

Seed Starting

1. Why use transplants?
 - a. Plant earlier, harvest earlier
 - b. Get a jump start on weeds
 - c. Save time + space in the field

2. Why start your own seeds?
 - a. Cost - Seeds and soil are relatively cheap, so one can potentially grow their own transplants for a fraction of the cost of commercially available starts.
 - b. Variety - If you can get the seed, you can grow it! Commercial starts typically offer only a few varieties, and may not even be regionally adapted. Unusual varieties or availability beyond March-May is often hard to find.
 - c. Better quality seedlings - Most seedlings at a store are not properly hardened off, and may be stunted by rapid introduction in your growing conditions. Often they are too old or too young for optimal transplanting, and are sometimes poorly tended sitting on the shelf waiting to be sold. The ability to properly fertilize, harden off, and time the transplanting of seedlings in your garden can give your vegetable garden several days head start.

3. Source. Locally grown and adapted seeds are important, as they are better suited to our climate than those grown in different areas. Local adaptation is especially important for shoulder season crops like brassicas, as our cool prolonged springs and falls are somewhat unique. For summer crops, northern New England seeds also often do well here, as our summers are similar.
 - a. Uprising Seeds (Whatcom County, WA) - Local, organic, heirloom seeds all grown in the northwest. Focuses on revitalizing heirloom varieties for the home gardener.
 - b. Osborne Seed Company (Mt Vernon, WA) - Extensive trial grounds in Skagit Valley, excellent customer service. Production oriented, but also useful for the large gardener.
 - c. Johnny's Selected Seeds (Albion, ME) - Popular market garden seed supplier, good source for high-yielding hybrids.
 - d. High Mowing Organic Seeds (Wolcott, VT) - 100% organic seed, many varieties suitable for cool summer climates.
 - e. Territorial Seed Company (Cottage Grove, OR) - West side seed company with long history focused on the home gardener.

4. Hybrid vs. Open Pollinated vs. Heirloom Seeds
 - a. Hybrid seeds are created by intentionally crossing two known varieties usually with a desired outcome in mind (vigor, yield, size, disease resistance).
 - b. Open pollinated seeds are naturally pollinated by wind and/or insects and are the results of essentially random parents.
 - c. Heirloom varieties are open pollinated seeds with at least a 50 year history of human use.
 - d. Pros/cons
 - i. Hybrid seeds are almost without exception more vigorous and higher yielding than their open pollinated counterparts. However, seeds saved from hybrids will not breed true to type. They are also more expensive and contain less genetic diversity.

- ii. Open pollinated seeds are able to be saved and remain true to type, and often have a higher degree of genetic diversity in their parentage (potentially, but not necessarily, making them more adaptable to extreme conditions or pests).

5. Seed Life

- a. Most seeds can remain viable for 3-5 years given ideal conditions of cool, dark, and dry. Lettuce and spinach seed often lose viability quicker, in 2-3 years.
- b. Tip: keep seeds stored in a dark sealed tupperware container in the refrigerator with desiccant packs.

6. When to Sow

- a. Most vegetable seedlings are sown 4-6 weeks prior to transplanting. Some, like most solanums (tomatoes, peppers, eggplant), alliums (onions, shallots, leeks), and many flowers and herbs are slower growing and prefer 6-10 weeks in pots. Determine your ideal planting date and count backwards. Average last frost date in Whatcom County is late April (coast) to early May (foothills). Anything frost sensitive shouldn't be transplanted before then.
 - i. General seed starting timeline:
 - February - onions, shallots, leeks, greens + brassicas (if protected at transplanting)
 - ii. March - tomatoes, peppers, greens, brassicas, herbs + flowers
 - iii. April - May - greens, brassicas, squash, cucumbers, corn
 - iv. June+ - fall greens + brassicas

7. What to sow

- a. Almost any vegetable, flower or herb can be started from seed and transplanted, EXCEPT:
 - i. Most roots vegetables (although beets do well)
 - ii. Some herbs are easier to propagate vegetatively (thyme, oregano)

8. Germination

- a. All seeds contain specialized cells that mobilize and grow when the germination process is triggered by environmental conditions of moisture, temperature and sometimes light. Moisture and stored nutrients energize the embryo, which contains the latent structures for a plant's root, stem and leaves. Most vegetable seeds that germinate quickly (such as cabbage and tomatoes) enter their dormant state with mature, fully formed embryos. The carrot family is at a disadvantage, however, because most Umbelliferae seeds (like parsley, fennel and dill) need time for their underdeveloped ovaries to grow before they can sprout. Other slow sprouters – spinach, for example – have compounds that inhibit germination in their seed coats. These compounds have to break down in the soil before the root and sprout can begin growing.
- b. Oxygen is vital to the germination process. Until seedlings have leaves to enable them to use solar energy, they rely on the food reserves in the seed combined with oxygen found in the soil to grow new cells. This is why it is important to use a light-textured potting medium to start seeds, and why over-watering can cause seeds to rot instead of grow.

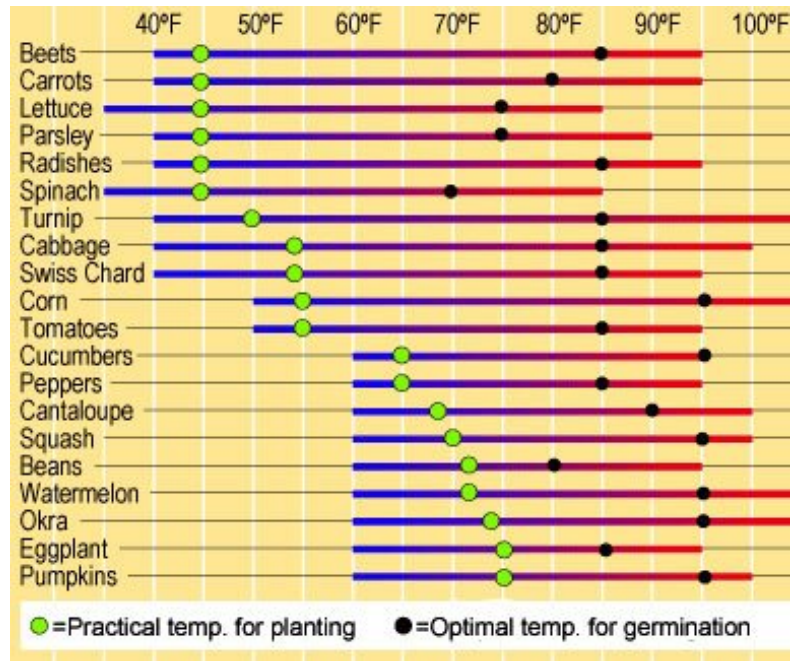
9. Growing Medium: Growing medium should be sterile and water retentive but with good drainage. Striking a balance between moisture retention and drainage is key, both of which are necessary for seedlings. It's easy for the soil to stay too wet, and that can lead to damping-off, a fungal disease that causes newly germinated seedlings to topple over and die. Most commercial mixes are composed of 3 components:
 - a. A moisture retentive component (such as peat, sphagnum moss, or coir)
 - b. A porous drainage component (such as perlite or vermiculite)
 - c. A fertility or nutrient-holding component (such as compost, worm casings, or organic amendments)
 - d. Purchase a ready-made mix (like Black Gold Seedling Mix), or make your own.
 - i. Homemade recipe:
 1. 1 part screened compost
 2. 1 part perlite
 3. 1 part vermiculite
 4. 1 parts peat or coir
 - e. Organic amendments:
 - i. Often organic amendments such as bone meal or feather meal are added to the seedling mix to supply nutrients to the growing seedlings. Be careful with quantities as too much can cause the seedlings to "burn up" or not germinate at all. Better to add fertility later as the seedlings are growing in the form of a soluble liquid fertilizer.
 - ii. Use only fresh clean seedling medium, as old soil can contain fungal diseases such as damping off that can harm or kill tender young seedlings.

10. Containers

- a. Open flats - good for onions, leeks, or any seedling that doesn't mind their roots disturbed at planting
- b. Cells - Great for most seedlings, lasts many uses
- c. 4" pots - Great for tomatoes, peppers, squash: anything large and kept in pots a while.
- d. Homemade containers - egg cartons, cottage cheese containers etc work in a pinch
 - i. For vegetables with a susceptibility to fungal diseases later in life (tomatoes, onions), sanitizing pots/cells with a bleach solution can eliminate one potential source of contamination. Use 1 Tbs bleach / 1 gallon water and submerge for 30 seconds.



11. Temperature Germination. temperature depends on the seed. Most cool-season vegetables (brassicas, greens) will germinate at 45-50 degrees, but summer vegetables (tomatoes, peppers, squash, beans), often won't germinate at all below 70 degrees. A heat mat or greenhouse can be helpful depending on your crop and germinating conditions.



12. Light. New seedlings need a lot of light! A windowsill is generally NOT enough light to grow healthy sturdy seedlings. Lack of light will lead to weak, leggy plants. Ideal conditions for the home gardener:

- Outside, in a greenhouse or cloche, with a heat mat set to the appropriate temperature.
- Indoors by a window, under fluorescent lights. Raise the light as seedlings grow so they are never more than a few inches above the leaves. Metal halide or high pressure sodium bulbs emit significantly more light, but also a lot of heat, so ventilation must be considered.

13. Light/temperature ratio: 'Legginess' is often a function of the light/temperature ratio the seedlings are exposed to. Warm temperatures signal the plant to grow, but without enough light to photosynthesize with and build plant matter, seedlings grow leggy and 'reach for the sun'. Either increasing the light or decreasing the temperature will often help. For most seedlings, we germinate at high (70-80 degree) temperatures, then once they have true leaves reduce the air temperature while still keeping the roots warm.

14. Depth: General rule is twice the longest dimension of the seed. 1/8"-1/4" for most small seeded vegetables, up to 1/2" or more for squash, cucumbers or corn.

15. Water should be regular but not excessive. Too much moisture can lead to fungal diseases like damping off and stunted growth due to the roots being unable to 'breathe'. Too little moisture will also stunt the plants. Allow the soil to dry out somewhat between waterings, but not to the point of wilting. Feel free to spot water dry cells rather than water cells that don't need it yet.

16. Fertility: In almost all cases, the sowing medium does not contain enough nutrients to take the plants from germination to transplanting. We must either supplement the medium with dry amendments at sowing (a balanced all purpose organic fertilizer like DTE's All Purpose), or fertilize with a soluble liquid fertilizer (usually fish or grain-based). Mix concentrate with water and use to irrigate the plants. We use a dilute fertigation solution twice a week, resulting in a continuous availability of highly

soluble nutrients. If using dry amendments, use half the recommended concentration and supplement with liquid fertilizer if needed.

17. Hardening off: Before seedlings are set out for planting they must be hardened off, or exposed to increasingly harsh conditions to prepare them for life outdoors. 3-5 days before transplanting begin exposing them to colder night temperatures and/or brighter sunlight. Leave them outside during the day (or overnight if mild), covering if conditions necessitate. A cloche or cold frame is very useful for hardening off.

18. Transplanting

- a. Prepare bed of loose weed-free soil
- b. Transplant on a cool cloudy day (if possible).
- c. Observe correct spacing and bury seedlings up to their first true leaves. Pack surrounding soil with gentle pressure
- d. Water in!
- e. Cover with plastic or row fabric, if necessary.



Resources:

[The New Seed Starter's Handbook](#) by Nancy Bubel