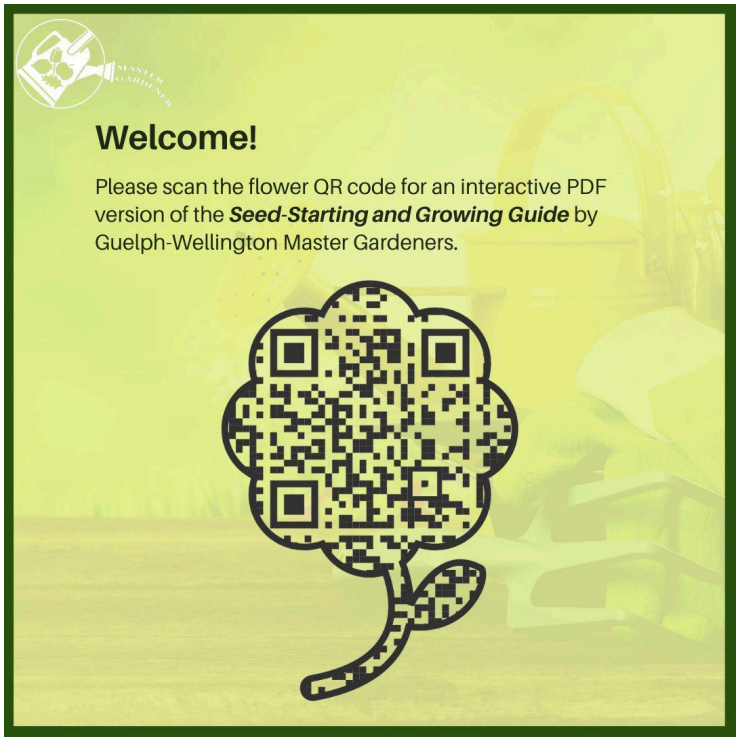
Guelph-Wellington Master Gardeners

Seed-Starting and Growing Guide

Prepared by Guelph-Wellington Master Gardeners
https://gwmastergardeners.ca



SECTIONS

1. ABOUT the Indoor Seed-starting Set-up

a. What's included in the kit
b. Kit materials
c. Lights and how to use them

2. Seeds and Sowing

a. Germination: Requirements and stages
b. Reading the Seed Packet: Understanding timing and germination requirements
c. How to Start Seeds: 3 Steps; Which seeds to start indoors: Seed-starting timelines
d. Caring for Seedlings
e. Watering: How often; How to do it right; Underwatering & overwatering issues

1. **ABOUT the Indoor Seed-starting Set-up**

This kit will provide your class with everything needed to start and grow seedlings. The equipment is durable and should last you many years!

While an indoor set-up like this is one of the best ways to start seedlings early, it's not the only way. This can be done inexpensively with some recycled materials like yogurt cups, some seeds and soil, and a sunny window. It's a bit more challenging to grow that way, but it can be successful as well.

a. **What's included in this kit:**

- Rack with removable casters & lights
- Light timer
- Power bar
- 2" plastic pots (Qty: 180)
- Soil – seed starter
- Bin with lid for storing supplies
- Plastic plant labels
- Paper lunch bags for taking plants home at the end of the term
- Misting bottle - with adjustable nozzle, used to mist small seedlings. Recommended for the first few weeks of watering, until plants size up and require a higher volume of water from a watering can
- Watering can - with small spout, used for sturdier seedlings to direct-water exactly where needed
- **Seed packets x 4:**
  - *"Honey Bunch"* red grape tomato hybrid seeds
  - *"Tumbling Tom"* yellow hybrid cherry tomato seeds
  - *"Crackerjack"* mixed marigold seeds
  - *"Durango Outback"* mixed hybrid marigold seeds

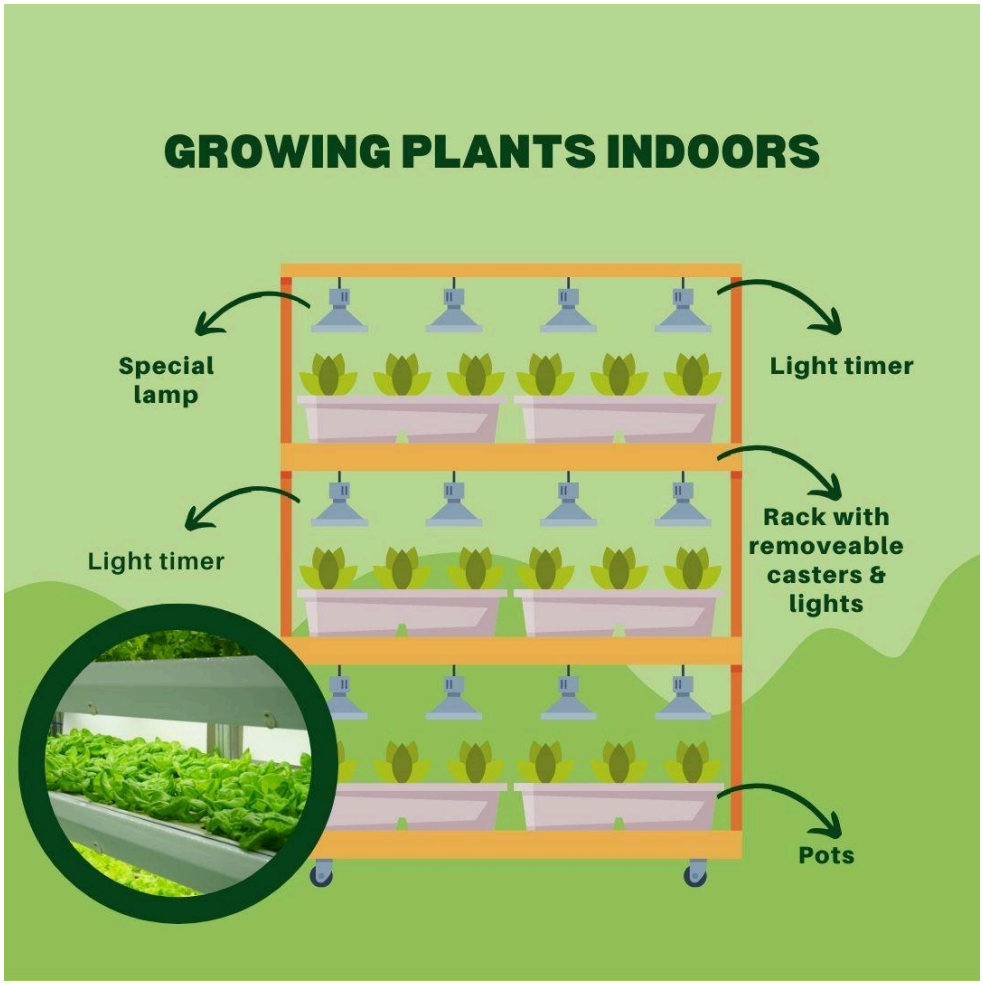
c. **Kit materials**

The racks we have provided come with built-in trays and lights. These racks are moveable so you can place them wherever is convenient. The lights are to be plugged into the timer, which is plugged into the wall. Set the timer so that the lights are on for 12-16 hours per day, ideally during regular daylight hours so that the plants get a rest at night with no light. A period of darkness is equally important for growth as light.

d. **About the lights & how to use them**

"Equipped with full-spectrum LED tubes for indoor growing, these stands are hard to beat. No matter what plants you grow, they like this light. With a color temperature of 6400 kelvin, it closely matches the wavelengths of natural sunlight and promoting vigorous plant growth; the 22" tube emits 1200 lumens." - *Lee Valley*

When the pots are first planted, the lights should be placed very close to them - about 2” above. You can slide the lights up and down by loosening the knobs. As the seedlings grow, keep moving the lights up so that they remain about 2” above the plants. If the plants get too close, their leaves can be scorched. If they are too far away, the plants can get “leggy” as they reach for the light. You should be able to fit 180 small pots with this system.



2. Seeds and Sowing

a. **Germination Requirements**

Seeds germinate when they are provided with the right combination of temperature and moisture. Many seeds also need darkness, but some actually require light. It's important to know the seed's germination conditions before starting.

Most vegetable crops have a minimum germination temperature between 2°C and 16°C, but there is also an optimal range. This is where the difference between cool-season crops (spinach, lettuce, cabbage, etc.) and warm-season crops (eggplant, cucumbers, tomatoes, peppers) comes into play. For example, parsnips will germinate best between 10°C and 21°C, but eggplant will germinate best between 24°C and 32°C, **tomatoes between 16°C and 30°C,** and peppers between 18°C and 35°C.

You can add heat with a heating mat below the germination pots, or find a warmer location like a sunny window. If you can't meet the optimal temperature for germination, you should still have success - it might just take a bit longer.

Germination Stage: Keeping moist and warm (as needed)

- Use a dome lid or plastic covering. Remove this when 75% of the seeds have germinated to make sure it's not too moist (this can lead to damping-off, which is when the stem weakens at the base).
- Water from below to avoid washing out seeds - add about ½" of water to the base tray when the top of the soil starts to dry. If this is not absorbed in about 15 minutes, pour it out to avoid water-logging the pots.
- Without enough water, seeds likely won't break dormancy. Or, if the seeds do start to germinate, a very dry growing mix can dehydrate the emerging plants before they break through the soil.
- Monitor timelines and track how long each plant takes to germinate. Compare this with what is on the seed packet for reference. Track the temperature near the pots and compare with germination time.

b. **Reading the Seed Packet: Understanding timing & germination requirements**

Most seed packets will list when the seeds should be started indoors (or outdoors). For example, it may say, "Start indoors 8-10 weeks before the last expected frost date in your area." You can simply count back from your frost-free date by checking a frost date calculator. In our area (Zone 5b), this is typically the weekend *after* the May Victoria Day long weekend.

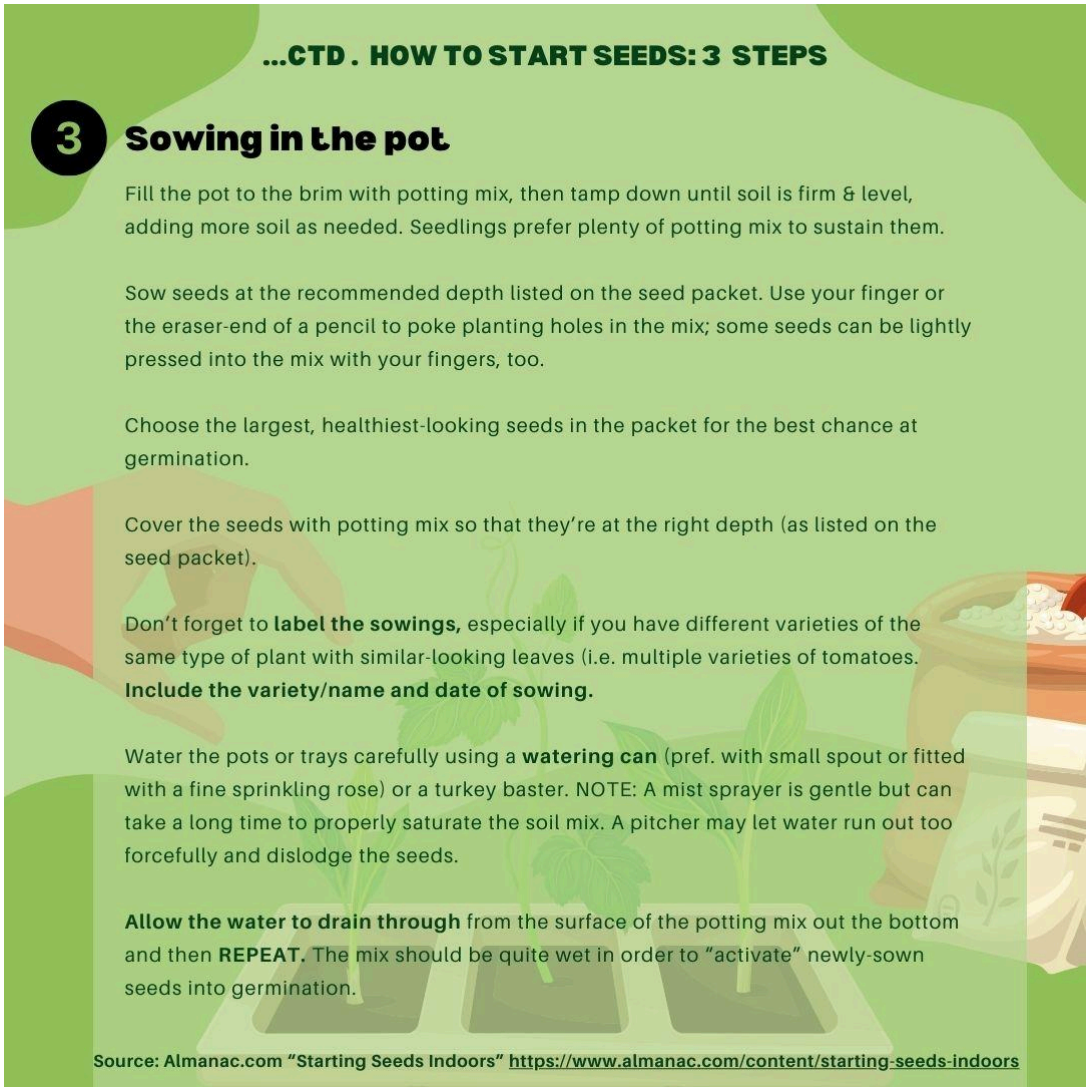
c. **How to Start Seeds**

To plant, fill up the pots with soil and then moisten the soil so that it's thoroughly moist but not soaking wet. Make a little indentation about ¼" to ½" deep in the pot and place one seed in the hole. Check the seed packet for specifics on seeding depth. You may want to put 2-3 seeds in each pot in case some don't germinate. Make sure they are spaced apart.

How to Start Seeds: 3 Steps

Compiled from https://www.almanac.com/content/starting-seeds-indoors


HOW TO START SEEDS:
3 STEPS
1
Choose a potting mix
Seed-starting potting mix is recommended for small or delicate seeds, designed especially for starting seeds & low in nutrients (the seed contains its own nutrients!).
All-purpose potting mix has good drainage but may also contain big chunks of wood & rock which should be sifted through a fine-mesh screen before planting (seedlings' roots will struggle if soil is not fine enough).
Avoid peat-based mixes if possible. A sustainable alternative is coconut coir.
2
Choose a container
For this project we are using pots. You can also sow into plug trays, or recycled containers.
Sowing many seeds into a large pot is space efficient as seedlings take up less space initially. It's also a more efficient use of seeds because you can germinate many seeds in a pot before transferring growing seedlings into individual pots. Sowing into a single container is also useful for sowing very tiny seeds such as basil or easy-to-transplant flower seeds. For easy, cool-season crops (i.e. onions, celery, cabbage), you can sow multiple seeds in the same container.



Which Seeds to Start Indoors?

Not ALL seeds should be started indoors. In fact, many vegetables grow perfectly well when started outdoors and even prefer not to be transplanted. Ultimately, it's important to consider how each type of vegetable grows in addition to where you're growing it. The seed packet should also indicate if the plant needs to be started early indoors.

The following table indicates which crops are typically started indoors and which are typically started outdoors. Remember that there isn't a hard-and-fast rule about what you can start indoors and outdoors; it varies by your experience, personal preference, planting location, and the plant itself.

Seed-Starting Timelines by Plant

Chart: Almanac https://www.almanac.com/content/starting-seeds-indoors

Plant	Start Indoors (prior to frost-free date)	Start Outdoors (Direct-Sow)
Artichoke	8 to 10 weeks	
Arugula		X
Beets		X
Broccoli	4 to 6 weeks	
Brussels Sprouts	4 to 6 weeks	
Cabbage	4 to 6 weeks	
Cantaloupe		X
Carrots		X
Cauliflower	4 to 6 weeks	
Celery	10 to 12 weeks	
Collards	4 to 6 weeks	
Corn		X
Cucumbers	3 to 4 weeks	X
Eggplant	8 to 10 weeks	
Green Beans		X
Kale		X
Kohlrabi		X
Leeks	8 to 10 weeks	

Lettuce	4 to 5 weeks	X
Okra		X
Onions		X
Parsnips		X
Peas		X
Peppers	8 weeks	
Potatoes		X
Pumpkins		X
Radishes		X
Rutabagas		X
Spinach		X
Squash (Summer)		X
Squash (Winter)		X
Sweet Potatoes		X
Swiss Chard		X
Tomatoes	**6 to 8 weeks**	
Turnips		X
Watermelons		X

c. **Caring for Seedlings**

Once the seeds have germinated, ensure that the lights are placed 2-3” above the pots. Set the timer to be on 12-16 hours per day, ideally timed during daylight hours. Seedlings need a time of rest from photosynthesizing. As seedlings grow, raise the lights up so they continue to be about 3” above the plants.

d. **Watering**

How often to water seedlings and how to do it right

Source: https://savvygardening.com/how-often-to-water-seedlings/

Knowing how often to water seedlings is an important skill to learn when starting seeds indoors. Too little water can affect germination or cause small seedlings to wilt. Too much water deprives plants of oxygen, encourages fungus gnats, and may prompt issues like damping off. The frequency of watering depends on factors like the size of the seedlings, the growing mix, and the types of containers you’re using.

Why it’s important to know how often to water seedlings

Starting seeds indoors isn’t difficult and you can boost your success by learning how often to water seedlings. Just-sprouted seedlings are delicate and both under and over-watering can affect their growth.

Underwatering issues:

- Wilting seedlings – Seedlings need a consistent supply of moisture and when there is too little water, the roots die and plants wilt.
- Dried up seedlings – If you forget to check your seedlings for a day or two and the growing mix dries out completely, your plants may not survive. Very wilted or dried up seedlings won't recover.

Overwatering issues:

- Wilting seedlings – As noted above, too little water can result in wilted seedlings, but so can too much water. In saturated soil, the spaces around the roots are filled with water. Plants also need oxygen and the lack of air causes the seedlings to droop or wilt.
- Insect, mold, or disease problems – Too much water can prompt a fungus gnat infection or mold to grow on the soil surface. Excess moisture also promotes problems like damping off, whose pathogens thrive in wet growing conditions.

The best water for watering seedlings:

When filling up watering cans or hand misters, use lukewarm or slightly warm water. Very cold water can shock young seedlings or delay germination of seeds. You also don't need to buy special water, like distilled water, for seedlings. Municipal tap water, and/or potable water that is safe to drink, is fine for seedlings.

How often to water seedlings

For most types of vegetable, flower, and herb seedlings, the goal is to maintain a lightly-moist growing medium - not too wet and not too dry. The most important point is to check the growing mix daily and

water when necessary. A visual check is ok but using your finger to measure the moisture level will give the most accurate reading!

To water from the top, you can use your misting bottle when the seedlings are small (for the first 1 to 2 weeks) to moisten the surface of the soil without risking drowning the newly emerged plants. Once the plants have several sets of leaves, they will be more firmly rooted and the watering can can be used.

Seedling growth

As seedlings grow, continue to provide a strong light source and water properly. Sometimes a gentle fan is directed to the seedlings to help them grow strong stems as they react to the air current. Monitor plants as they grow new leaves and watch the different types of leaves that emerge. If multiple plants are growing in one pot, they may be separated and replanted once they have a few “true” leaves, or the extras can be plucked out and the strongest plant kept. This ensures the seedling has as much space to grow as possible.

When to transplant seedlings

The young plants will go out after the last frost date once they’ve been properly “hardened off.” Hardening off is the process of acclimating plants to outdoor conditions over a period of about a week so that they get used to being outside. This involves bringing the plant outside for increasing increments of time, starting with a couple of hours and eventually being able to leave the plants out all day. Ensure they start in a sheltered and shady location, gradually moving them into the sun and a bit of wind. Once the frost-free date has passed, the plants can remain outdoors, planted in their final location.

Why We Start Seeds Indoors

1. Starting seeds indoors will help to give you a head start on the growing season. You will have vegetables/flowers earlier than if you plant directly in the ground.
2. There are some plants that need to be started indoors in Zone 5B, which is where Guelph is located. They are considered warm-season vegetables, ie. tomatoes, peppers, eggplant. If the soil is too cool they can’t be planted outdoors. By starting indoors you’ll get more tomatoes!
3. As an alternative to starting your own seedlings, you will need to buy young plants called “transplants” or “starts” at the garden store or nursery. While some nursery starter plants are grown nicely, others may be of poor quality and don’t thrive once they’re home. When you plant your own seeds, you tend to have healthier starts since you can care for them from day one.
4. Variety - Hundreds of varieties to choose from - a **much-wider range** of seed varieties are available —things you would never find in a six-pack at the local garden centre!
5. Cost-effective seeds are much less expensive than buying plants at the garden store.
6. Making sure that you know 100% what is put into your plants. You will know how they have been raised—organically instead of bathed in a wash of chemicals. You can time the plants to be ready for when you want to plant them.

Resources:

Starting Seeds Indoors: How and When to Start Seeds
https://www.almanac.com/content/starting-seeds-indoors

How often to water seedlings and how to do it right
Source: https://savvygardening.com/how-often-to-water-seedlings/

Floret Seed-Starting Guide
https://www.floretflowers.com/resources/seed-starting-101/

Why We Start Seeds Indoors
https://www.almanac.com/content/starting-seeds-indoors