready to start planting! Make sure you make a crop rotation plan to get the best from your plot.

[www.rhs.org.uk/advice/profile?PID=84](http://www.rhs.org.uk/advice/profile?PID=84)



# Structures

## Sheds

measuring no more than 4.32 square metres (8ft x 6ft) should be sufficient for use on an allotment plot. Securing them with a padlock or d-lock is highly recommended, as is chaining up any equipment left inside them. Adding guttering connected to a water butt is an excellent way of harvesting rainwater. The walls of a shed can form micro-climates, providing the ideal position for cold frames or mini greenhouses, warming up the air and helping seeds to germinate quicker. Sheds are not meant to be slept in overnight, have running water or electricity. They are shelters from the elements and spaces in which to keep your tools. To ensure you are not breaching local planning guidance, ensure you have written permission from the landowner before erecting any shed, polytunnel, fruit cage or greenhouse on an allotment.



## Greenhouses

can either be made of plastic or glass. Generally glass offers better growing conditions but as some tenancy agreements do not support the use of glass on sites, it is advisable to check your agreement before purchasing any such structure. Depending on the greenhouse's structure, it may require a firm base (slabs on a compacted sand/grit base or sleepers on open ground) and as such you will require written permission from the landlord. Like the sheds, guttering and a water butt make an excellent addition to your greenhouse, providing free water for your crops.



## **Polytunnels**

are easy to acquire and erect. Usually made from UVI polythene stretched over a frame. Polytunnels can suffer from condensation so good ventilation is essential. Please check with your Local Authority regarding consent, and you may need to talk to your local Planning Authority. Consider whether you will remove and replace the skin at the end of each growing season to avoid damage to the skin.



## **Cold frames/ Cloches**

offer an alternative to greenhouses and polytunnels. They are inexpensive and require no permission. They do not protect from the frost but they are useful for hardening off seedlings or using year round to grow salad crops. If you are in the mood for some recycling, you can build your own cold frame out of an old window frame and some wooden planks. A cloche is a mini, portable structure that is placed over a young plant (or row of plants) to help bring it on. Often you will see old plastic bottles being used as cloches – to make one, just cut the bottom of an old bottle and stick it over the plant and into the ground.



## **Fruit Cages/ Brassica Cages**

These are used to protect your fruit bushes/ brassicas from hungry birds. You can either drape netting over the bush, or with a bit of DIY magic, build a simple frame around the plants and attach your netting. These shouldn't require any permission as the cage should not exceed the size of the fruit bush too greatly.



## Rainwater Harvesting

Water use is a key component of managing a plot. Glasgow does not lack in available rainwater and using what nature provides is also best practice. Harvesting rainwater lessens demand on mains water and there are sites in Glasgow which manage successfully without a mains water connection or standpipes on site.

Rainwater is easily harvested by attaching guttering to structures on your plot such as greenhouses and sheds and capturing the runoff in containers ( water butts etc). This can then be transferred to a watering can with a funnel and rose to water plants. Plants prefer watering that mimics rains and a watering can fitted with a rose is the best way of doing this.

All water butts should be securely covered to keep out debris which could contaminate the water and also from a safety perspective to keep out children. They should also be insulated or painted a light colour to reflect sunlight to keep them cooler in summer and limit the risk of legionella bacteria building in the standing water.

The following link contains further information around minimising health risks on your plot:

[www.rhs.org.uk/advice/profile?pid=541](http://www.rhs.org.uk/advice/profile?pid=541)

## Anything Else

If you are on a waiting list for an allotment, take it as an opportunity to prepare for having an allotment. There is so much information available on growing on the internet through instructional videos, blogs, and dedicated websites and there is always the library for those who prefer to read from a book.

Please remember there is nothing stopping you from practicing at home in preparation for the day when you have an allotment. For example, you could start your seeds off on a south facing windowsill, or have you thought of turning some of your own garden over to growing? Where you don't have access to a garden, do you have a balcony which you could use for growing in pots?

It can be of value to speak with current ploholders in your area, learning from their experience on what has worked well for them, things they wouldn't do again, does the site operate collective/ co-operative purchasing , or are there any restrictions on what can be grown on site etc.

Check with your local authority if they provide or signpost to any training that may be useful in getting started.

Some local colleges provide introductory course to horticulture, but please remember there may be a cost for this service.

# Section 3

## Planning



## Planning

This is an essential part of managing an allotment and can be as enjoyable or bothersome as you choose. It offers us the opportunity to sit and reflect about what you want to grow, why you want to grow it, where should you grow it and what you will do with it when it has been grown. Not all these questions will be answered in this specific section (that's right, you'll need to read the full thing!!) however it should highlight how important Planning your Plot is.

So what should you be planning? Getting yourself a decent template for record keeping (a journal) is as good a place as any to start. When planning your plot, there are other requirements but they'll be covered throughout the handbook. First things first, look at what you have got on the plot you take on.



# Record Keeping Journal

## You will be more organised.

Journals are not just a vessel for recording your feelings or scribbling out thoughts on deep and meaningful topics – although it's a very useful aid for both. A journal is also a convenient tool to record your plans, to-do lists and varieties of veg. Many growers often find themselves frustrated when they learn about an interesting vegetable variety and then forget what it was called. Recording it in your journal will save you frustration if you forgot the variety.

## It serves as a reminder of accomplishments and mistakes.

Success with growing your own is largely about understanding what you have to work with. This includes the soil on your plot, the weather and climate for your particular area and the types of crops you choose to grow. Keeping a journal enables you to record very specific information on these matters and allows you to celebrate what worked successfully and consider those which didn't turn out so well. It is a permanent record for you to utilise as you move from one growing season to another.

## You can track progress.

Using a journal to track your progress against initial plans and ambitions for the gardening season is may be an obvious suggestion, but it's very powerful. After a short time doing this you will see how you have done over weeks and months. If you keep a journal for a few years it's a way of comparing progress on particular crops year on year too.



### **You can collect everything.**

You can put anything in your journal. It isn't just about words. Many journals have sketches and allotment plans, mind-maps for blog posts, quotes that the owner has come across and articles and pictures they've cut out of magazines.

### **It forces you to think through plans and ideas.**

It's easy to jump on ideas for the allotment – where a bed will go and where to plant each of our crops. Sometimes we act without thinking these ideas through and later learn it was a mistake. The act of writing down our ideas and plans naturally helps us to think about them more critically because the mechanism of writing slows us down and enables us to pull together other matters before we implement the idea. The following templates provide you with a basic starting point for planning on paper that can be translated to the allotment itself when you are content with the layout and that you have fully considered all environmental aspects that may impact on your growing.

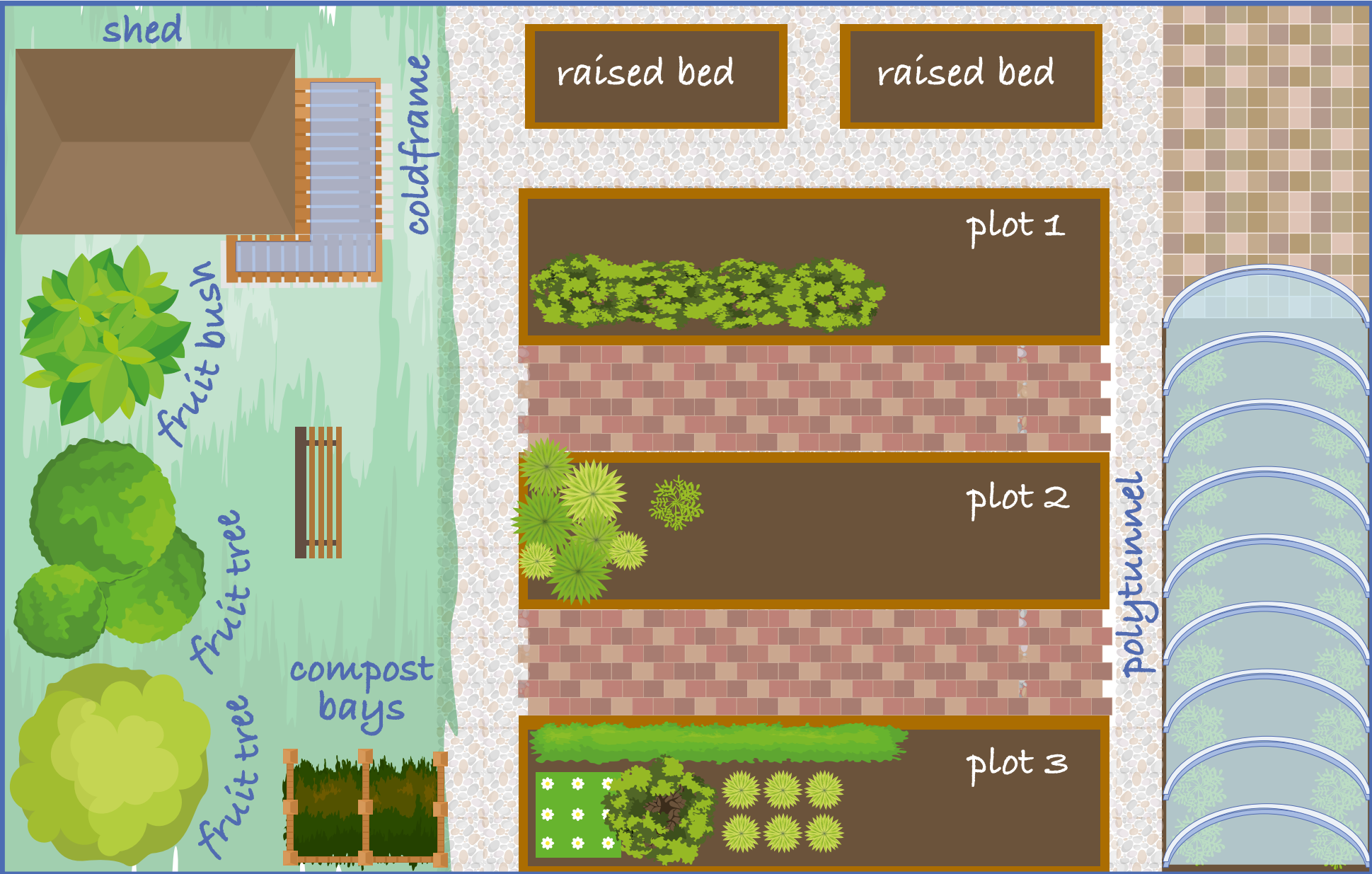
Also please remember that many jobs on an allotment can often require more than one pair of hands, perhaps a "you scratch my back, I'll scratch yours" approach can be of benefit here.

Below are example templates of recording sheets and design sheets that a journal might contain; you are welcome to adapt these to your own particular need.

When deciding your layout, please consider how you will work your beds so they are accessible and do not lead you to trampling over them and compacting the soil.

[http://www.gardenaction.co.uk/fruit\\_veg\\_diary/herb\\_planner.asp](http://www.gardenaction.co.uk/fruit_veg_diary/herb_planner.asp)





**Garden / Landscape Design Grid (Blank)**

Section	Soil Preparation		Problem(s)		Pest Management		Treatment(s)
	Date/What/Results		Date/What/Results		What/When/Results		Date/What/Results
A pH – 7.8, sandy loam soil, wind blown, 6" organic matter incorporated, applied fertilizer per soil test recommendations. (See attached soil test)							
All	4/1	6" Manure, Plowed	5/2	Too Wet	5/2	Rabbits	
B pH – 7.8							
Annual Planting Areas	4/1	6" Manure, Tilled					
C pH – 7.8, soil is sandy, drains too well, draughty							
All Installed irrigation	4/1 5/1 2						
D pH – 7.5, mixed perennial and annual flowers							
All	4/1						
Set pole fence	5/1 0						
Installed irrigation	5/1 0						
E							

## **Garden / Landscape Design Grid (Blank)**

### **The Growing Year**

Rather than trying to describe what a year looks like links to calendars specifically developed for Glasgow's prevailing maritime climate have been provided. When accessed these calendars provide a helpful guide (not a guarantee of success) to growing. The links provide information on vegetables, fruit, herbs and Monthly to do's; we hope you find them useful.

### **General Calendar (Vegetables)**

This link includes information on when to sow, plant out, feed, water, mulching, soiling up etc.

[http://www.gardenaction.co.uk/fruit\\_veg\\_diary/veg\\_planner.asp](http://www.gardenaction.co.uk/fruit_veg_diary/veg_planner.asp)

### **General Calendar (Fruit)**

A simple and easy to use guide for planning your fruit growing (although the apricot may require further specialist adaptations for Glasgow)

[http://www.gardenaction.co.uk/fruit\\_veg\\_diary/fruit\\_planner.asp](http://www.gardenaction.co.uk/fruit_veg_diary/fruit_planner.asp)

### **General Calendar (Herbs)**

Again, another easy to use guide with an indication of how difficult it may be to grow each herb. Star Anise is frost tender so will need specialist adaptation to grow successfully in Glasgow.





## Monthly to do's

Being organised on your plot will give you the best chance of success, doing jobs at the right time will ensure you are doing as much as you can, on the factors you can control, to provide you with a decent harvest. The following link is a useful guide for working your plot throughout the year. Please remember that this is a guide only and may require tweaking for your specific plot.

[http://www.gardenaction.co.uk/fruit\\_veg\\_diary/fruit\\_veg\\_index.asp](http://www.gardenaction.co.uk/fruit_veg_diary/fruit_veg_index.asp)

## Further considerations

Whilst these guides will be useful, carrying out your own research for your area can help refine your practice further.

Before starting to grow anything, it can be of value to ask yourself the following questions:

- What do I like to eat?
- What grows well where I am?
- Are there any restrictions on what I can grow on my plot?
- What work will be required on my plot to make it ready for growing?
- What type of soil do I have?
- Can I break the work down into individual projects e.g. plot clearance (a potato crop is useful in bringing an underused plot back to a workable condition), designing layout of plot, building structures, laying paths, etc.
- What crop rotation plan should I adopt?

As this practice provides many benefits and can cut down the amount of work required on your plot in the long term, we have included a link to the advice provided by the Royal Horticultural Society:

[www.rhs.org.uk/Advice/Profile?pid=124](http://www.rhs.org.uk/Advice/Profile?pid=124)

As you will learn there may be a fair bit of work required before you start growing and how you approach the preparation of your site to make it ready for growing can determine the type of growing experience you have.

This guide is in such a way that each section provides a logical approach to understanding what you will require to do to have the best chance of growing successfully. Our next section provides information on site and soil assessment, understanding both will be crucial to your growing.



# Section 4

## Site and Soil Assessment



## Site and Soil Assessment

To understand what will have the best chance of growing on your plot, it is important you have an understanding of factors affecting your plot. Things like:

- Aspect
- Water shedding and drainage
- Shade
- Sun movement/Daylight hours
- Frost pockets
- Soil Make Up/Profile
- Soil type

In the following, we aim to provide some more information on each of these bullet points

**Aspect** – This essentially means the direction your site faces.

As direction will have an impact on what you can grow and where you can grow it, understanding your site's aspect is critically important to your chance of successful growing; it is also linked to daylight hours and sun movement. For example, as the sun rises in the east and sets in the west, a westerly facing site will get later afternoon sun than an easterly facing site but may take a little longer to warm up through the day. A site facing south will get more all-day sun than a northerly facing site. You can determine this simply by understanding where North would be in relation to your plot. The following diagram gives an indication of the above and the related sun movement.



**Water shedding and drainage** – How water moves through your plot.

After a rain drop or snowflake falls on your plot, it may infiltrate the soil, or it may run over the land surface to low spot in the land (which in the natural environment would be a body of water such as a loch, burn, river or bog.)

Drainage is simply how quickly the water will move through the soil type you have. Some soils drain better than others and many fruit, vegetables, flowers and herbs do not thrive in areas of high water table or poor drainage.

If your plot is at the bottom of a hill or valley, you may find yourself subject to more water shedding than a plot in a flat area. Plots close to rivers can have a higher water table than other plots.

Ensuring you understand your soil type will also improve your understanding of how water will move through your plot and will determine any steps you can take to improve this should improvements be needed.

When initially assessing your site, have a look at what's growing, some plants where present, suggest that drainage could be improved. If the plot has the following growing, it may be an indicator you will need to improve the soil creeping buttercup, sedges, reeds, rushes, brooklime, flag iris would all suggest drainage could be improved. Areas of standing water that only disappear through evaporation tell us the soil needs improved also. A percolation test is simple to carry out and will give a better idea of the drainage capability of your plot. Here's how to carry out this test:



### How to perform a percolation test.

- Dig 1-foot by 1-foot holes in several places on your planting site.
- Let the soil dry out for a few days.
- Cover the holes to keep water out (and to make sure no one - human or beast - falls in).
- After the holes dry out, fill them with water and determine how long the holes take to drain completely.

Use a timer so you don't forget what time you started. Then use the following list to determine your soil's likely drainage pattern:

- If the water drains out within 10 minutes of filling it, the soil drains too well. It will probably dry out too fast for most plants.
- If the water drains out within 30 minutes of filling it, the soil is still draining fast, but it's probably okay for plants that like well-drained soils.
- If the water drains within 30 minutes to 4 hours of filling it, you have ideal drainage. Most plants thrive in this type of drainage situation.
- If the water takes longer than 4 hours to drain, the soil is poorly drained and probably won't be good for most plants. You may wish to consider raised beds or digging filed drains.



**Sun movement/Shade** – Some plants will tolerate shade better than others and provide a harvest. The majority of vegetables, fruit, herbs and flowers however will though require lighter conditions to provide a harvest. Understanding how the sun moves across your plot and what will create shade will help you plan your plot layout (see Section 2 Planning) more effectively.

The obvious causes of shade are trees, shrubs, buildings and structures. You should consider all these when developing your plot layout.

Trees will outcompete other plants for available nutrients, water and soil oxygen and this should be borne in mind when planning your layout but will also provide a buffer from winds.

Walls and buildings can provide sheltered growing spaces and act as “heat banks” (particularly east facing walls) slowly releasing heat captured from the sun during the day back into the environment at night. They can however also cause winds to vortex which can damage plants.

Tracking the sun’s movement and measuring daylight hours across your site can be as easy as putting a stick in the ground on a sunny day and watching how the shade created by the stick develops and moves through the day and taking a note of the time it takes to do so.



**Frost Pockets** – Understanding frost pockets will influence your plot layout. As cold air is heavier than warm air, it naturally seeks to move to the lowest point of a plot. It would be wise not plant fruit trees/bushes at the lowest point of your plot as their emerging flowers will be damaged by frost and without flowers there is no fruit.

It's worth noting however that some brassica's and root crops flavour improves when they have been subject to a frost due to naturally occurring sugars providing almost an anti-freeze effect within the plant.

We hope this has given you some feeling of how important it is to take your time to assess these various factors BEFORE putting a spade into the soil. But how do I know what soil I have and what soil type it is?





**Soil Make Up/Profile** – Soil is a many varied thing and understanding its components and make up is essential. You may find different soil types within the boundaries of your plot and being able to remediate the soil effectively will help you grow successfully. Please remember that “soil make up” indicates the “soil type” which will be covered soon.

A great explanation of what soil is can be found at <https://kidsgardening.org/lesson-plans-soil-texture-and-composition/> which describes soil as the following:

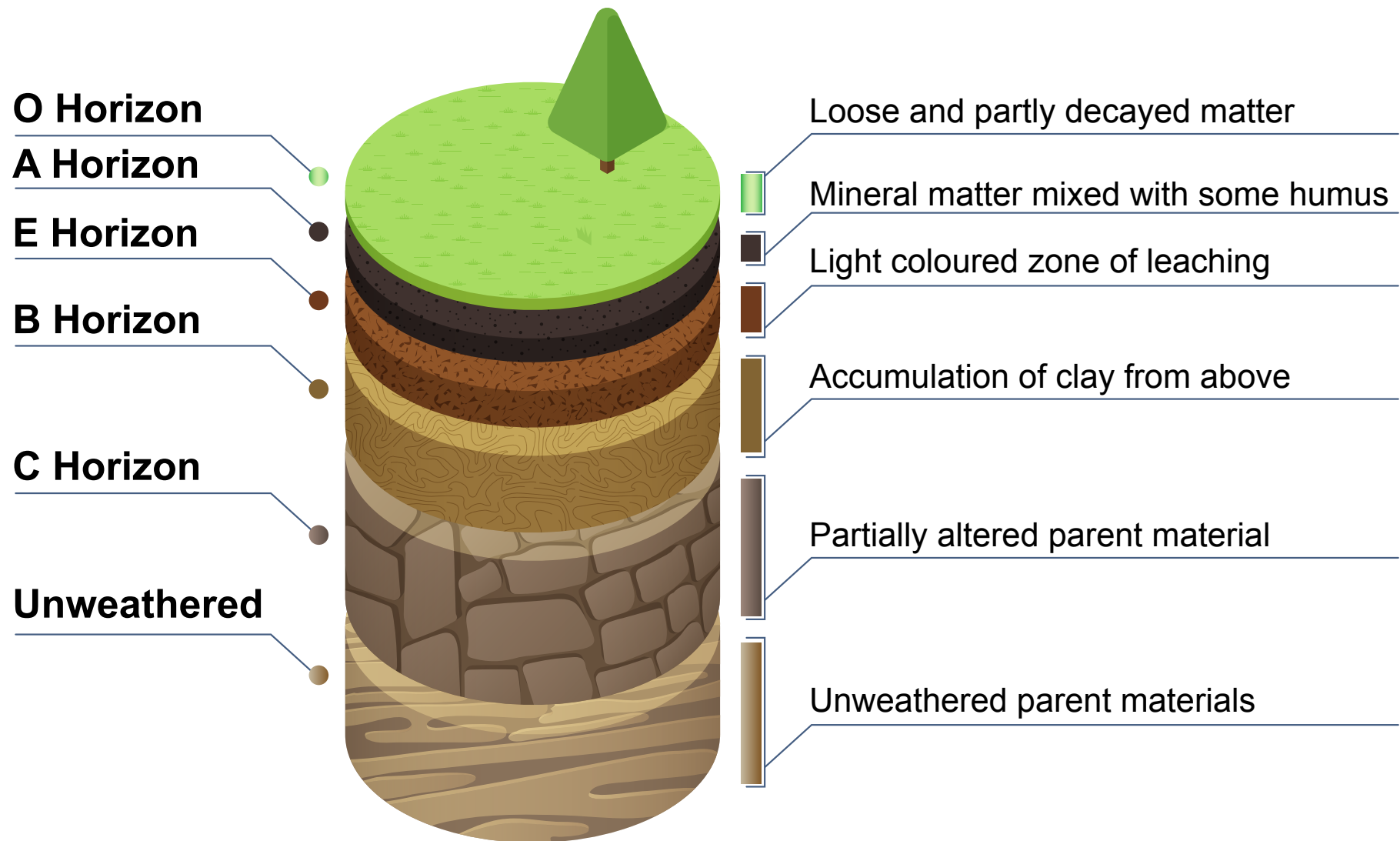
// Although many factors contribute to a thriving garden, any seasoned gardener will stress the importance of good soil. In addition to anchoring roots, soil provides life-sustaining water and nutrients. Plants in poor soils will struggle to grow, even if optimal water and light are available. In contrast, plants in good soils will grow to their fullest potential and experience fewer problems with insects and disease.

Soil is composed of minerals and organic matter. Sand, silt, and clay are the mineral particles derived from rock broken down over thousands of years by climatic and environmental conditions (rain, glaciers, wind, rivers, animals, etc). The largest, coarsest mineral particles are sand. These particles are 2.00-0.05 mm in diameter and feel gritty in your fingers. Silt particles are 0.05-0.002 mm and feel similar to flour. Clay particles are extremely fine -- smaller than 0.002 mm -- feel sticky in your fingers when wet, and clump to the point that you can't see an individual particle without a microscope. The proportion of these three minerals in a soil determine its texture or the way it feels. Organic matter is the decayed remains of once-living plants and animals. Good plant growth and development depends on the mineral and nutrient content of soil, as well as its structure.

//

Soil is teeming with life, including microorganisms like bacteria and fungi (billions in a single teaspoon!) and larger animals such as worms and sowbugs. Many of these underground inhabitants feed on remains of plants and animals, breaking down their tissues. In the process, they create pore space and release nutrients that plants need and the cycle begins again.

**Pore space** - the arrangement of soil particles in relationship to each other -- is an important component of soil structure. In an optimal situation about 50 percent of the volume of the soil would be pore space, with half of that filled with water and half filled with air. The other 50 percent would be sand, silt, clay, and organic matter. Roots need air as much as they need water; plants can actually suffocate or drown if they are completely submerged in water for extended periods of time.



The proportion of these different-sized particles affects the amount of air, water, and nutrients available to plants, and how the soil “behaves.” The smaller the soil particles, the more they stick together when wet. Thus clay soils can be sticky and difficult to work. With fewer air spaces, they drain poorly, and roots may suffer from a lack of oxygen. However, clay soils can be rich in minerals. In contrast, sandy soils can drain water too quickly and be low in nutrients, but they are easier to work. Adding organic material can offset many of the problems associated with either extreme.

While there’s no such thing as a perfect soil, particular plants grow best in particular soils. In general, common garden plants prefer loam -- soils with a balance of different-sized mineral particles (approximately 40 percent sand, 40 percent silt, and 20 percent clay) and ample organic matter and pore space, but some common plants grow better in sandy conditions, while others are well adapted to clay soils.”

Further information about your soil can be gathered from the soil profile, which show the depths of the various layers (horizons) which make up the profile. You will largely be interested in the topsoil layer or rooting zone.

So now you know how soil is described and what a soil profile looks like, how do you find out what particles, and in what amounts, make up your soils?



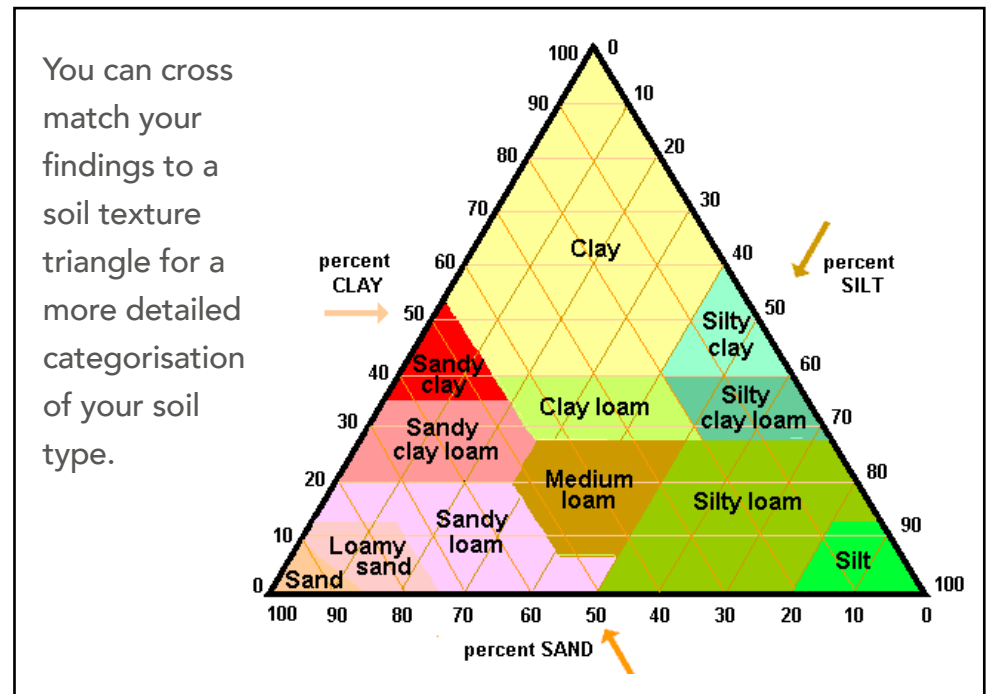
## How to do a settlement test

To find out, you will need to do a jar settlement test, sometimes known as a mudshake, for which you will need a clean jar with a lid, some water, a trowel and spade and somewhere to put the jar where it won't be disturbed.

- Use the spade to cut through any layer of grass on the surface and pull it back enough to allow access to the soil below.
- Take your trowel and scoop out some soil (no more than half the volume of the jar).
- Drop the soil into the jar
- Add the water leaving around an inch of space in the jar.
- Now put the lid securely back on the jar and shake vigorously (the jar that is).
- Leave it on a flat surface and leave it to settle undisturbed for a day or two at most. The various particles will settle in the jar and you should see something similar to the image below.

Due to difference in particle sizes of the clay (small), silt (medium) and sand (large) you should have 3 distinct bands. You may also have some organic material which floats on the surface or remains suspended above the clay layer in the water.

Your soil type will be determined by the percentage of each particle size within the jar as shown above.



## Soil Crumb

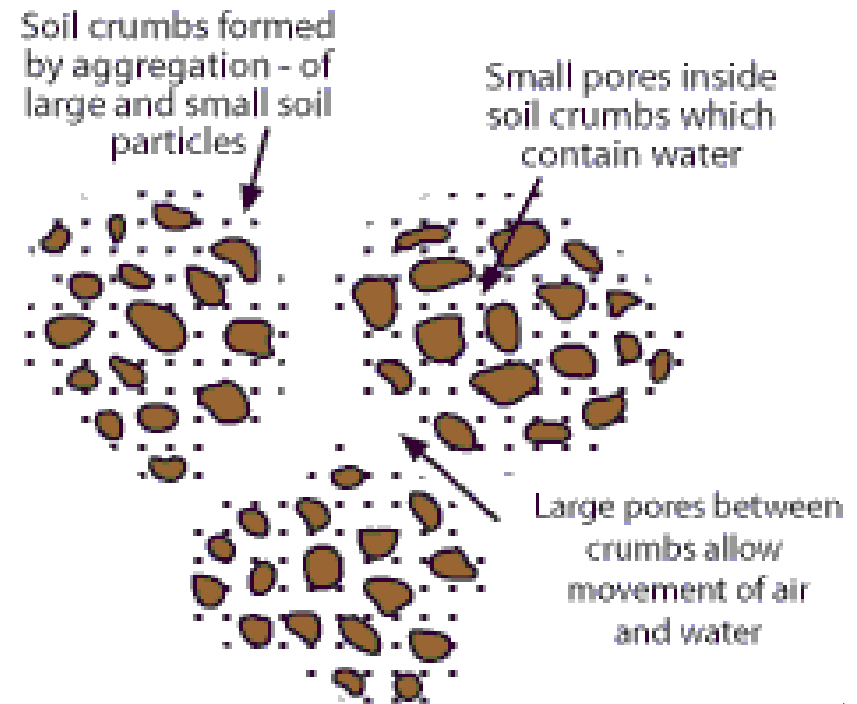
Soil crumbs are essential to plant health; the following diagram shows how a healthy crumb would be made up. The crumb should be around 50% particles and 50% pores. Of the pores 50% of this will be gas filled (soil oxygen) and the other 50% will be water. The pores are also where roots will move through, anchoring themselves into the ground. A complex interaction between root hairs, soil particles surface area, soil organisms and pores will allow the plant to take up the nutrients, oxygen and water to keep it healthy and robust.

Waterlogging (where all available soil pores spaces are filled with water) where natural drainage is poor, will suffocate plants and should be dealt with in the planning stages when/if identified.

## Further Testing

Some final tests that are valuable to your understanding of your soil will be a pH test and nutrient test which tells you how acidic or alkaline your soil is and what nutrients are available in your soil. These test kits can be purchased from most garden centres and some DIY stores.

Knowing this will also inform the layout of your plot as some plants prefer slightly acidic or slightly alkaline soil where they can flourish. Putting a calcium loving plant in an acidic soil will



affect how well the plant grows or the volume of crop it yields, similarly trying to grow a plant that prefers an acidic soil in alkaline ground will provide disappointing results.

The results of your pH and nutrient test will also allow you to decide which type of fertilisers may be required to be added to the soil, dependant on the results of the nutrient test.

Some growing practices can improve soil fertility, with no chemical nutrient inputs by harnessing the benefits gained naturally from deep rooted plants. These deep rooted plants are grown alongside a plot and cut before the end of the growing season to be left on the ground to be broken down by soil organisms.

These deep rooted plants draw up nutrients from deep within the soil profile (that are out of reach of standard fruit and veg varieties) and make these nutrients available within the soil once again.

A layer of well-rotted wood chips (rotted for at least 3-5 years old) is added to the area with the cut plants and then cultivated into the soil.

This improves soil fertility, increases the number of beneficial insects which naturally control pests, and avoids any chance of run off (excess fertilisers being leached into the water table and eventually water courses) which can lead to algal blooms within watercourses suffocating the naturally occurring life in the watercourse.



## Quick facts

- Clay soils are heavy, high in nutrients, wet and cold in winter and baked dry in summer
- Sandy soils are light, dry, warm, low in nutrients and often acidic
- Silt soils are fertile, light but moisture-retentive, and easily compacted
- Loams are mixtures of clay, sand and silt that avoid the extremes of each type
- Peat soils are very high in organic matter and moisture
- Chalky soils are very alkaline and may be light or heavy

## Benefits of earthworms

No conversation around soil would be complete without mention of the unsung hero of soil, the worm family.

### Charles Darwin said of the worm:

“ The plough is one of the most ancient and most valuable of man’s inventions, but, long before he existed, the land was in fact regularly ploughed, and still continues to be ploughed by earthworms. It may be doubted whether there are many other animals which have played so important a part in the history of the world as have these lowly organised creatures.

By their activity in the soil, earthworms offer many benefits: increased nutrient availability, better drainage, and a more stable soil structure, all of which help improve the plot. ”





### Improved drainage

The extensive channelling and burrowing by earthworms loosens and aerates the soil and improves soil drainage. Soils with earthworms drain up to 10 times faster than soils without earthworms. In zero-till soils, where worm populations are high, water infiltration can be up to 6 times greater than in cultivated soils. Earthworm tunnels also act, under the influence of rain, irrigation and gravity, as passageways for lime and other material.

### Improved soil structure

Earthworm casts (the squiggly pile of soil left behind by the worm) cement soil particles together in water-stable aggregates. These are able to store moisture without dispersing. Research has shown that earthworms which leave their casts on the soil surface rebuild topsoil. In favourable conditions they can bring up about 50 tonnes/hectare annually, enough to form a layer 5 mm deep. One trial found worms built an 18-cm thick topsoil in 30 years.

### How to encourage earthworms

Because earthworms do not like soil that is too acid, alkaline, dry, wet, hot or cold, their presence is a good indicator of soil conditions suitable for plant growth. Ensure soil pH is above 4.5

Earthworms do not like acid soils with pH less than 4.5. The addition of lime raises pH and also adds calcium. Earthworms need a continuous supply of calcium, so are absent in soils low in this element. South Australian research found that earthworm numbers doubled when pH rose from 4.1 to 6.7.

### Increase organic matter

Earthworms feed on soil and dead or decaying plant remains, including straw, leaf litter and dead roots. They are the principal agents in mixing dead surface litter with the soil, making the litter more accessible to decomposition by soil microorganisms. Animal dung is also an attractive food for many species of earthworms. The following practices provide food for earthworms.



### **Green manure crops:**

Green manure crops are fodder crops turned into the soil to provide organic matter to benefit the following crop. The crops are grazed or slashed, sometimes pulverised, and then left on the surface or turned into the soil.

### **Reduce use of some fertilisers and fungicides**

Highly acidifying fertilisers and some fungicides reduce worm numbers.

### **Keep soil moist**

Worms can lose 20% of their body weight each day in mucus and castings, so they need moisture to stay alive. Groundcover such as mulching or green manures reduces moisture evaporation. Decaying organic matter (humus) holds moisture in the soil. In dry times some species burrow deep into the soil and are inactive until rain 'reactivates' them.

### **Improve drainage**

Worms need reasonably aerated soil, so you may need to drain or mound soil in wetter areas to prevent waterlogging.

### **Reduce soil compaction**

It is difficult for earthworms to move through heavily compacted soil, so do not work wet soil or to a minimum in wet conditions.

### **Reduce cultivation**

Tilling soil reduces earthworm numbers. Researchers have found that after four years, zero-tilled ground had twice as many worms as deeply cultivated soils. However, shallow cultivation may not affect worm numbers.

### **Protect from weather extremes**

Earthworms are intolerant of drought and frost, and do not like dry sandy soils. They are active only when the soil is moist, are inactive when it is dry. Organic matter cover helps reduce the effect of climatic extremes, and retains soil moisture.

As plot holders there is a responsibility to future generations to protect, and improve where possible, the soils we grow in.

Soil is the anchor for the roots of plants which simply put, feed us. It is not easily replaceable and takes time on a geological scale to form. It hosts a myriad of biological and chemical processes that are subject to constant study and review as our understanding of soil increases. It is an example of recycling in its most fundamental and elegant form and is extremely precious to our continued development on this planet. It's where the magic happens. Where would we be without soil?

Section 5  
**Soil Preparation/  
Growing Mediums**



## Soil Preparation/Growing Mediums

It's often repeated that if you ask 3 gardeners a question, you'll get 6 different answers. Many topics in horticulture are hotly debated, and rightly so, how else to learn?

This handbook is not intended to offer any preference to any chosen practice; it is to provide information and signposting for growers to further information to support them in making such choices.

In this section the subjects will introduce you to a number of terms, some which you may not be familiar with yet, others you may already know and some you may already be practicing. Hopefully after reading this you'll be better informed and keen to put this knowledge to good use.

Cultivation can be described as "the act of preparing land and growing crops on it"

<https://dictionary.cambridge.org/dictionary/english/cultivation>

**Primary Cultivation** – This involves operations, in your case digging, which cut and shatter the soil with relatively deep penetrating tools (a spade) 15 cm to 75 cm and leave a rough surface texture. This is normally done in Autumn with the soil turned to the elements over the winter. It has the benefit of exposing some pests which will happily be eaten many birds

and allowing frost to work the soil improving the crumb structure over the winter.

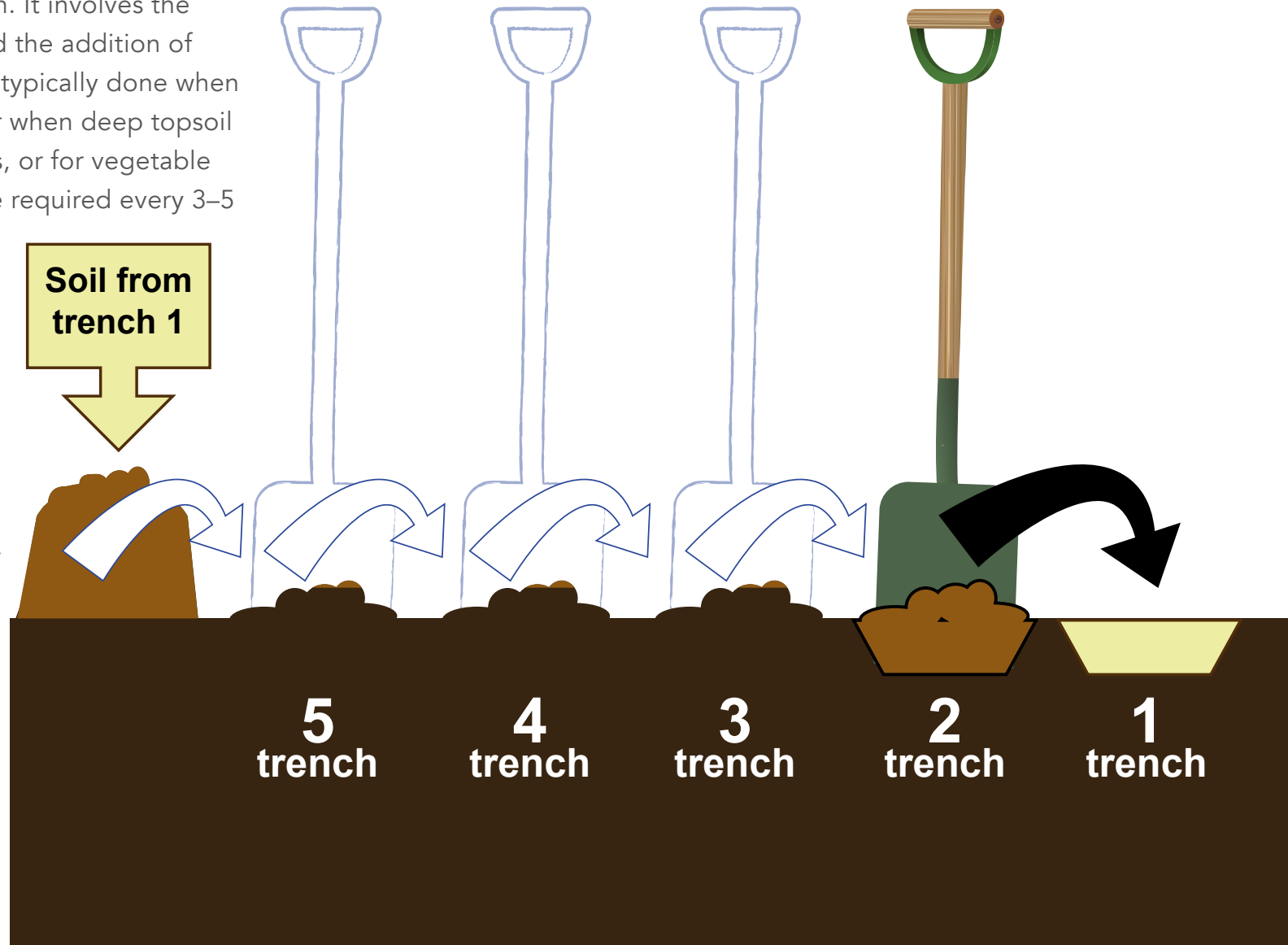
Avoid carrying out primary cultivation (or any cultivation for that matter) on wet ground as this will lead to soil compaction where the soil becomes squashed together excluding air and water. As a general rule of thumb, if the soil sticks to your boots, it's too wet to work.

Compaction can be avoided by the use of narrow strip beds easily accessible from paths or where this isn't possible, can be alleviated by using boards which will distribute your weight over a wider surface area minimising soil compaction.

**Secondary Cultivation** - Secondary cultivation involves operations that work, level, and firm the top 5 cm to 15 cm of soil. Secondary cultivation is often carried out to produce a fine seedbed or planting bed, ready for sowing seed or planting. It usually involves actions such as hoeing, raking, levelling, fertilising and mulching. This is normally carried out in the spring as the soil begins to warm up. The same care should be taken not to work a wet soil as in primary cultivation. A considered plot layout design can go a long way to ensuring the soil you grow in is as healthy as you can support it to be.

**Double digging** – what exactly is double digging and what are the benefits of doing this?

Double digging is a gardening technique used to increase soil drainage and aeration. It involves the loosening of two layers of soil, and the addition of organic matter. Double digging is typically done when cultivating soil in a new garden, or when deep topsoil is required. On poor or heavy soils, or for vegetable gardens, double digging might be required every 3–5 years. Using a wheelbarrow to move the soil. The techniques is shown in the following image:



[www.seedparade.co.uk/news/wp-content/uploads/2012/12/double-digging2.jpg](http://www.seedparade.co.uk/news/wp-content/uploads/2012/12/double-digging2.jpg)

Further information on double digging can also be found at the following RHS webpage:  
[www.rhs.org.uk/advice/profile?PID=133](http://www.rhs.org.uk/advice/profile?PID=133)

## Seed beds

This is a further form of cultivation for those who may not have much space to start plants off indoors. Please refer back to your calendar for appropriate dates for planting seed directly outdoors into a prepared seed bed.

You'll probably need a seed bed where you can sow the seeds and bring on the seedlings for later transferring to the final position of the plants (alternatively, sowing in trays will do just as well for many plants). The main reasons for having a seed bed are:

Some young seedlings need less space than the mature plant, so less of the plot need be committed to a crop until it is really necessary.

A crop may be started off in the seed bed while its final position has another crop waiting to be harvested. This is known as successional planting. More of that later.

It must be noted that not all plant seeds are suitable for starting off in a seed bed; a large number of plants cannot be successfully transplanted so these seeds need to be planted in their final location.

## Position for a seed bed

It must be remembered that seed germination and early growth of any plant has an important influence on the final quality of the plant - if the seed bed is shaded by hedges or buildings, the seedlings may grow weak and spindly. Similarly drainage of the bed is important, seeds generally don't do well if they become waterlogged (nor if they dry out).

Ideally the seed bed should:

- Be in an open, but sheltered, position with good drainage.
- Be free of perennial weeds as weeding between the small seedlings can be difficult and time consuming.
- If the garden is a haven for the local pets, it is worthwhile putting wire netting around the bed.
- Do not use a bed which was used to grow potatoes in the previous year, any sprouting potatoes left from the crop will be a problem around the young seedlings.

## Preparing the seed bed

The requirement for a seed bed is basically the same as for any vegetable bed, except that the soil need be only forked to a relatively shallow depth. If it is a new bed (i.e. never previously used to grow plants), the bed will need to be dug and prepared as with any new bed.

If plants have previously been grown on the bed, the preparation required is much less as the soil will have been broken up and most stones removed.

The biggest challenge to any grower is to decide when the soil is suitable for working - not too dry and not too wet. This depends to some extent on the type of soil, a clay soil can turn from a sticky mass to hard as rock very quickly. Choosing the right time is one of the hardest choices, especially for new growers - it is largely a matter of experience with the particular soil type in the garden.

Assuming the seed bed is established, the likelihood is that there will be some seedlings in it when you come to prepare it for a new sowing, so any preparation will just apply to the area you require and care must be taken to avoid disturbing the existing seedlings.

To prepare for a new sowing:

- Lightly fork over, or hoe, the top 5 to 7.5cm (2 to 3 inches) of the bed. If the bed has not been used for some time, or the soil is very wet, it may be necessary to leave the soil for a day or two to dry out.
- When the soil is dry enough for it to freely break up, rake the surface back and forth to give a suitable tilth - some clods may need a hit with the back of the rake or even breaking up by hand. Larger seeds generally benefit for a rather coarse tilth while fine seeds need a fine tilth.

- As you rake back and forth, remove any stones, weeds or other vegetation. Keep raking to get the surface fairly level.

### Using a seed bed

Once the seed bed is ready, choose a day when the soil is moist and little wind to plant your seeds.

Normally a 'drill' (or number of drills) is created on the surface of the seed bed - a drill is a shallow depression into the bottom of which seeds are sown. The drill can be formed either by pulling a hoe or a gardening trowel (backwards) through the surface of the prepared bed with the earth pulled to the sides, the depth required varies from seed to seed. A line stretched above the soil before drills are made will help keep them straight.

The way the seeds are sown along the bottom of the drills will depend upon the seed been planted, typically one of three variations will be specified:

- Very thinly - say 2.5cm (1 inch) between seeds.
- Thinly - say 1.2cm (½ inch) between seeds.
- At stations - a number of seeds together at given spacing.

Check on the seed packet or refer back to your calendar to determine the appropriate spacing for particular vegetables. Using more seeds than necessary will just waste seeds and cause extra thinning later on.

Once the seeds have been sown, they are normally covered by pulling the back of a rack or hoe over the surface of the bed to fill the drills.

Identify the drill and the seeds sown by putting in a short stick at each end of each drill and attaching a waterproof label with the name of the plant marked on it.

Stretching a line between the end sticks above each drill will help keep birds off the seeds and young seedlings.

Watch out for other pests - for example slugs; young plants are tender and will provide a good meal for a number of pests.

### **Alternative Growing Techniques**

As mentioned earlier in this section, this guide is to provide information and advice; how you wish to grow will be down to you to decide based on all information available to you.

While many growers will seek to follow horticultural practices derived from thousands of years of practice, alternative growing methods are also gaining traction across the world. These alternative practices are often referred to under the catch all title of permaculture which covers techniques from no dig formats to food forest, hugelkulture and others.

Many growers utilising alternative methods do so because they choose to employ natural processes with as little interference to the ecosystem as possible. Research leads us to understand permaculture or permanent agriculture was initially developed by Australians Bill Mollison and David Holmgren in the 1970's, since when permaculture has spread wildly throughout the world. The term initially meant 'permanent agriculture', however it evolved to also represent 'permanent culture'. It is described as the ethical, scientific and synchronistic design of natural systems to ensure a sustainable philosophy of living. It also aims to facilitate abundance for the future of humanity by producing all the food and materials it needs on a local scale. At its core, permaculture is simply the collaboration of humans and nature in action.

The aims of permaculture are described as:

**// to create systems that are ecologically-sound and economically viable, which provide for their own needs, do not exploit or pollute, and are therefore sustainable in the long term //**

*Bill Mollison*



Information on no dig techniques and other forms of permaculture can be found at the following link;  
[jan's link inserted here](#)

### **Growing Medium**

Growing media are materials that plants grow in. Growing media is specifically designed to support plant growth and can either be a solid or a liquid. Different components are blended to create homemade and commercial growing media. Different types of growing media are used to cultivate various plants.

This can cover every type of compost, nutrient gel, clay pumice (pellets), soil mixes, perlite or vermiculite to name a few. They are specifically chosen to provide the following 3 major functions:

- Physically support plant growth
- Allow for maximum root growth
- Supply roots with necessities such as water, air, and nutrients

Roots develop in pore spaces between the individual particles of the growing media. Water and air move through the pore spaces. Air is responsible for the health of soil microorganisms and is needed for root growth while water is needed to fuel plant growth. Microorganisms in the growing media help supply

plants with nutrients necessary for their growth. Choice of growing medium will largely be dependent on the type of plants you wish to grow.

### **Mulch**

Can be either a verb or noun. As a noun a mulch arises from the German language and refers to a soft material (such as decaying leaves, bark, compost, hay, straw, hemp) used to cover and insulate the soil.

As a verb it means to cover (with a mulch). Mulching provides several benefits such as:

- Inhibits weed germination and growth. (Weeds compete for resources with desirable garden plants and can act as a vector for pest and disease.)
- Holds in soil moisture, protecting your plants from drying out quickly
- Moderates soil-temperature fluctuations (This benefit is especially valuable during that turbulent-weather period in spring when you don't want your plants to be stressed.)
- In cold-winter areas, protects plant roots from winter cold and helps prevent frost-heaving, in which plants are literally pushed out of the ground by the natural expansion and contraction of the soil as it cools off and heats up

- In hot-summer areas, helps keep plant roots cooler
- Depending on what you use, adds a bit of welcome nutrition to your garden as it breaks down
- Mulches also limit soil capping and reduce erosion of soil by wind and water.

### **Green Manures**

- The purpose of a green manure crop varies depending on each situation but some of the benefits they offer are:
- Increasing organic matter and soil humus.
- Increased Nitrogen fixation.
- Protection of the soil surface.
- Prevention of erosion.
- Maintaining or improving soil structure.
- Reduced susceptibility to leaching. (loss of nutrients through water moving through the soil)
- Access to unavailable nutrients from lower soil profile.
- Provide readily available nutrients to the next crop.

The RHS describes green manures as “fast-growing plants sown to cover bare soil. Often used in the vegetable garden, their foliage smothers weeds and their roots prevent soil erosion. When dug into the ground while still green,(this should be done before the crop flowers and sets seed) they return valuable

nutrients to the soil and improve soil structure.”

Further information on the use of green manures can be found at the following links:

[www.rhs.org.uk/advice/profile?pid=373#nav-get-involved](http://www.rhs.org.uk/advice/profile?pid=373#nav-get-involved)  
[www.gardenorganic.org.uk/green-manures](http://www.gardenorganic.org.uk/green-manures)

### **Nutrient Teas**

Plants enjoy a tea too. We brew the tea, strain out the solids and sediment, and drink the tea. Our bodies take up the nutrients we need, and the excess is flushed out in our elimination processes. A similar process takes place in the garden with the use of natural fertilisers often called nutrient teas.

These organic fertilisers can be made from perennial weeds (roots and all), nettles, comfrey, chickweed, to mention a few; even the waste product from making the teas can be safely composted.

A “How to” guide is included as an appendix to this handbook.

### **Manures**

Manure is the decomposed form of dead plants and animals

(organic matter) which is applied to the soil to increase the production. It is a natural form of fertilizer and is cost-effective. Animal excreta usually mixed with straw or hay (use herbivore excreta only, meat eating animal excreta can cause issues) is also used as manure. The livestock manure is rich in nitrogen, phosphorus, and potassium.

Manure is highly rich in organic matter and humus and thus improves the soil fertility. These are better in the long run and does not cause any pollution. It is a valuable and renewable resource

### **Advantages of Manure**

- These are a good source of macronutrients (Nitrogen(N), potassium (K) and phosphorus (P)) which are essential for healthy plant, flower and fruit growth.
- Improves soil fertility
- Reduces soil erosion and leaching.
- Improves the physical properties of the soil and aerates the soil.
- Improves the water and nutrient holding capacity of the soil.
- It helps in killing weeds and pests.
- Crops grown on the land treated with manure produces healthy crops.

### **What to be aware of with Manures**

Fresh manure on a plot can scorch plants; make sure it is well rotted (fresh manure will generate heat as it breaks down and there may be visible steam rising from the heap. Well-rotted manure would not).

Know where and who you are buying it from. Manure while hugely beneficial, can contain residual drugs used to treat livestock. These can damage soil life. If you are unsure, leave it sunlight for around 6 weeks but not close to any water sources as the drugs can leach into these.

Never use manure derived from meat eating animal faeces. It's often cheaper to purchase bulk loads, check if your allotment site buys collectively. Ensure you wear gloves and wash your hands after handling.

### **Compost**

Compost is organic matter that has been decomposed in a process called composting. This process recycles various organic materials otherwise regarded as waste products and produces a soil conditioner. Compost can be made in a number of ways, from simply piling up old plant material, to using complicated plastic bins.

Basically, plant waste + moisture + warmth + air + micro-organisms + time = compost. Plant waste is either 'green' (leaves, flowers, weeds, grass cuttings) or 'brown' (bark, stems, roots, hedge trimmings). Aim for a mix of both. Don't forget you can use kitchen waste and small-pet litter (hamster and gerbil - not cat and dog faeces!)

Micro-organisms (bacteria and fungi) either come in naturally from the soil underneath the heap or they are added in as a sprinkling of fresh soil every so often. They feed on the waste, breaking it down into hot compost.

Don't put large quantities of the same waste in the heap together, particularly grass clippings. Instead, mix a variety of other waste. Ensure you stir it up to let the air in.

Compost heaps and bins benefit from being emptied and turned from time to time, so that the bits at the edges also rot down.

Composting is an effective and free way of dealing with naturally occurring waste from your plot which in return provides an effective soil conditioner.

We really have only touched on the basics of composting here. Much more detailed information can be found in Appendix 2 and at the following link:

[www.recycleforscotland.com/reduce/home-composting](http://www.recycleforscotland.com/reduce/home-composting)

## Housekeeping

We really can't finish this section without discussing the importance of good housekeeping. It is important to ensure you always apply good housekeeping practices on your plot. In our understanding of housekeeping we include cleanliness and best practice under this term too.

Whether it be ensuring you have the right protective clothing, boots, gloves and goggles/eye protection when working around fruit trees/bushes or ensuring you keep your tools in an orderly, safe secured space to ensuring you leave your plot in a tidy safe state before leaving after each visit, housekeeping can save you a lot of time and trouble, some say it can even help you feel more content.

An untidy plot is not only troubling but can be dangerous to visitors (authorised or otherwise), friends, family and fellow plot holders. Plots are a great place to recycle materials that might be regarded as waste in another situation and anything that diverts waste from landfills must be a good thing.

Please bear in mind though, that where a plot holder takes materials onto their plot and for whatever reason they are not used, the responsibility for managing this waste lies with the plot holder. There are recycling facilities across Glasgow where you should take any non-organic waste materials coming from your plot.

See this link for information: [www.glasgow.gov.uk/index.aspx?articleid=17040](http://www.glasgow.gov.uk/index.aspx?articleid=17040)

Housekeeping is especially important when dealing with manures, fertilisers, compost, tools and yourself. We have mentioned previously the importance of ensuring you know where and how your manure is produced before purchasing, failure to do so could impact on your soil health and the health of the plants you are growing. You should never compost diseased plant materials, if you do, you multiply the chance of spreading such disease throughout your plot.

Also avoid composting the roots, flowers and seed heads of perennial weeds, the compost heap may not kill these off and when you apply the compost you spread these weeds over your plot. Poor management of a compost heap/bin can also create conditions where the compost can do more damage than good and you find yourself with a smelly heap to deal with. Please ensure you read the Appendix on composting for further information.

Working safely may seem like an obvious choice when on your plot, however it takes only a small lapse of practice to leave a fork or a rake in a position where it could cause injury to others or yourself.

Failing to practice good housekeeping on your plot can also allow weeds to become established and encroach onto surrounding plots, this is never welcomed by your neighbours on an allotment site.

Good housekeeping can also save you money, looking after tools properly will extend their useful lifespan and save you unnecessary expense in replacing them.

Working a plot can provide contentment, healthy locally produced food and can be a beneficial social past time where you can meet likeminded individuals, share knowledge and provide support and encouragement to each other. Plots are often a reflection of you and your practice, and where good housekeeping isn't practiced, you can find yourself missing out on such benefits as mentioned before.

Please ensure you remember (and apply) good housekeeping practices on your plot.

# Section 6

## Tools and Maintenance



## Tools and Maintenance

Now you have an understanding of the previous sections we should look at tools next, without which, looking after a plot would be a lot more difficult. In the excitement of getting a plot the urge might be to rush out and stock up on every tool in the catalogue. A wiser approach would be to consider what tools will be required for the work you need to carry out.

Further consideration should be given to how much you wish (or have) to spend on tools. When properly looked after, investing in a good quality branded tool can save money.

Maintaining your tools in good condition is relatively simple if you follow 6 easy steps:

- Store your tools in a safe, secure, cool dry place.
- Clean tools after use.
- Sharpen tools after cleaning.
- Wipe with an oily rag after sharpening
- Follow the manufacturer's instructions
- Use the tool only for its intended purpose.

The following table lists the basic essentials that will be of use when taking on a plot:



## Basic essentials To Grow Vegetables

Tool	Use
<b>Fork</b>	A garden fork, spading fork, digging fork or graip is a gardening implement, with a handle and several (usually four) short, sturdy tines. It is used for loosening, lifting and turning over soil in gardening and farming.
<b>Iron rake</b>	Iron (Soil) rakes are hard toothed and long handled, these are best used for dragging through soil beds to help break down the earth prior to planting
<b>Draw hoe</b>	A draw hoe has a blade set at approximately a right angle to the shaft. The user chops into the ground and then pulls (draws) the blade towards them. Altering the angle of the handle can cause the hoe to dig deeper or more shallowly as the hoe is pulled. A draw hoe can easily be used to cultivate soil to a depth of several inches.
<b>Dutch hoe</b>	A Dutch hoe, also called a push hoe, doesn't have the typical hoe blade with its 90-degree-angle. Instead, the blade of the Dutch hoe faces forward. If you are wondering how to use a Dutch hoe, it's not at all difficult. You just use a push-pull movement instead of a chopping movement.
<b>Garden line</b>	A garden line is a length of string used to mark out straight lines for sowing seed or planting out.
<b>Trowel</b>	When to use a gardening trowel depends on the job at hand. Garden trowels are used for digging small holes, such for planting bulbs, annuals or perennials. It would take a lot of time and effort to dig a hole for a tree or shrub with a garden trowel. Garden trowels are also used to dig up weeds.
<b>Dibber</b>	A dibber is used to plant bulbs, tubers, small plants, and sometimes seeds. These bulb planters come in many different shapes and sizes. A dibbler is used by pushing the tapered end into the garden soil to the depth required and twisting it to loosen the soil.
<b>Wheelbarrow</b>	A wheelbarrow is an essential garden tool that takes a load off your back. It can be used to transport supplies, tools, soil,
<b>Brush and Shovel</b>	A long handled brush and shovel are used for sweeping up and collecting debris.
<b>Watering can and rose</b>	A watering can is a portable container, usually with a handle and a funnel, used to water plants by hand. Some watering cans have a fine spray which delivers water gently. These are useful for delicate plants and newly sprouted specimens. The rose at the end of the spout can be removed so you can also deliver fast doses of water. This is also helpful if the spout clogs, so it can be cleaned.
<b>Sharpening stone</b>	Sharpening stones, water stones or whetstones are used to sharpen the edges of steel tools and implements through grinding and honing. They should be used after any sharp edge tool has been used and cleaned.
<b>Secateurs</b>	Secateurs are used in different ways in the garden, and that is why they are so popular. This one tool can handle dozens of various tasks in the garden, so you can be sure that you will get good use out of them. Generally speaking, secateurs can be used to clean, cut, and trim away branches, weeds, and stems that are unwanted in your garden.
<b>Loppers</b>	A lopper is a pruning tool that can be used to prune stems and branches that are 1 to 2 inches thick. A branch less than 1 inch thickness can be pruned with the help of a shear and a branch more than 2 inches thick will need a pruning saw. A lopper can be either a bypass lopper or an anvil lopper.



Tool	Use
<b>Pruning saw</b>	A pruning saw is a saw which is specifically designed for pruning tasks. Pruning saws can be utilized for thick branches which are too dense for secateurs or loppers, and also for high branches which are difficult to reach
<b>Garden (Pruning) knife</b>	Pruning knife uses run the gamut from trimming vines to harvesting veggies. You can use a pruning knife to slice string, cut flowers, prune vines and graft trees
<b>Garden twine</b>	Garden twine can be used for tying and supporting plants, such as tomatoes. Garden twine can also be used to make straight lines for planting rows and to separate areas of your garden. In addition, twine can be used for hanging garlic, onions, or herbs to dry.
<b>Netting</b>	Netting is used to protect crops from predation by birds and prevent some flying insects from laying eggs on them. Care must taken when using netting and checks should be carried out to ensure no birds or small animals have become entangled or trapped by netting.
<b>Fertiliser</b>	Fertilisers are used to improve plant growth. The faster growing the plant, the more it will benefit from fertiliser application. If you have a healthy soil, it is often not necessary to use fertilisers, but using them may produce a showier display of blooms or a higher yield of produce from edible crops.
<b>Compost</b>	Compost is made of decomposed organic matter that is used as a medium in which to germinate seeds (seed compost), for potting on seedlings, (potting compost) or for general use as a soil conditioner providing organic material including beneficial microbes, bacteria to improve the structure of soils.
<b>Propagator</b>	A propagator is a tool which can increase germination by providing an enclosed environment that lowers the risk of damage to seedlings from changing weather in the spring. It can be as simple as a clear glass or plastic sheet over a seed tray or pot or purpose built.
<b>Pots/Seed Trays</b>	Pots/ seed trays are basically receptacles for holding a growing medium and single or multiple seeds/seedlings or plants. They come in a variety of shapes, sizes and materials. Natural materials such as clay pots or coir pots are more environmentally friendly however dry out quicker.
<b>Labels and Pens</b>	Labels and pens are an absolute essential in any plot holders tool kit. Chose a waterproof pen where possible. They label is used to remember what we planted where when we fail to record it in our notebooks. Placed at the head of the seed or seedling drill so we also know what is germinating in our trays or pots.
<b>Cloche</b>	Cloches are low portable protective structures made of glass or rigid transparent plastic. Tunnel cloches are low continuous tunnels of flexible plastic. Single cloches can often be joined to provide continuous protection to plants, especially vegetables,
<b>Canes</b>	from the elements. A cloche can raise the local soil temperature by up to 10°C and hasten germination of direct-sown crops by 10- 14 days. This, in turn, raises air temperatures and also reduces the amount of heat lost at night, resulting in earlier harvest dates (3-4 weeks with most crops).
<b>Soil Sieves</b>	Garden canes offer a practical way to guide the growth of flowers and plants and are often used to create frameworks for climbing plants such as beans and peas. They can also be used to create seed drills or low furrows.

## **Importance of Tool Maintenance**

As mentioned previously, housekeeping is essential in successfully maintaining a plot and even more so when maintaining tools and sundries. As these tools and materials have the potential to spread disease and viruses throughout all your seedlings, plants and crops, it is very important that tools and sundries are cleaned after each use.

For pruning tools such as secateurs, loppers, pruning saw and knife, it is a good habit to get into to give them a sterilising wipe after pruning each plant to ensure you do not transfer anything from one plant to another. Ensure they are kept sharp as a clean cut from a sharp blade heals quicker.

Sweeping up debris and cleaning as you go are also good habits to practice on a plot. Putting tools away after use and cleaning can also reduce the risk of injury arising from slips, trips, falls cuts or bangs.

It is also good practice to inspect and assess any tool or sundry before use to ensure they are safe to use; damaged tools can cause injury.

A tool maintenance checklist and risk assessment template are included as in appendices to this handbook.

While discussing housekeeping we should also mention safe storage of materials and chemicals. Materials when stored away tidily are easier to retrieve, less likely to cause a slip trip or fall, and makes best use of available space. This is good practice to follow. The use of chemicals on a plot should be a decision that is reached either by the individual or collectively as an association. Many growers choose growing organically for many reasons even where an association permits the use of chemicals on plots.

There are non-chemical control methods (cultural controls) that do not require the use of chemicals on your plot. We will look at all control methods later.

Where chemicals are chosen as part of a control method, the plot holder has the responsibility to ensure they are stored safely and securely. Chemical control methods should always be used within the manufacturer's guidelines and solely for the purpose for which they were chosen.

Chemicals must be kept in the original packing and never decanted into other containers. They should be stored out of the reach of children and animals as ingestion of chemicals can be dangerous or even fatal.

Knowing that poor practice can cause injury or fatality, spread disease through your crops or impact adversely your neighbours sends a clear message that you should always follow best practices on your plot. It is your responsibility to do so.



## Basic essentials To Grow Vegetables

Tool	Use
<b>Spade</b>	Gardeners use a spade for digging. It is designed for the specific task of lifting up and removing dirt. This would be the tool of choice for digging a planting hole, a trench or a ditch. The blade or digging end, made of metal, is sharp. The upper edge is dull, and is where the digger can place his foot to help force the sharp end into the ground.
<b>Fork</b>	A garden fork, spading fork, digging fork or graip is a gardening implement, with a handle and several (usually four) short, sturdy tines. It is used for loosening, lifting and turning over soil in gardening and farming.
<b>Iron rake</b>	Iron (Soil) rakes are hard toothed and long handled, these are best used for dragging through soil beds to help break down the earth prior to planting.
<b>Draw hoe</b>	A draw hoe has a blade set at approximately a right angle to the shaft. The user chops into the ground and then pulls (draws) the blade towards them. Altering the angle of the handle can cause the hoe to dig deeper or more shallowly as the hoe is pulled. A draw hoe can easily be used to cultivate soil to a depth of several inches.
<b>Dutch hoe</b>	A Dutch hoe, also called a push hoe, doesn't have the typical hoe blade with its 90-degree-angle. Instead, the blade of the Dutch hoe faces forward. If you are wondering how to use a Dutch hoe, it's not at all difficult. You just use a push-pull movement instead of a chopping movement.
<b>Garden line</b>	A garden line is a length of string used to mark out straight lines for sowing seed or planting out.
<b>Trowel</b>	When to use a gardening trowel depends on the job at hand. Garden trowels are used for digging small holes, such for planting bulbs, annuals or perennials. It would take a lot of time and effort to dig a hole for a tree or shrub with a garden trowel. Garden trowels are also used to dig up weeds.
<b>Dibber</b>	A dibber is used to plant bulbs, tubers, small plants, and sometimes seeds. These bulb planters come in many different shapes and sizes. A dibbler is used by pushing the tapered end into the garden soil to the depth required and twisting it to loosen the soil.
<b>Wheelbarrow</b>	A wheelbarrow is an essential garden tool that takes a load of your back. It can be used to transport supplies, tools, soil, compost or debris to, from or around your plot. A must have!
<b>Brush &amp; Shovel</b>	A long handled brush and shovel are used for sweeping up and collecting debris.
<b>Watering can &amp; rose</b>	A watering can is a portable container, usually with a handle and a funnel, used to water plants by hand. Some watering cans have a fine spray which delivers water gently. These are useful for delicate plants and newly sprouted specimens. The rose at the end of the spout can be removed so you can also deliver fast doses of water. This is also helpful if the spout clogs, so it can be cleaned.
<b>Sharpening stone</b>	Sharpening stones, water stones or whetstones are used to sharpen the edges of steel tools and implements through grinding and honing. They should be used after any sharp edge tool has been used and cleaned.

## Sundries

Tool	Use
<b>Netting</b>	Netting is used to protect crops from predation by birds and prevent some flying insects from laying eggs on them. Care must be taken when using netting and checks should be carried out to ensure no birds or small animals have become entangled or trapped by netting
<b>Fertiliser</b>	Fertilisers are used to improve plant growth. The faster growing the plant, the more it will benefit from fertiliser application. If you have a healthy soil, it is often not necessary to use fertilisers, but using them may produce a showier display of blooms or a higher yield of produce from edible crops.
<b>Compost</b>	Compost is made of decomposed organic matter that is used as a medium in which to germinate seeds (seed compost), for potting on seedlings, (potting compost) or for general use as a soil conditioner providing organic material including beneficial microbes, bacteria to improve the structure of soils.
<b>Propagator</b>	A propagator is a tool which can increase germination by providing an enclosed environment that lowers the risk of damage to seedlings from changing weather in the spring. It can be as simple as a clear glass or plastic sheet over a seed tray or pot or purpose built.
<b>Pots/Seed Trays</b>	Pots/ seed trays are basically receptacles for holding a growing medium & single or multiple seeds/seedlings or plants. They come in a variety of shapes, sizes and materials. Natural materials such as clay pots or coir pots are more environmentally friendly however dry out quicker.
<b>Labels &amp; Pens</b>	Labels and pens are an absolute essential in any plot holders tool kit. Chose a waterproof pen where possible. They label is used to remember what we planted where when we fail to record it in our notebooks. Placed at the head of the seed or seedling drill so we also know what is germinating in our trays or pots.
<b>Cloche</b>	Cloches are low portable protective structures made of glass or rigid transparent plastic. Tunnel cloches are low continuous tunnels of flexible plastic. Single cloches can often be joined to provide continuous protection to plants, especially vegetables, from the elements. A cloche can raise the local soil temperature by up to 10°C and hasten germination of direct-sown crops by 10-14 days. This, in turn, raises air temperatures and also reduces the amount of heat lost at night, resulting in earlier harvest dates (3-4 weeks with most crops).
<b>Canes</b>	Garden canes offer a practical way to guide the growth of flowers and plants and are often used to create frameworks for climbing plants such as beans and peas. They can also be used to create seed drills or low furrows.
<b>Soil Sieves</b>	Soil sieves (or riddles) are useful for sifting out large lumps from soil, leaf mould and compost, to leave you with a fine material suitable for sowing seeds like salad leaves and sunflowers, or for potting mixes

## To Grow Fruit (in addition to the above)

Tool	Use
<b>Secateurs</b>	Secateurs are used in different ways in the garden, and that is why they are so popular. This one tool can handle dozens of various tasks in the garden, so you can be sure that you will get good use out of them. Generally speaking, secateurs can be used to clean, cut, and trim away branches, weeds, and stems that are unwanted in your garden.
<b>Loppers</b>	A lopper is a pruning tool that can be used to prune stems and branches that are 1 to 2 inches thick. A branch less than 1 inch thickness can be pruned with the help of a shear and a branch more than 2 inches thick will need a pruning saw. A lopper can be either a bypass lopper or an anvil lopper.
<b>Pruning saw</b>	A pruning saw is a saw which is specifically designed for pruning tasks. Pruning saws can be utilized for thick branches which are too dense for secateurs or loppers, and also for high branches which are difficult to reach
<b>Garden (Pruning) knife</b>	Pruning knife uses run the gamut from trimming vines to harvesting veggies. You can use a pruning knife to slice string, cut flowers, prune vines and graft trees
<b>Garden twine</b>	Garden twine can be used for tying and supporting plants, such as tomatoes. Garden twine can also be used to make straight lines for planting rows and to separate areas of your garden. In addition, twine can be used for hanging garlic, onions, or herbs to dry.

# Section 7

## Planting and growing



## Planting and growing

Before we begin on our discussion around planting and growing, we should reinforce the importance of the previous sections. The information provided there is crucial to successful planting and growing and you should understand how important before it is reading this section.

So, if you jumped to the “juicy bits” please go back and read sections 1 to 5 before reading this. It will be to your benefit in the long run.

## Sowing

Successful growing begins with successful sowing. Prior to sowing you should consider weather conditions, location and soil condition. As long as the soil is warm and moist, seed can be sown and it will germinate quickly.

In practice, this usually means when the threat of the last frost has passed, usually late May/early June in Scotland, and before the first frost returns, usually late summer (September), although due to the shorter growing season in Scotland it is advisable to start early by utilising propagators, greenhouses or if you do not have access to such equipment, a south facing window sill can offer an alternative.

If you can provide the crop with protection, such as cloches or fleece, direct (into the ground) sowing can begin in earlier than would normally be recommended as long as the soil is warm and

moist.

Prior to sowing, please refer to the calendar in the previous sections. The following link provides further information on sowing outdoors although some dates may need to be revised (using your calendar):

[www.rhs.org.uk/advice/profile?pid=619](http://www.rhs.org.uk/advice/profile?pid=619)

You can sow seeds, sets or tubers. These may be unfamiliar terms, so we'll offer a brief description of each.

Essentially seeds are the unit of reproduction of flowering plants capable of developing into another such plant or if you prefer, they are an embryonic plant clothed in a protective outer covering.

A set is essentially a small bulb, e.g. onions/shallots that is planted to produce an earlier cropping plant.

Tubers are a thickened underground part of a stem or rhizome, e.g. in the potato, serving as a food reserve and bearing buds from which new plants arise.

Another increasingly popular and time saving method is to grow from plug plants. These are young plants that have been germinated and grown on in a nursery and purchased to be planted



generally into their final location. This can remove the need for a seed bed from your plot but are definitely more expensive to buy than seed, nor do you learn how to sow seed and enjoy the satisfaction of nurturing a plant through its life stages from seed to crop before harvesting. Again, the choice would be down to the individual.

Prior to sowing directly, you should refer to your site assessment notes to determine what seeds should be started where and if these are the final location for each plant. You should also consider orientating your sowing, so each variety has access to the best conditions for them to grow well e.g. avoid frost pockets for planting fruit, sow carrots in an area with the lightest free draining soils, plant across a sloping ground rather than up and down the slope etc.

### **Propagation**

Plant propagation is the process which grows new plants from a variety of sources: seeds, cuttings, and other plant parts. Plant propagation can also refer to the man-made or natural dispersal of seeds.

Much of your propagation may be done indoors (greenhouse, polytunnel, potting shed, south facing windowsill) or undercover outdoors (under fleece, bell cloche or tunnel cloche, or cold frames).

Putting some time into planning your propagation can ensure

you are not producing gluts (too much of a crop that needs harvested at one time), provides back up if you have poor germination or if seedlings suffer damping off (a disease or condition, caused by several different pathogens that kill or weaken seeds or seedlings before or after they germinate. It occurs most commonly in wet and cool conditions) and allows successional (or succession or successive) planting.

This can also be known as a catch crop which is a quick maturing crop that can be planted between the harvesting of one crop and the maturation of another or in a piece of land lying empty or where a crop has failed.

Successional planting is a way to extend your harvest by staggering plantings of crops or planting varieties with staggered maturing dates. There are four methods of succession planting.

### **Successional Sowing/Planting**

Some crops, such as peas, have short growing seasons and the space they were using can be replanted with a later season crop, like swiss chard. The best vegetables for succession plantings include: basil, beans (pole), beetroots, broccoli, carrots, chicory, cilantro, dill, endive, green onions, kale, kohlrabi, lettuce, mustard, bok choy, radish, rutabaga, spinach, swiss chard, and turnips.

### **Paired vegetables in the same spot**

Often you can seed the early season vegetable at the same time you are planting. Intercropping, or pairing up plants, is an excellent way to squeeze even more productivity from your plot.

### **Same Vegetable, Different Maturity Rates**

An easy way to keep your harvest coming in is to choose more than one variety of a crop and make them early-, mid-, and late-season varieties. Sometimes the seed packet will be labelled as such, and sometimes you will just have to read the “days to maturity” number. Vegetables to sow with different maturity dates include beans (pole), broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celeriac/celery, collards, corn, kale, peas, squash, and tomatoes

### **Same Vegetable, Staggered Plantings**

Space out plantings of the same vegetable every two to four weeks. Many vegetables fade after producing their initial crop, setting a heavy yield initially, then smaller and smaller yields throughout the summer. Rather than planting your entire row of beans all at once and having feast or famine, you can plant part of the row at the beginning of the season and then plant more in about two to four weeks. A new crop will be continually coming in. As the first plants start to flag, you can replant that area with beans or use it for a different crop.

### **Tips for Successful Succession Planting**

Make sure you have enough seed to get you through the season.

Add some compost or leaf mould to the beds, between plantings, to keep the soil rich.

Don't hesitate to pull out vegetables past their prime. Use them while they are at their best and then use the space for something else.

[www.thespruce.com/succession-planting-1403366](http://www.thespruce.com/succession-planting-1403366)  
(acknowledgement)

### **Seed Sowing**

Now we have covered ideas around planning and succession, we should really return to sowing seed for germination (the process of a seed starting to grow, or the act of causing a seed to start growing).

Due to climatic conditions in Scotland, most of our sowing will be carried out indoors to encourage germination before thinning out (The act of thinning out seedlings produces healthier plants and higher yields by allowing room for proper growth. It also reduces competition for water and nutrients from nearby plants. It allows for good air circulation between plants leading to stronger healthier plants) and pricking out (A technique of

moving seedlings from where they germinated and spacing them in pots or trays) and potting on (A technique of moving a plant in a small pot/modular seed tray into a larger pot to encourage stronger roots) before hardening off (the act of moving plants outdoors for specific lengths of time so they become acclimatised to the sunlight, temperature, dry air, and colder nights) at later date.

and finally transplanting ( the act of transferring the plant from a pot to the soil) into final positions in the plot. Try and ensure your transplanting is carried out on dry day with light or no winds as the plant will suffer shock from transplanting. Make sure that you water you plant in well after transplanting to minimise the risk of shock.

Most small seeds can be started in a seed tray with bigger seeds starting in a modular plug tray. Always sow your seeds specifically in a seed compost which has a fine grade and contains few nutrients which could damage the seed in a higher concentration. Very small seeds can be mixed with a fine sand and scattered over a seed tray.

As a general rule of thumb, seeds should be planted to twice the depth of the size of the seed e.g. if a seed is 5mm it should be planted in a drill (trench in seed tray, or soil for planting seeds) 10mm deep and backfilled with growing

medium.

Using a cold frame is ideal for hardening off plants as long as the lid is open during the day. It also frees up space in your greenhouse, potting shed or polytunnel for later cropping seeds to be started off. Some seeds are even happy to germinate in a cold frame as it provides a warmer environment than if you were to sow directly into soil. This can allow you a head start and have vigorous young plants ready to be planted when the soil warms up.

Greenhouses, potting sheds, polytunnels and south facing windows are also ideal for starting off seeds due to a higher and more consistent ambient temperature than outdoors. Ensure that there is good air flow within these structures though and they do not become too humid as this can hasten damping off.

All seeds have enough energy reserves to germinate and put up seed leaves which will then use photosynthesis (Photosynthesis is a process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the plants growth) to produce its own energy for growth.

The following link provides more information around seed sowing:

[www.rhs.org.uk/advice/profile?pid=501](http://www.rhs.org.uk/advice/profile?pid=501)

Some growers do not like the number of seedlings lost at the thinning out stage however unless the seedlings are diseased, they should be turned into compost and fed back into your plot. Thinning out also allows the other seedlings to go on and thrive. Overcrowded seedlings do not make for the best plants.

Even if you thin out, you can still find yourself with too many plants ( perhaps you had better germination rates than anticipated or you sowed just a little extra seed, just in case) which isn't always a bad thing. You could swap with a neighbouring grower for varieties or crops you have not sown, give them to friends and family to encourage them to grow their own or failing that, they can be turned back into compost too.

Some growers will grow a percentage of their crops and allow them to run to seed which they harvest and get ready for the following seasons or swap with other growers. Many seeds available from major seed suppliers are what are termed F1 hybrid varieties which means it has been selected from specific traits

however F1 plants generally do not produce seeds that are open pollinated and therefore are not viable i.e. they are not capable of producing plants.

Some growers avoid these entirely and prefer heritage (sometimes known as heirloom) varieties of seed as they feel they have a better taste, are more nutritious. If you save seed, you can select seed strains over several years that perform well within your plot and have adapted to your local pests and diseases, they are less uniform than hybrids which means they won't all ripen at once, they can be less expensive than hybrids (free if you save seed after your initial purchase) and finally some growers choose heritage varieties due to the stories and history associated with them connecting them to growers from long ago.

Again, there is plenty of discussion around whether you chose an open pollinated heritage variety which will provide viable seed or whether you prefer the uniformity of an F1 hybrid seed. The choice will be entirely up to you.

Now you've read about seed sowing, it can be helpful to improve your technique by learning from other growers, or alternatively there are plenty of on-line videos that will show you how. Type "vegetable seed sowing videos" into your browser and you will be overwhelmed with choice.

Further specific information around growing vegetables, fruits and herbs can be found at the following link:

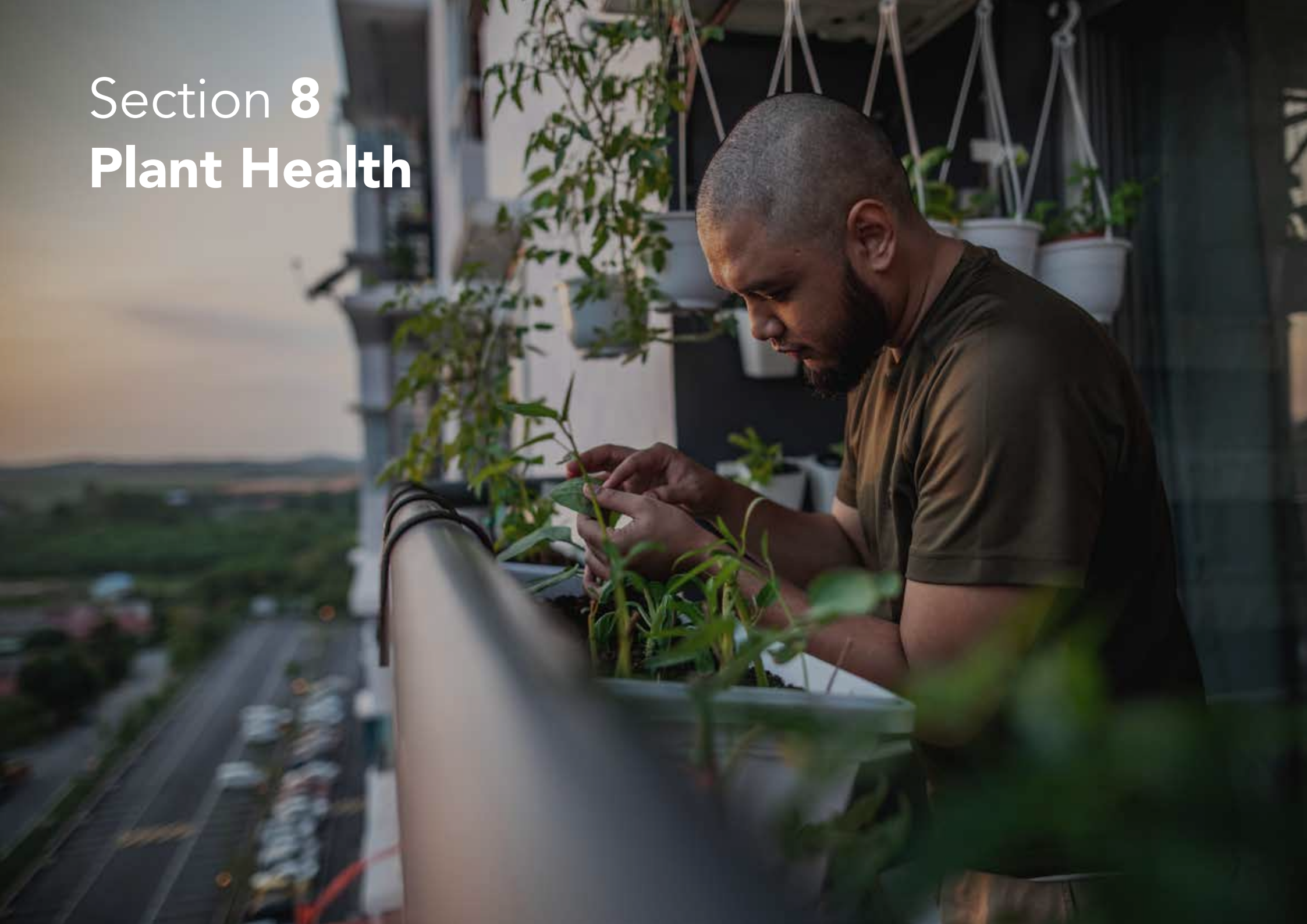
[www.rhs.org.uk/advice/grow-your-own](http://www.rhs.org.uk/advice/grow-your-own)

### **Glasgow Allotment Forum's Potato Day**

Glasgow Allotment Forum's Potato Day is an integral date within Glasgow's growing calendar attended by many growers from across the City and beyond. On the day you will be able to make purchases from around 50 varieties of seed potato. There are also seed swaps, workshops and opportunities to share knowledge and learn from each other. It is normally held in mid-February and is open to all.

# Section 8

## Plant Health



## Plant Health

We intend to cover plant health in the following section and an important part of this is knowing what you are growing and what is growing without you planting it otherwise known as a weed. As with all things in horticulture there is much debate around this subject too. The simplest definition of a weed is “the wrong plant, in the wrong place, at the wrong time.” So, as you can see there is plenty of scope for discussion around this subject alone.

The aim of this guide is to provide you with information to encourage you to make informed choices around what you grow. Correctly identifying weeds is essential as to the novice’s eye it can be difficult to tell a weed from an emerging seedling.

## Weed Identification

The following link will be useful in helping to identify weeds and how to deal with them: [www.rhs.org.uk/advice/Common-Weeds](http://www.rhs.org.uk/advice/Common-Weeds)

Please note any instances of Japanese Knotweed or Giant Hogweed on Glasgow City Council plots should be reported immediately to Glasgow City Council at [land@glasgow.gov.uk](mailto:land@glasgow.gov.uk) or at by using the “Get in touch” option at the following link: <https://glasgow.gov.uk/article/19432/Japanese-Knotweed>

We have also included the note below which might be useful too.

The Gardening Year in Weeds:

- **January:** dandelions, docks and creeping buttercup grip the soggy soil waiting for better weather. These dandelions are some of the first spring flowers and a good food source for emerging bees. Just pick the flowers off before they go to seed
- **February:** Bright yellow Coltsfoot flowers may appear and fade before the leaves emerge. Keep removing perennial weeds and their roots.
- **March / April:** Young shoots of nettles, ground elder and mustard garlic have a place in the kitchen, before you dig them out! The soil reservoir of seeds start to germinate as the soil warms up; time to prepare seed beds for your own crops
- **May:** Horsetail makes its appearance from long, deep underground ‘boot-lace’ rhizomatous stems. It doesn’t like well nourished and well cultivated soil neither does it like constant picking; so keep it from building up photosynthesised stores!
- **June:** Bindweed will have entwined itself up any innocent stem towards the sun and will then produce its daily white trumpet flowers. Free your plants of this stranglehold, tracing the stems back to the white fleshy roots: remove all.

- **July:** burrs of Cleavers (Sticky Willie) sticking to your clothes is a late reminder to remove as much of this fast smothering annual as possible before the seeds ripen.
- **August:** Dock seed heads if left to ripen will typically populate your and your neighbours plots with a further 60,000 plants! Probably best removed ASAP for world peace
- **September:** Left unchecked, Chickweed soon forms a carpet over beds which is both edible and a useful winter covering for the soil; but catch it before it seeds in early Spring
- **October:** The last of the hangers on are still visible. It's a good time to remove couch grass root. A therapeutic exercise chasing the root to its end in one piece – very satisfying! The roots of all perennial weeds can be 'drowned' before composting; the water is great on fruit trees and bushes.
- **November/ December:** A covering of annual weeds (though green manure is better) can provide useful protection to otherwise bare soil from winter wind and rain. Add them to the compost bin in early spring.

### Non-chemical (Cultural) Control Methods

For growers who wish to grow organically, non-chemical or cultural control methods will be required to manage your plot without using chemicals. We will start with weed control, but cultural controls can apply to pest and disease management also

which we'll come to later in this section.

Cultural control methods for weeds include the following:

- Manual removal and cutting back
- Hoeing
- Hand pulling or hand weeding with a fork
- Weeding knife
- Repeated cutting back
- Flame gun

Weed barriers

- Mulching
- Edging boards or strips
- Root barriers

### And weed suppressant fabrics

Such cultural controls will not be a one-off fix and will need repeated as weeds grow. Further information on cultural controls for weeds can be found at the following link:

[www.rhs.org.uk/Advice/profile?pid=343](http://www.rhs.org.uk/Advice/profile?pid=343)

### Pests and Diseases

Pests and disease can destroy your enjoyment of growing (and the food you are growing) and should be dealt with as soon as they are identified. They could also take a full handbook



by themselves so we will start with the basics here and recommend you do some further reading in future.

When it comes to dealing with pests and diseases, prevention is better. Curing an infestation or dealing with a disease can be much more complicated than preventing them in the first place.

Maintaining clean tools and a tidy plot and growing robust healthy plants are vital in reducing opportunities pests and disease have to feed on or attack your crops. Fewer chemical controls are available for pest and disease management as concerns for the natural environment rise, so it is important to know what cultural control methods can be applied.

Good housekeeping (yes, again with the housekeeping!) is one of the most effective ways of keeping pests and diseases to a minimum.

Simple steps such as plant selection, good garden hygiene, applying good cultural controls and encouraging natural predators are a must do.

### **Cultural Controls for Pests and Disease.**

- The right plant, in the right place. Give a plant a good environment and it will flourish and be more resistant to pest and disease.
- Select varieties with tolerance or resistance to pests and disease. The potato variety "Charlotte" fends off slugs. Others are resistant to blight.
- If purchasing plug plants, ensure they are healthy before buying.
- Test your soil using a pH and nutrient test kit. This should be done annually in a vegetable plot and any missing nutrients added to the soil.
- Plant well, ensure you break up the bottom of any planting holes and tease out the roots of the plant going into it. Mycorrhizal fungi can be added to planting holes to help establish new plants.
- Plant well. Spacing properly between your crops will ensure good air flow and let you in to weed as required.
- Mulch. This will lessen stress on plants and suppress weeds which can be a gateway for disease.
- Look after plants well by giving them the correct amount of water they need.
- Be vigilant. Keep an eye out for signs of pest activity or disease. Slugs are a massive issue in the West of Scotland as they like damp conditions; be prepared to remove

them by hand (gloves on, of course) and deal with them.

- Act quickly. Nip it in the bud, remove mouldy leaves, if you see aphids wash them off with a hose.
- Garden hygiene. Don't allow clutter to build up. Cut out diseased parts of plants. Dispose of dead and diseased plant material properly, dry it out and burn it if permitted. If not take it to the recycling centres referred to earlier.
- Garden hygiene. Reduce disease potential in gutters, potting benches, greenhouses, pruning knives, water butts, tools, pots and seed trays by ensuring they are kept clean and disinfected when not in use.
- Garden hygiene – Keep yourself and your boots clean. It's amazing what a muddy boot can pick up and transfer all over your plot. Your clothes can also be a safe haven for some pests and spores.
- Keep an eye on the weather forecast. Dull damp days in summer are ideal for the spread of airborne fungal diseases.
- Practice Crop Rotation which will save a build up of pests and disease in the soil.
- Keep your soil as healthy as possible. Healthy soils promote healthy plants. Healthy plants are more tolerant of pests and disease. Using mulches like willow bark can add "natural tonics" such as salicylic acid into the soil.
- Use Barriers. You may wish to protect fruit trees and bushes by netting them. If you do, please ensure they are checked

regularly for any birds or animals which may have become entangled in them. Felt disks around the base of brassicas can prevent club root and grease bands around fruit tree trunks can deter egg laying by moths for example.

- Use companion planting. (The close planting of different plants that enhance each other's growth or help protect from pests and diseases.) Further information on companion planting can be found at the following link:  
[www.organicgarden.org.uk/gardening/gardening/companion-planting/](http://www.organicgarden.org.uk/gardening/gardening/companion-planting/)
- Encourage beneficial insects which prey on pests such as hoverflies.
- In controlled environments such as greenhouses or polytunnels the use of pheromone traps is useful in preventing infestations.

**Other organic cultural control methods can also be incorporated into your practice.**

- Insecticides derived from natural materials and natural oils and soaps are gaining popularity compared to synthetic chemical products. While better they can still cause damage to non-target species such as the
- beneficial insects mentioned earlier.
- Some gardeners use garlic oils and chilli oil in solutions to deter pests

- Green manures when worked into the soil can increase beneficial microbes when breaking down in the soil.
- Certain brassicas such as mustard can act like a bio fumigant releasing natural occurring toxins which target certain nematodes in the soil.

This list is not exhaustive and further information on cultural controls for pests and diseases can be found at the following links:

[www.rhs.org.uk/advice/profile?pid=1021](http://www.rhs.org.uk/advice/profile?pid=1021)

and here: [www.rhs.org.uk/advice/profile?pid=1023](http://www.rhs.org.uk/advice/profile?pid=1023)

### **Chemical Controls**

For those comfortable with using chemical controls and where their use it is permitted, you have a responsibility to read the label of the product you intend to use. Always do this before uses!!

Labelling regulations on chemical controls such as weed killers, fungicides, insecticides etc are strictly controlled and contain specific information that must be adhered to when being used. It is illegal not to follow the instruction on the label!!

Further information on chemical control labelling can be found at the following links and should be read and adhered to:

[www.rhs.org.uk/advice/profile?pid=309](http://www.rhs.org.uk/advice/profile?pid=309)

[www.rhs.org.uk/advice/profile?pid=409](http://www.rhs.org.uk/advice/profile?pid=409)

### **Nutrition and Feeding**

Like any other living organism, plants require to take in nutrients to stay healthy. Much of the nutrients a plant requires will be drawn from its surrounding environment. When a plant is not thriving despite your efforts in preparing the soil correctly, watering and mulching, it can be a sign that the soil or compost is lacking in nutrients. Other factors such as waterlogged soil, very dry soil, the soil being too alkaline or acidic can also affect a plant's ability to take up nutrients from the soil.

Fruit and vegetables can be particularly susceptible to all of the above and so you will need an understanding of how nutrient deficiencies occur, what this looks like in a plant and how to rectify it.

In horticulture we speak about macronutrients and micronutrients which simply means plants need large amounts of macronutrients and small amounts of micronutrients. These are essentially minerals that the plant requires to maintain healthy growth, produce flowers, fruits and seeds and maintain healthy root and shoot growth.

Macronutrients are:

- Nitrogen (N) which promotes green leafy growth
- Potassium (K) which controls water uptake by the plant and photosynthesis, It is also required for flowering, fruiting and general hardiness.
- Phosphorous (P) which is required for healthy root and shoot growth. While rare in soil it can occur in heavy clay soils and areas with high rainfall.

Micronutrients are:

- Magnesium (Mg)
- Manganese (Mn) and Iron (Fe)
- Molybdenum (Mo)
- Boron (B)
- Calcium (Ca)

See the table below for information on symptoms and remedies

### **Biodiversity**

Biodiversity is described as “ the variety of living things on Earth, from the smallest insect to the largest mammal and tree. It encompasses the variation within a species and the complex ecosystems, or habitats, where they are found. It is not just restricted to rare species or threatened wildlife sites,

but includes the whole of the natural world” in Glasgow’s Local Biodiversity Action Plan

A plot can reflect this variety of living things; in fact, it could be argued the more biodiverse a plot is, then the healthier the plot is, and following this, the produce it provides will be healthier than produce grown in an environment of limited biodiversity.

Maintaining a plot is an opportunity to improve the biodiversity of an environment and many growers try to grow in a wildlife friendly manner. This has been recognised in Glasgow for several years and led to Glasgow City Council’s Biodiversity and Conservation team working with Glasgow Allotment Forum to co-produce a “Biodiversity on Allotments” handbook which can be viewed at the following link:

[www.glasgow.gov.uk/CHttpHandler.ashx?id=31684andp=0](http://www.glasgow.gov.uk/CHttpHandler.ashx?id=31684andp=0)

It contains useful information on how to grow in a manner that provides benefit for many species not just us humans and should form part of your further reading.

Deficient in	Symptoms	Remedy
<b>Nitrogen</b>	Spindly yellow plants or yellow leaves, sometimes with pink tints.	In the long term, mulching with organic matter (such as well rotted garden compost or manure) provides a steady trickle of nitrogen to stabilise levels. In the short term, applying high nitrogen fertilisers such as sulphate of ammonia or poultry manure pellets will remedy the problem.
<b>Potassium</b>	Yellow or purple leaf-tints with browning at the leaf edge and poor flowering or fruiting.	Apply high potassium fertilisers such as sulphate of potash, tomato feed or certain organic potassium sources derived from sugar beet processing
<b>Phosphorous</b>	Slow growth and dull yellow foliage	Apply fertilisers such as superphosphate or bone meal.
<b>Magnesium</b>	Yellowing between the leaf veins, sometimes with reddish brown tints and early leaf fall.	In the short term, apply Epsom salts as a foliar feed in summer. Dilute the salts at a rate of 20g of Epsom salts per litre of water (1/3oz per pint) plus a few drops of liquid detergent. Apply two or three times at fortnightly intervals, spraying in dull weather to avoid leaf scorch. In the long term apply to the soil around the roots either Dolomite limestone (calcium- magnesium carbonate) at 100g per sq m (4oz per sq yd) or Epsom salts (magnesium sulphate) at 30g per sq m (1oz per sq yd)
<b>Manganese and Iron</b>	Yellowing between the leaf veins with browning of leaf edges on acid-loving plants	Apply chelated iron and manganese treatments, such as Sequestrene, to the soil around the plant roots.
<b>Molybdenum</b>	Elongated twisted leaves on cauliflowers or other brassicas growing in alkaline soil.	Liming the soil will help in the long term, as making the soil more alkaline will help to make the molybdenum more available.
<b>Boron</b>	Stunted growth and tip dieback on lettuce, brown cracks in celery; rotten swedes, turnips and celeriac; dimples in pears with brown patches underneath.	Applying borax (disodium tetraborate) to the soil before sowing vegetables or as a foliar spray feed applied to pear trees. Soil application rates for borax are: 35g per 20 sq m (1oz per 20 sq yd). Mix well with a large quantity of light sand before spreading so that the chemical is evenly distributed. Foliar spray application rates for borax are: 70g borax in 22-litres water (2½oz in 5 gallons), plus a few drops of detergent to act as a wetting agent, sprayed at petal fall.
<b>Calcium</b>	New growth at the leaf tips and margins begins to wither and die back, and the new leaves are often deformed. Appears as blossom end rot on tomatoes and peppers and oval spots leading to cavities in carrots and as browning in brassicas	Liming the soil and adding organic matter will help make calcium available to the plant.

## Section 9

# Harvesting and Storing



## Harvesting and Storing

By now you should have enough basic information to begin growing with the aim of harvesting your own produce. In this section we provide information on not only harvesting but also what to do after you have harvested your produce.

While growing is a pleasure in and of itself, it might be a bit strange if we didn't intend to use the produce for anything when harvested. Yes, we know the obvious and ultimate answer is to eat it but what happens when you have more tomatoes than you can eat? Or bucket loads of beetroot? Or if you can't face the sight of another strawberry, far less eat one... well for a month or two at least?

Come the long dark days of January when you're sitting with a cuppa and planning your plot for the coming year and rifling through seed catalogues or trawling websites for that new variety that will excite you (and make you neighbours just a bit envious) wouldn't it be excellent just to spread a thick dollop of your own homemade blackcurrant jam on top of your scone to compliment that cuppa?

With a plot, no matter how well you manage it, you will have times of glut and times when fresh produce is thin on the ground. The secret is ensuring you get the best from your produce for the longest time.

If this sounds like your kind of thing then read on.

## Harvesting

How do you know when it is time to harvest?

This will be influenced by local climate however, remember that calendar and your seed packets and your notebooks? They will all provide a guide to how long the plant takes to be ready to harvest from the time it was planted, and the rest will be down to your observations.

As the time approaches you can test one or two individual to check for if they are ready; too soon and the flavour may not have fully developed and too late and the crop might be a bit soft, or woody and will not have the same storage qualities.

Windfall (fruit falling from trees) is usually an indication that the crop is ready for harvesting but use your own sense and observations too as not everything will be this obvious.

## How do you harvest?

That will be dependent on the crop you are harvesting, from twisting an apple stalk of a tree, to gently unearthing your potatoes or root crops with a fork, there are a multitude of techniques. This is another subject that could fill its own handbook and once again we would direct you to many of the instructional videos available on the internet.

Again, take care when harvesting, being gentle in your treatment of your crops will improve their storage potential if this is what you intend to do with them. Ensure you loosen the soil before lifting crops and return any excess soil from the crop to the bed it has been lifted from. It's far too precious to be haphazard with.

### **Storage**

When harvested, storing fruits and vegetables will provide produce long into the winter where done well. As you might expect different fruit and vegetables require to be stored differently. The following link provides information to some excellent information on storing your crops:

[www.gardenorganic.org.uk/harvesting-and-storage](http://www.gardenorganic.org.uk/harvesting-and-storage)

There are other ways to process fruit and vegetables when harvested that will also extend the time you will have to eat them. Pickling, preserving, dehydrating, freezing and fermenting different fruit and vegetables will provide nutrients and beneficial bacteria in your diet long after they have been harvested.

We've provided links the above-mentioned techniques for further information on these techniques

[www.gardeningchannel.com/top-pickling-recipes-homegrown-fruit-vegetables/](http://www.gardeningchannel.com/top-pickling-recipes-homegrown-fruit-vegetables/)

[www.growveg.co.uk/guides/storing-and-preserving-your-garden-harvest/](http://www.growveg.co.uk/guides/storing-and-preserving-your-garden-harvest/)

[www.rhs.org.uk/advice/profile?PID=666](http://www.rhs.org.uk/advice/profile?PID=666)

Another way to preserve you crops is to keep them in a clamp. This is a relatively old technique on which further information can be found at this link:

[www.1900s.org.uk/1900s-storing-root-veg.htm](http://www.1900s.org.uk/1900s-storing-root-veg.htm)

### **Microgreens**

Another area we wish to look at in relation to extending the time you have produce available to you is the area of microgreens which are the shoots of salad vegetables such as rocket, celery, beetroot, etc., picked just after the first leaves have developed. They may only contain a stem, seed leaves and the first true leaves of a plant when harvested. They are nutritious and quick to grow.

As lighting technology has progressed these easy to grow, almost effortless young plants can now be grown indoors at not much expense. They are popular with "foodies" and many chefs would be loath to send a plate out without some of these as a garnish.

Further information on growing microgreens and there proposed



health benefits can be found here: [www.healthline.com/nutrition/microgreens#bottom-line](http://www.healthline.com/nutrition/microgreens#bottom-line)

Whilst not usually preserved but rather eaten fresh, edible flowers are an increasing popular addition to many meals. You may be surprised by how many flowers are edible and they can enhance meals with colour and taste.

Here is some useful information on edible flowers:  
[www.gardenorganic.org.uk/joy-edible-flowers](http://www.gardenorganic.org.uk/joy-edible-flowers)

### **Seed Saving/ Storing/ Swapping**

Back in Section 6 we briefly covered seed saving as part of your growing plan and will now take the opportunity to look at this in a little more detail.

While seed saving is far from a new practice, many growers are increasingly practicing saving seed. Whether this arises from concerns around the decreasing diversity of seed available from seed suppliers and the increase of hybrid seeds which may not provide viable seed, or whether they prefer the characteristics of specific seed they wish to propagate in future years, or if this practice is driven to ensure future growers have diversity of choice available to them, one response to this by growers in Glasgow is to have set up its own seed library

Glasgow Seed Library (a depository of seeds held in trust for the public) is hosted by the Centre for Contemporary Arts (CCA) on Sauchiehall St. Further information on this can be found here:  
[www.cca-glasgow.com/about-cca/glasgow-seed-library](http://www.cca-glasgow.com/about-cca/glasgow-seed-library)

Within the library you will also find books and information on seed libraries and growing, as well as books exploring ecology, food and environmental politics.

If seed saving is a practice you are keen on developing skills in, we have included a useful guide which Garden Organic have developed and which can be accessed at the following link:  
[www.gardenorganic.org.uk/seed-saving-guidelines?gclid=EAIaIQobChMI7sOd5LGy5QIVk0PTCh1ooQMUEAAYASAAEgLzEvD\\_BwE](http://www.gardenorganic.org.uk/seed-saving-guidelines?gclid=EAIaIQobChMI7sOd5LGy5QIVk0PTCh1ooQMUEAAYASAAEgLzEvD_BwE)

Harvest

Storage - Dry/Jams/Pickle/Fermentation/Bunds

Catch Crops/Micro Greens

Seed Saving/Storage/ Swapping

[www.gardenorganic.org.uk/seed-saving-guidelines?gclid=EAIaIQobChMI7sOd5LGy5QIVk0PTCh1ooQMUEAAYASAAEgLzEvD\\_BwE](http://www.gardenorganic.org.uk/seed-saving-guidelines?gclid=EAIaIQobChMI7sOd5LGy5QIVk0PTCh1ooQMUEAAYASAAEgLzEvD_BwE)

## Glossary

Ensure any materials include in the handbook is written for the audience.  
Include anecdotes

My Allotment year 1  
Plot 1 Path Plot 2 Path Plot 3 Path  
Plot 4

Compost heaps  
Cold frames  
Glasshouse  
Shed  
Water butt/Stand pipe

Long term vegetables and glasshouse crops

For example:-

Rhubarb  
Asparagus

Tomatoes  
Peppers  
Aubergines  
Fruit Plot

Top fruit/Stone fruit

Path

Soft Fruit

Site

Name

Aspect:-

## My Fruit and Vegetable Allotment

Tool list:

### Vegetables

- Spade
- Fork
- Iron rake
- Draw hoe
- Dutch hoe
- Garden line
- Trowel
- Dibber
- Wheel barrow
- Brush and shovel
- Watering can with rose

## Fruit (In addition to above)

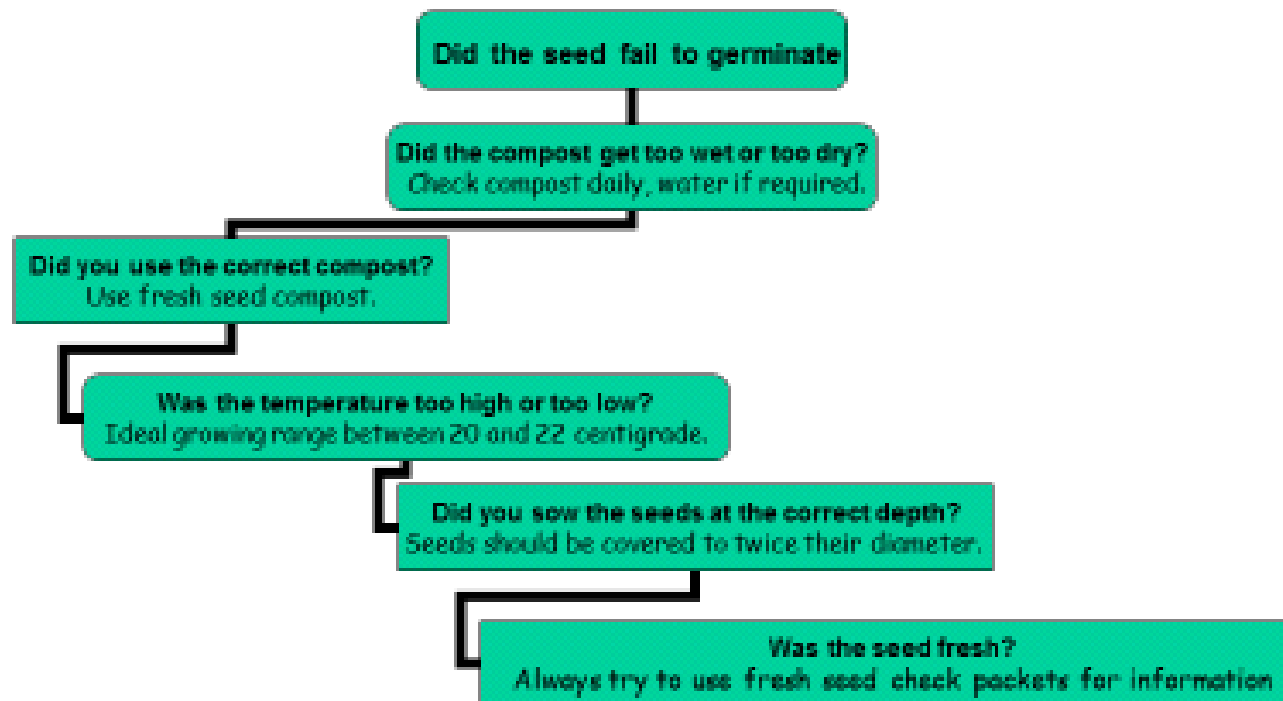
- Secateurs
- Loppers
- Pruning saw
- Garden knife
- Garden twine

## Sundries

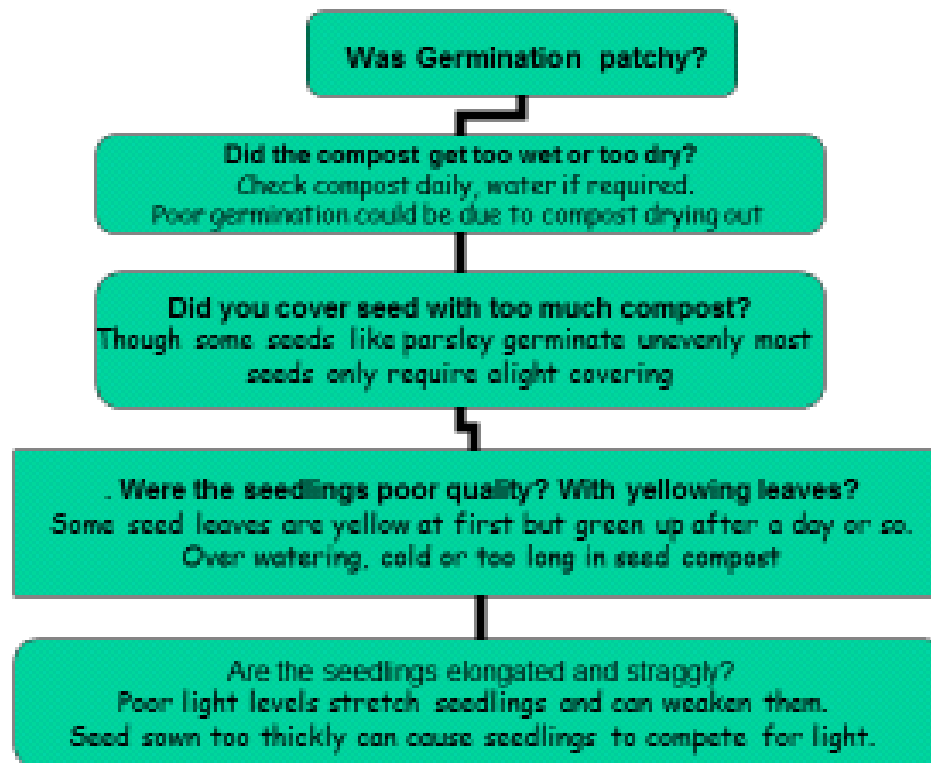
- Fruit net
- Fertilizer
- Compost (seed, potting, grow bags, etc)
- Propagator
- Pots seed trays
- Labels and pens
- Cloche
- Canes
- Note book (good record keeping essential for planning stage)

Please note: A good pair of gardening gloves, outdoor clothing and sturdy pair of boots is recommended. Eye protection is also advised when working around fruit trees and bamboo canes.

## Indoor seed sowing problem solving: Seeds



## Indoor seed sowing problem solving: Germination





information contact department...

## Indoor seed sowing problem solving: Germination continued

