



GROWER'S TOOLKIT



Brought to you by the
VEGETABLE ACADEMY

INTRODUCTION

There's no such thing as a green thumb.

The degree of success that you experience in your garden has nothing to do with your family lineage, educational background, or luck. Vegetables are logically functioning living organisms that will just do their best to perform in whatever conditions they are planted. It's your job as the gardener to give them the conditions they need to thrive.

This workbook is designed to accompany the mini lesson about our second major breakthrough in the free workshop. The exercises and resources introduced here will help you diagnose a few of the major pain points growers face and suggest some possible tools and methods to improve your vegetable game. Watch the video lesson for more guidance and examples on this subject.

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THE FIVE CORE VARIABLES

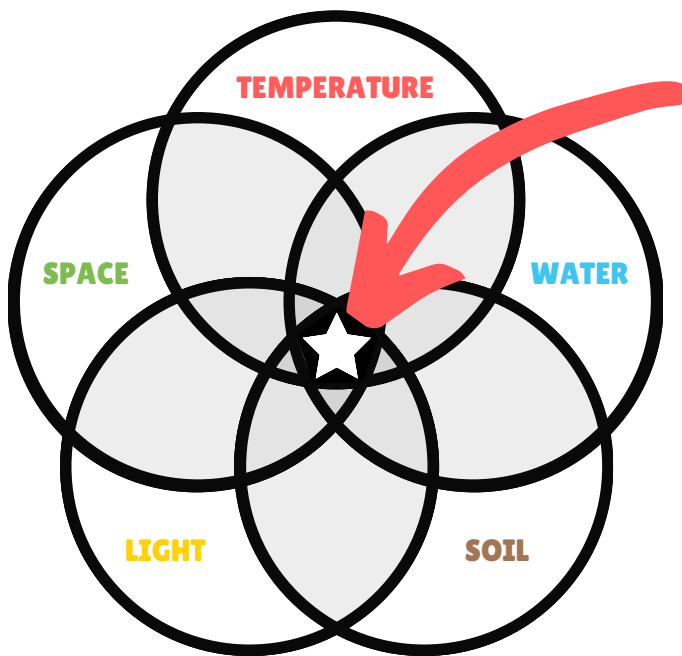
It's not about luck.

If you have ever found yourself blaming your success or failure in the garden on luck, you are not alone. It is common for our human minds to attribute seemingly random occurrences to luck, but vegetable growing is much more logical than a game of chance. Vegetables are actually quite predictable, and thank goodness they are! That makes them much easier to grow.



Despite their many unique qualities, plants all have certain needs that must be satisfied in order for them to perform at their best. The five variables that are most important to plants are **temperature, water, soil, light, and space**. A lot can go wrong in those five categories, so it should become obvious now that if you treat vegetable growing like a game of chance, your odds of winning are pretty slim.

Instead, look for ways that you can control these variables to create more ideal growing conditions.



SWEET SPOT

Every crop has a sweet spot in which it performs the best, and to find this sweet spot, each one of the 5 core variables must be addressed. If you ignore any one of these variables, you will likely create conditions that fall outside of the sweet spot and the performance of your crops will suffer as a result. The next few pages share strategies for controlling these five core variables in your indoor and outdoor spaces.

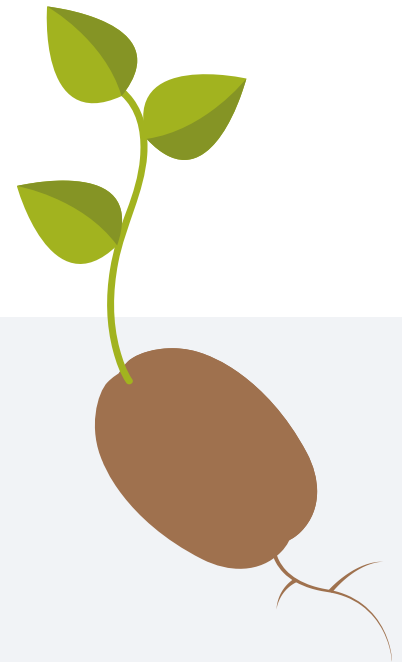
SUCCESS PATHWAYS

Approach every problem considering the five core variables.

Plants are amazing living organisms just like us, but sometimes it helps to think of them more like computers. Each plant variety simply operates its own set of algorithms to the best of its ability in the place where it was planted. The symptoms we see on the surface, such as wilting, discolouration, or stem elongation, are just the plant's adaptation to its current growing conditions, and these adaptations are logical.

Many common problems in the vegetable garden can be linked back to causes related to the **five core variables**. Once you start to understand the patterns of plant behaviour, you can better diagnose the symptoms you are seeing and fix the problems with changes to the temperature, water, light, soil, and/or space.

The next three pages guide you through the general troubleshooting process that we follow when things go wrong in our vegetable garden. For the purpose of this workbook, we'll focus our troubleshooting on the three common problem areas listed below.



①

SEED STARTING

②

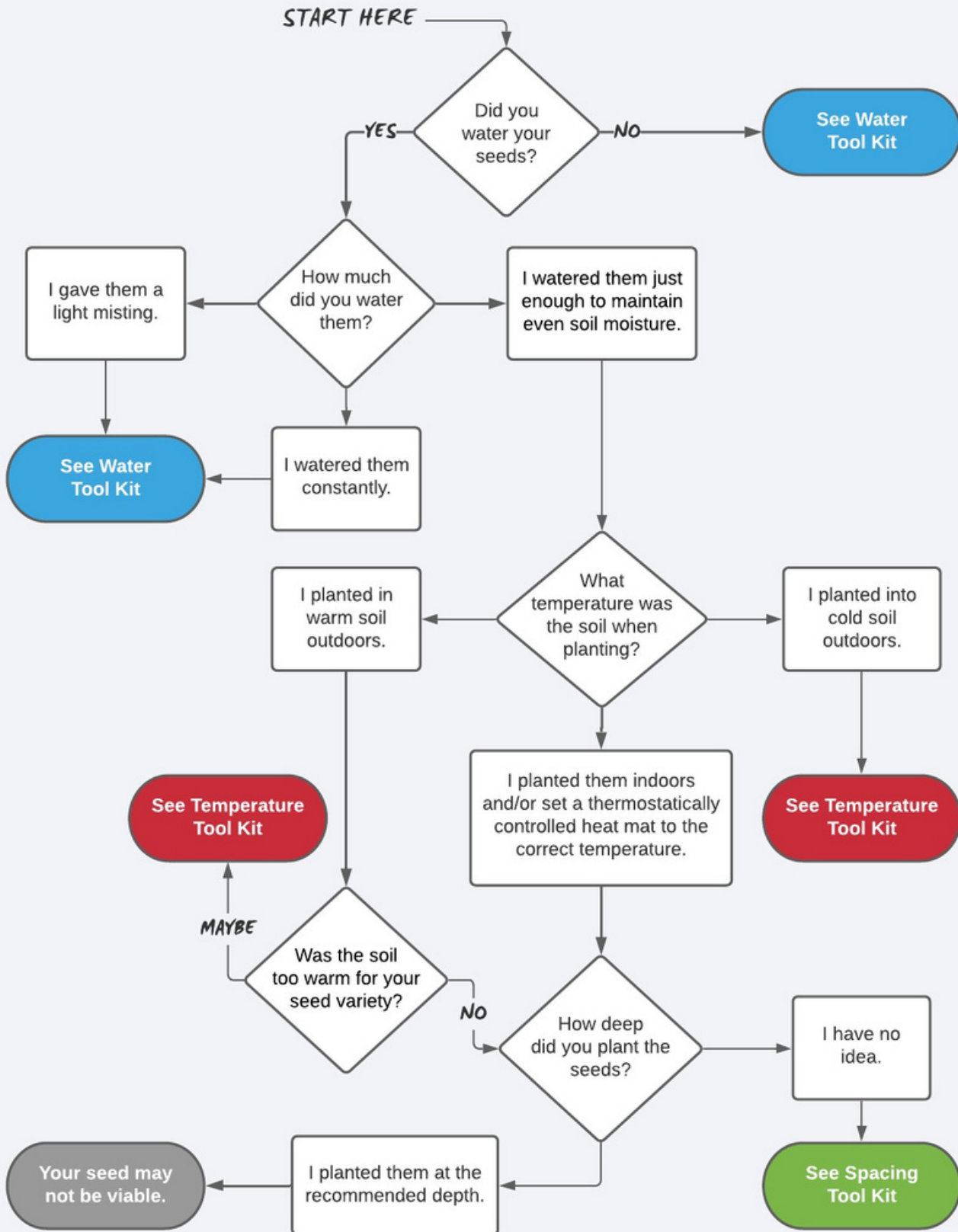
PLANT HEALTH

③

WEED MANAGEMENT

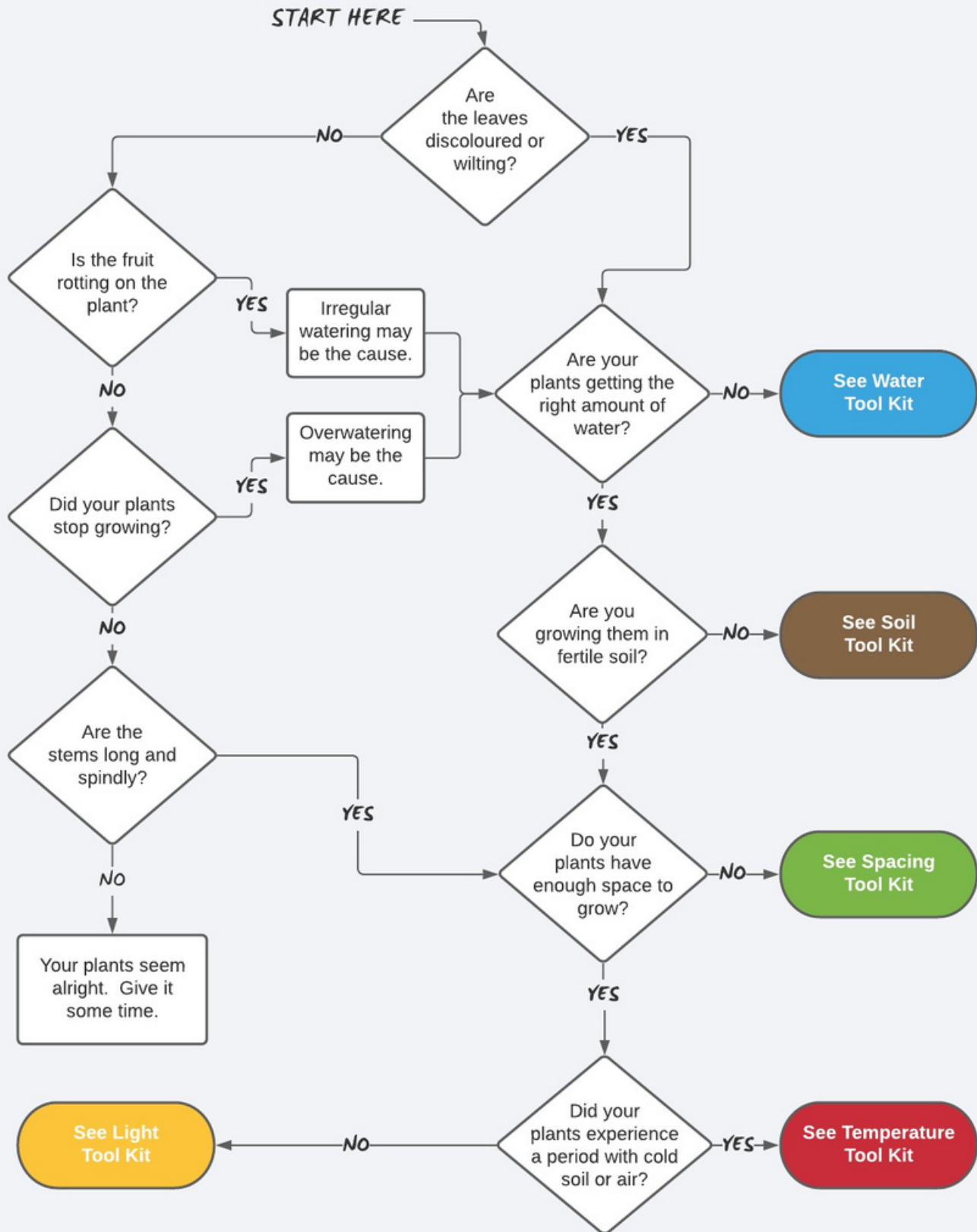
1

My seeds didn't come up!



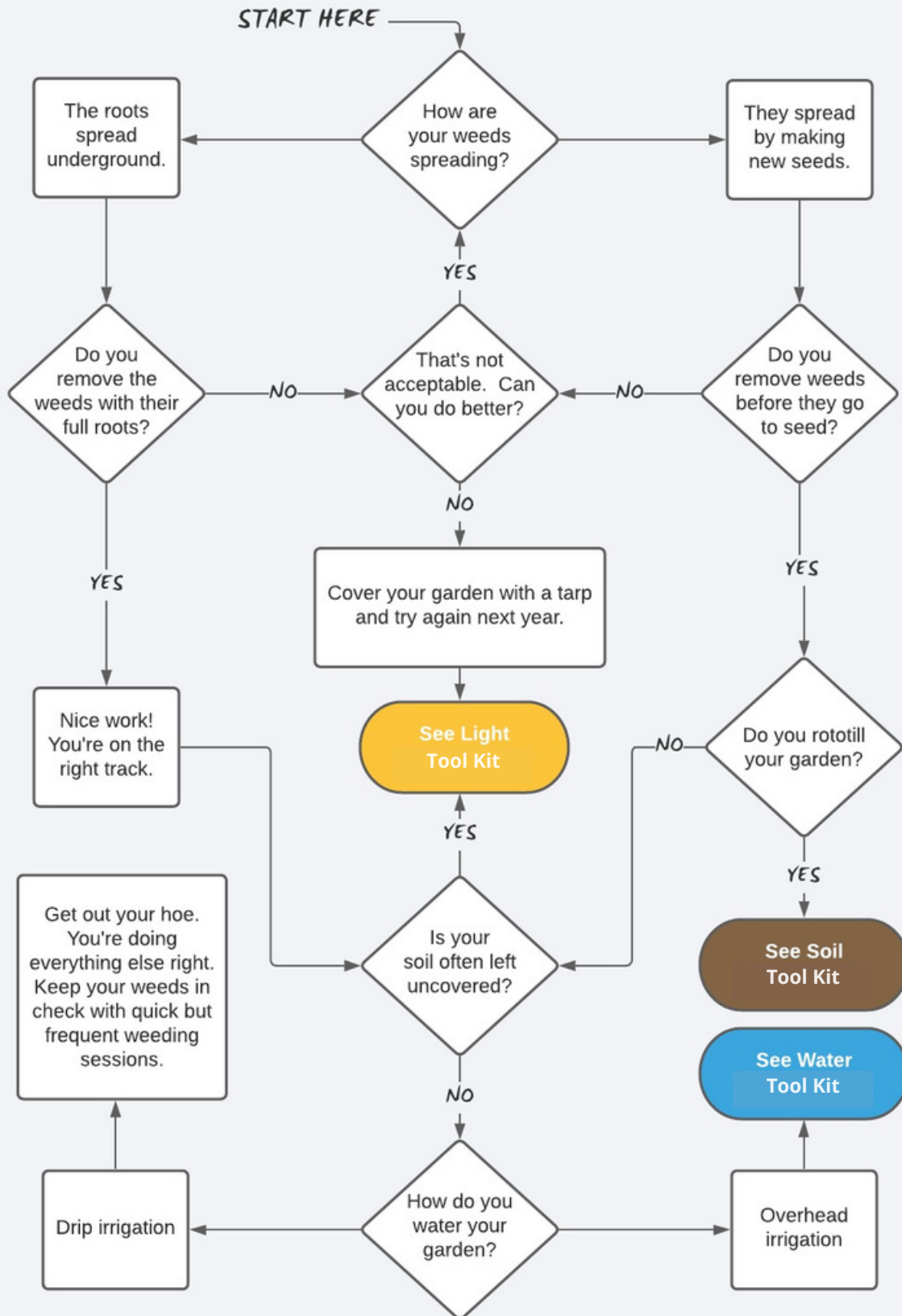
2

My plants don't look healthy!



3

There are weeds everywhere!



TEMPERATURE TOOL KIT

Temperature is the easiest variable to measure.

Remember that plants have to endure whatever temperatures come their way.

They can't throw on a sweater if it get's too cold or move into the shade on a hot day. If the temperature goes outside of their ideal range, they have no choice but to modify their growing strategy. That often doesn't end well for you.

Here are our top 5 tools for controlling temperature:

Thermometer

Temperature is the easiest variable to measure so don't make it a guessing game. Pick up a simple soil thermometer.

Thermostatically Controlled Heat Mat

This is absolutely wonderful for germinating seeds indoors or even in an outdoor nursery.

Floating Row Covers

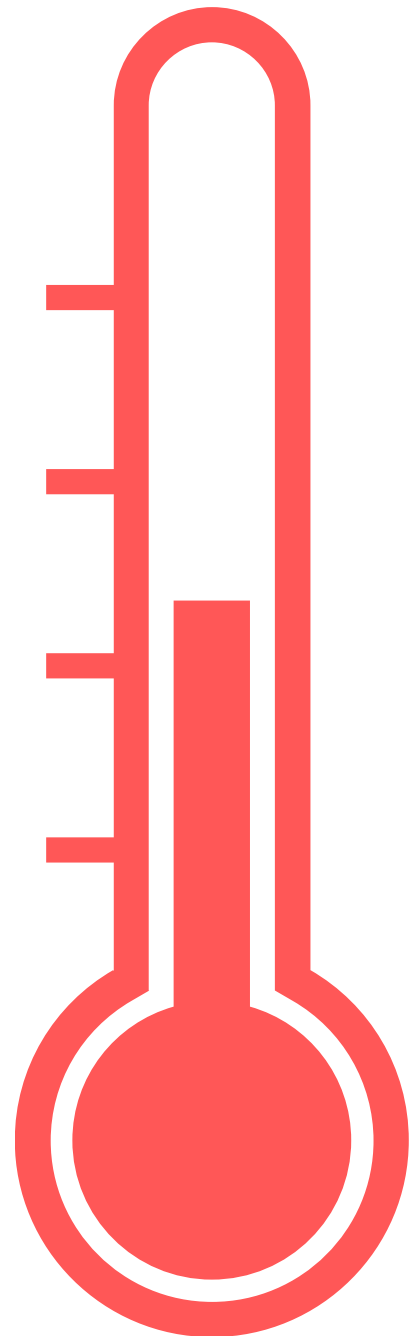
Plants can't throw on a sweater when it's chilly but you can. Breathable floating row covers can be left over a crop day and night enhancing the growing conditions at all times.

Germination Temperatures Table

This is my favourite table in our Classroom. It tells you the expected germination percentage at various temperatures so you can set your heat mat for the perfect temperature.

High and Low Tunnels

We can't change our climate, but a growing tunnel can create a microclimate that makes our zone 3 conditions a whole lot cozier.



SOIL TOOL KIT

Healthy soil is filled with living organisms.

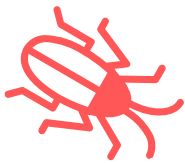
Thousands of different species are present in every teaspoon of soil and they all have a role to play in the growth of your plants. That means when you nourish the life in your soil, you nourish your plants as well. Since the living creatures in your soil require food, water, oxygen, and heat, many of the soil improvement measures listed here relate to influencing one of these variables. Investments made in soil building can be significant, but since they pay you back many times over during the life of your garden, this is usually the number one place to start if your vegetables are struggling.



Here are our top 5 tools for controlling soil:

Compost

This is the single best investment you can make in your soil. We top our beds with 1 to 2 inches of screened compost every season. Since the organic matter in compost holds 10 times its weight in water, it helps with our water control too.



Seed Starting Mix

We make a custom soilless mix for seed starting using natural slow release fertilizers that nourish the seedlings in the nursery and increase the soil fertility after transplanting.



Ground Covers

Uncovered soil is an invitation for weeds to grow. Nature doesn't leave soil uncovered and neither should you. As much as possible, cover your garden soil with plants, mulch, or synthetic covers such as landscape fabric and silage tarps.



Rototiller

This is a powerful tool that can accomplish a lot of earth moving in a short time. However, tilling also helps weeds to multiply and destroys soil aggregates leading to greater compaction, so till with caution.



Broadfork

This is our tool of choice for aerating compacted soil. A simple garden fork can accomplish the same task with a bit more time.



WATER TOOL KIT

Water is the lifeblood of your vegetable plants.

Plants are 90% water by weight and this water is essential for nutrient uptake and photosynthesis. Therefore, in most cases it would serve us all better to reach for the water tap before wandering through the local garden centre for more fertilizer.



Irregular watering adds unnecessary stress to a plant, leading to symptoms like disease, fruit rot, and germination trouble. While it is a top priority to provide water regularly, remember that more water is not necessarily better. Overwatering also causes plant stress by depriving plant roots of oxygen. Irrigation is a balance. Water deeply when you do water and allow the soil to dry in between so that it can breathe.

Here are our top 5 tools for controlling water conditions:

Water Timers

Irrigation is an important task to automate in the garden. Water timers make sure that our crops always get a drink of water when they need it.

Drip Irrigation

Drip lines deliver water straight to the soil where the plants need it most. Also, by keeping the water off of empty beds and pathways, weed growth is discouraged.

Micro Sprinklers

Direct seeded crops are very vulnerable to the drying effects of wind and sun. Our micro sprinklers maintain bed moisture during seed germination with their gentle and even water coverage.

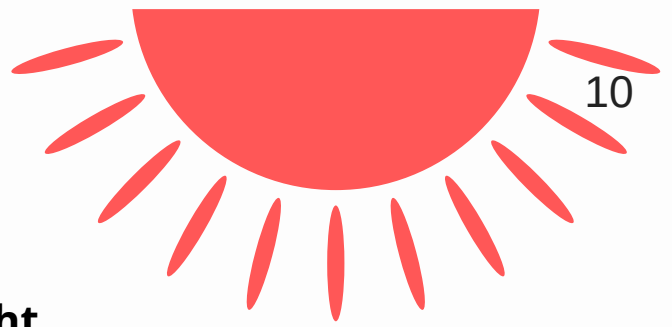
Breaker Nozzles

A breaker nozzle turns a forceful stream of water into gentle rainfall while still delivering a high volume of water. It's perfect for watering transplants in the nursery or giving beds a thorough soak after transplanting.

Sprayer Wand

The sprayer wand is our top pick for watering seed starts indoors. We run a hose to this wand for continuous output so it makes quick work of watering our many seedlings.

LIGHT TOOL KIT



Plants cannot function without light.

Light drives photosynthesis, the fundamental process plants use to convert carbon dioxide and water into carbohydrates. Therefore, adequate light is a nonnegotiable necessity for your vegetables. If you don't provide enough light, plant growth changes, slows down, or even stops entirely. Coincidentally, that also makes light restriction one of your most powerful weed management tools. By preventing light from reaching the soil surface we can decimate weed populations with minimal labour and a bit of patience.



Here are our top 5 tools for controlling light conditions:

Sunlight

In case it's not obvious, good old sunlight needs to be at the top of this list. We only select growing locations with great sun exposure because our vegetables need it.

Grow Lights

Proper lighting is critical when starting seeds indoors because it allows us to grow strong sturdy transplants that transition smoothly into outdoor growing conditions. Seedlings grown with less than adequate light are weak and elongated.

Light Covers

Lots of light isn't always a good thing, so we occasionally make an effort to stop light. We use shade cloth to absorb some of the sunlight when planting heat sensitive crops in mid summer, and we use silage tarps to block all light for the purpose of weed killing.

Garden Planner

A carefully organized garden plan can make sure that all of the right crops get access to optimal sunlight to perform at their best. In some cases when direct sunlight is not advantageous, we can also plan to give a crop dappled sunlight.

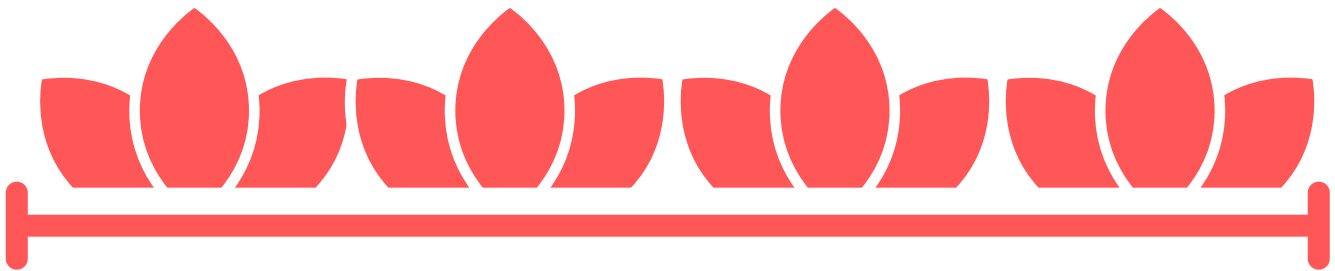
Trellises

Growing vertically can give a plant access to more light than what it would receive on the ground, and at the same time prevent it from smothering out lower neighbouring plants.

SPACE TOOL KIT

Vegetables rely on you to put them in the right place.

Seed depth can make or break germination rates, and final plant spacing will impact everything from bolting to pest pressure. Therefore, proper space management is important from the moment you plant your seed until the time a crop is harvested. In return for your spacing control, you will be rewarded with healthier plants, more consistent production, and an orderly garden, if you like that sort of thing.



Here are our top 5 tools for controlling space:

Transplanting Trowel

The simplest way to control plant spacing in the field is to transplant your seedlings exactly where you want them. I love using a rectangular trowel for this task.

Soil Block Makers

The task of "potting up" is an important part of starting our own seeds because it allows more space for plants to expand in their root zone. Our soil block makers make it easy to complete this task quickly and with minimal stress to our seedlings.

Mechanical Seeder

When we want to seed a crop directly, we often use our Earthway mechanical seeder. It can precisely deposit seeds into a growing bed at a consistent depth and spacing.

Row Marker Rake

The tines of our landscape rake are spaced 1 inch apart, so by attaching wooden extensions to certain tines, we can quickly change our rake into a bed marking tool.

Hand Pruner

It's not fancy, but hand pruning is one of our most important space management techniques. A few minutes with a pruner can quickly bring an overgrown patch of tomatoes, cucumbers, or squash back into check.