Seed Starting Success

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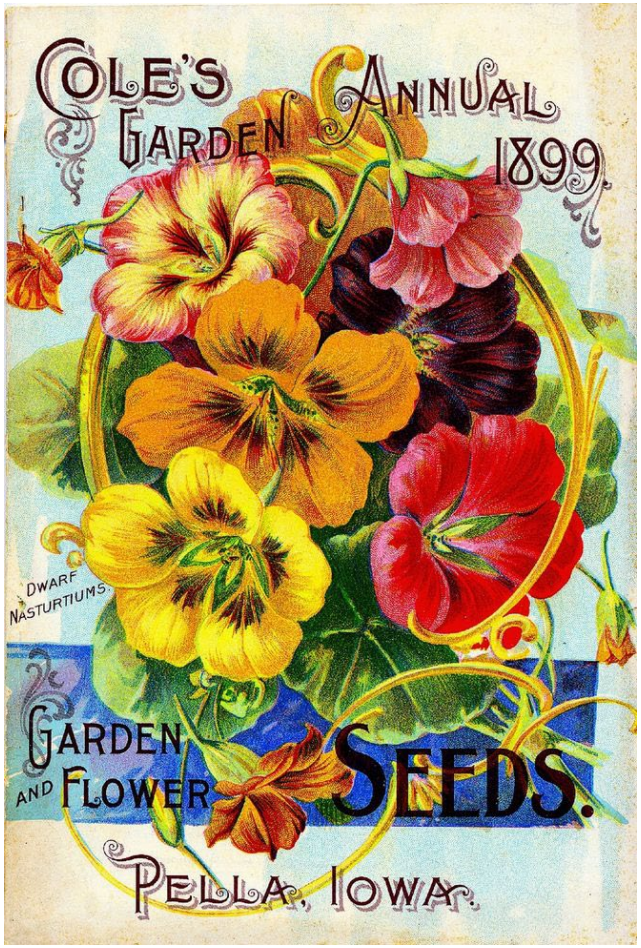
Why grow plants from seed?

- More options – color, size, disease resistance
- Cost of seeds vs. transplants
- Control over growing conditions
- Gets you in the dirt well before spring
- Fun and educational!

Seed sources

- Catalogs
- Online
- Nurseries
- Big Retailers
- Organized swaps
- Friends



Life-cycle terminology

Annual - A plant that completes its life cycle, from germination to setting seed, in one growing season.

Biennial – A plant that completes its life cycle in two years. The first year it grows leaves, stems and roots. In the second year it produces flowers, fruits, and seeds.

Perennial – A plant that comes back year after year.

Genetic terminology

Hybrid - created by cross-fertilizing plants for desired features in offspring, creating a new variety (F1) that is superior to either parent plant.

Open-pollinated – Grow true to type without hybridization. Seeds may be saved and will produce the same plant in future sowings.

Heirloom – variety that has been grown reliably, carefully preserved and handed along from generation to generation. Usually open-pollinated and over 50 years old.

Other terminology

Organic - Grown without the use of synthetic pesticides and fertilizers and is not genetically modified seed.

Treated – Seed is coated with chemical ingredients (usually anti-microbial) to improve germination and growth.

GMO (Genetically Modified Organisms) – variety that has had DNA sequence modified by genetic engineering techniques.

When to sow?

Based on average last frost date – refer to seed packet or charts. Delaware County's date is around 6/1, but late frosts do happen!

https://www.johnnyseeds.com/growers-library/seed-planting-schedule-calculator.html

Based on production goals

- Early harvest
- Specific bloom time
- "Baby" vegetables
- Seed saving

Indoors or out?

Considerations

- Date to harvest vs. season length
- Germination requirements
- Response to transplanting
- Available space and equipment
- Seed size & rarity
- Weeds & pests

Plants to start indoors

Long season, heat loving crops

- Tomatoes
- Peppers
- Eggplants

Early/late crops

- Broccoli
- Cauliflower
- Kale
- Lettuce

Flowers

- Most perennials
- Small-seeded annuals
- Rare varieties

Slower-growers

- Celery
- Parsley
- Onion

Plants to direct sow

Legumes

- Beans
- Peas
- Nasturtiums

Later Greens

- Lettuce
- Spinach
- Chard

Cucurbits

- Cucumbers
- Squash
- Melons
- Pumpkins

Root crops

- Radish
- Beets
- Carrots
- Turnips

Others: Sunflowers, Lupines, Corn, Cilantro

Starting seeds indoors

Supplies:

- Containers
- Starting mix
- Labels

Environment:

- Light source
- Temperature control
- Water source
- Air circulation

Containers

Source: yougrowgirl.com

Recycled

Source: gardenbetty.com

Source: www.greenhousemegastore.com

Purchased

Jiffy Pellets and Pots

Source: www.farmandfleet.com

Pellets

Source: harrisseeds.com

Peat pots

Source: www.huntersgardencentere.com

Soil Block Makers

Source: leevalley.com

Soil Block Makers

Advantages:

- Space-saving
- Air pruning controls size
- Eco-friendly

Disadvantages:

- Dry out quickly
- Fragile
- Blockers are expensive

Starting mix

Pre-mixed: convenient, consistent, sterile

Homemade: more affordable for large quantities

- Peat moss
- Commercially prepared compost
- Perlite and/or vermiculite
- Lime
- Slow-release fertilizer

Fine-texture best for small seeds

Source: www.homedepot.com

Vermicompost

Contains beneficial micro-organisms and plant growth enhancers.

Increases size and growth of vegetable seedlings.

Mix 1 part to 3 parts soil or seed starting mix.

Source:
https://vermicompostingne.wordpress.com/

Wetting

Batch mix: Place mix in container, add water

Overhead watering: Use a fine sprayer or watering can

Mix should moist & crumbly but not saturated

Source: www.toddsseeds.com

Labels

Source: www.rareseeds.com

Source: www.rabbittalk.com

- Purchased labels
- Popsicle sticks
- Plastic knives/forks
- Old mini-blinds
- Cut-up yogurt cups

Light

Natural

LED

Fluorescent

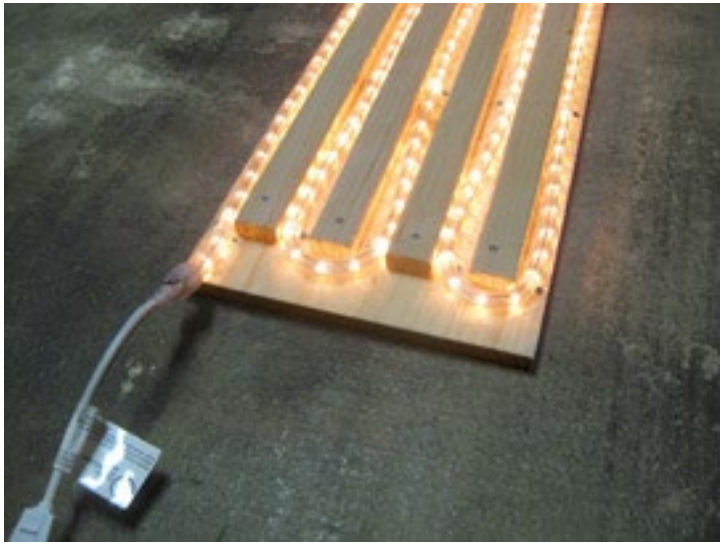
- Grow light
- Cool + Warm bulbs

Source: www.amazon.com

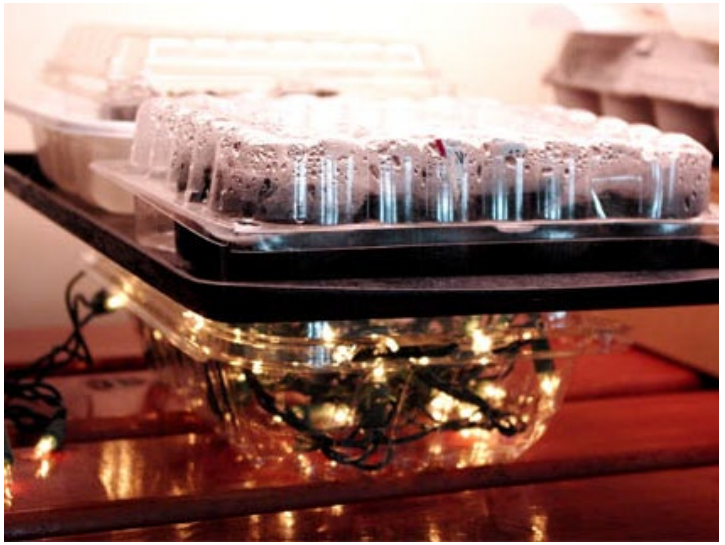
Artificial lighting needs timer!

Heat

Heating mats
Warm appliance
Space heater
DIY



Source: www.vegetablegardener.com/



Source: dabbletree.vrya.com/

Not every seed needs or even likes heat for germination!

Moisture

Pre-germination humidity domes

Bottom watering

Overhead watering

Source: www.therustedgarden.com/

Source: harvesttotable.com/

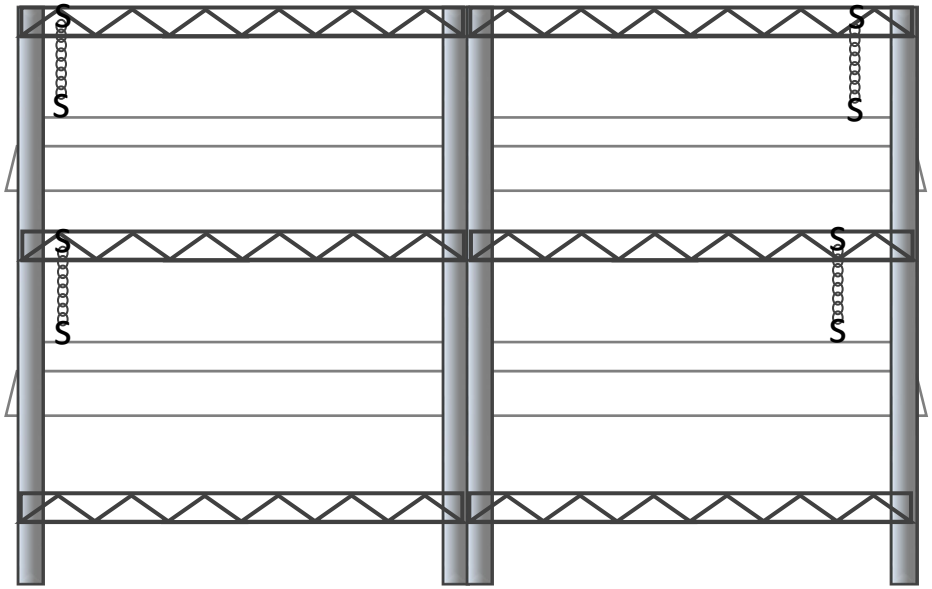
DIY Grow System

DIY Grow System

Components:

(2) 3 or 4-Tier Shelving Units (size approximately 23in x 13in x 30in.)
(2) 4-Foot Shop Lights (2 per shelf)
(4) Fluorescent Light Bulbs (buy in bulk pack)
(1) Outlet Strip with Timer
(4) Extra S-hooks

Total investment: $250 - $300



DIY Grow System

From Amazon:
Lithonia Lighting 1233 RE 2-Light T8 Fluorescent Shop Light, 120 Volts, 32 Watts - $17.44 each (purchase 2 per shelf)

NSF Wire Shelving Unit 4-Tier Layer Shelf Steel Commercial Grade Storage Shelves 24"x14"x47“ - $33.99 each (purchase 2)

MET Certified 2 Pack Seedling Heat Mat, Seedfactor Waterproof Durable Germination Station Heat Matt - $23.99 each 2 pack (purchase 1 pack per shelf)

From hardware store:
32-Watt 4 ft.Alto Linear T8 Fluorescent Tube Light Bulb, Cool White (4100K) - $29.98 per 10-Pack (need 2 per shelf)

32-Watt 4 ft. Alto Linear T8 Fluorescent Tube Light Bulb, Daylight (6500K) - $29.98 per 10-Pack (need 2 per shelf)

Total investment: $250 - $300

Planting strategies

Considerations

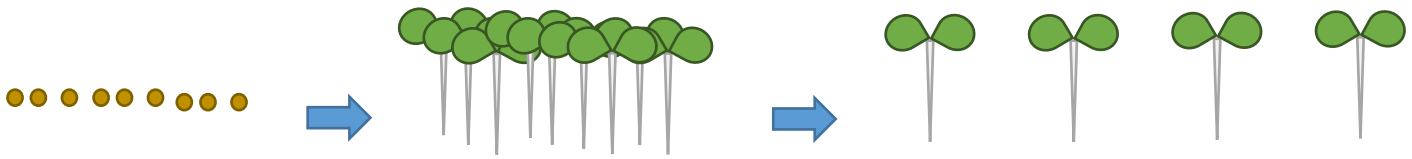
- Seed price/availability
- Days to maturity
- Harvest window
- Space/materials available
- Time to care for seedlings

Thinning

Seeds are sewn thickly and either pulled, snipped, or transplanted after germination.

Advantages – makes up for low germination, most vigorous seedlings can be selected, more seedlings in less space.

Disadvantages – requires more seeds and handling, more risk of root damage in transplants, must thin promptly to avoid overcrowding.



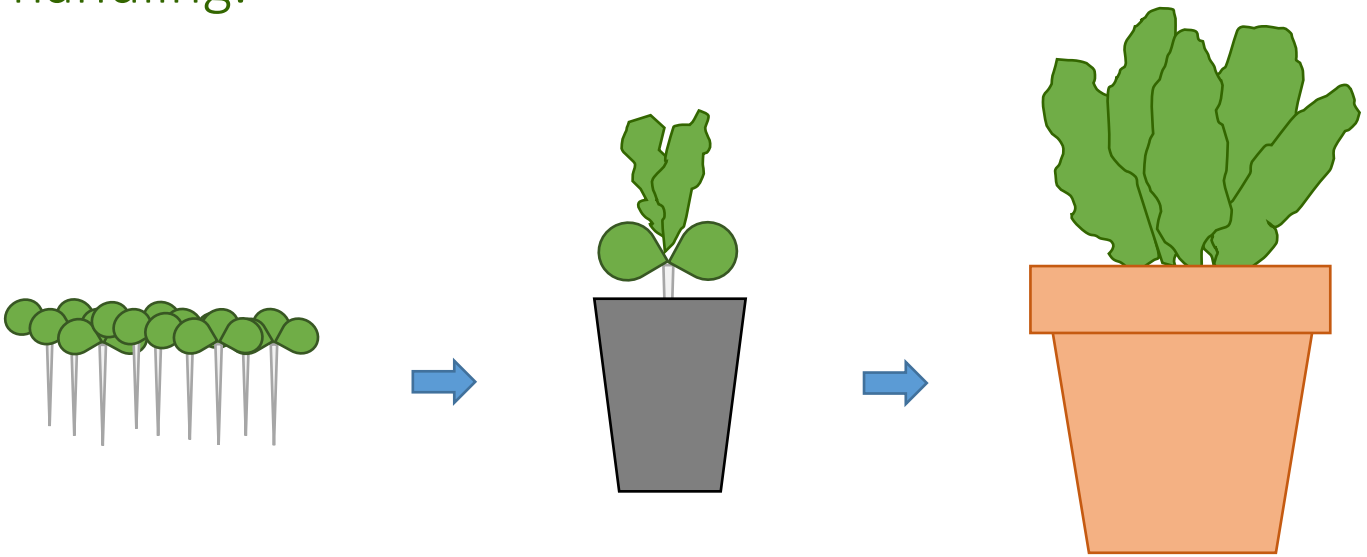
Tip: enjoy lettuce and greens thinnings as microgreens!

Potting up

Seedlings are moved to larger containers as they grow

Advantages – Allows larger seedlings to have more time indoors before planting outside, improves root mass development.

Disadvantages – requires more space, containers and handling.

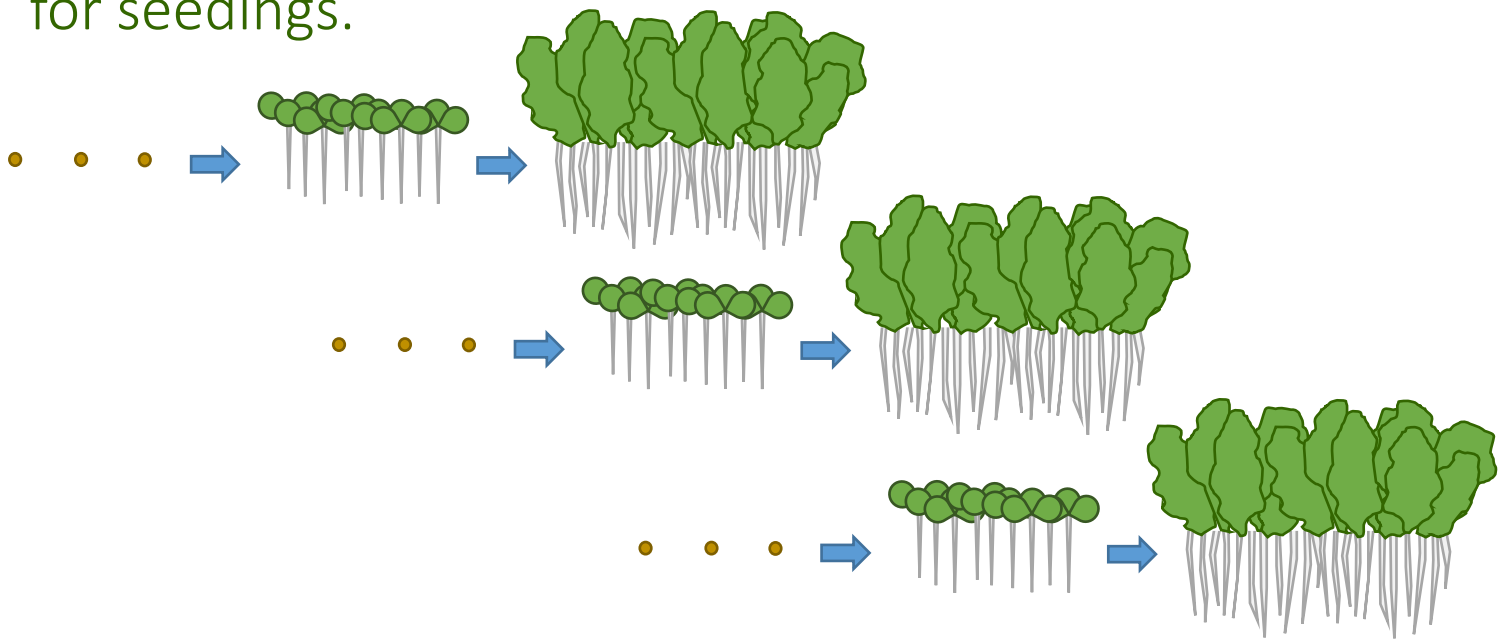


Succession Planting

Seeds are sown every few weeks

Advantages – Ensures continuous harvest. Good for radishes, cilantro, dill, basil, lettuce, most annual cut flowers.

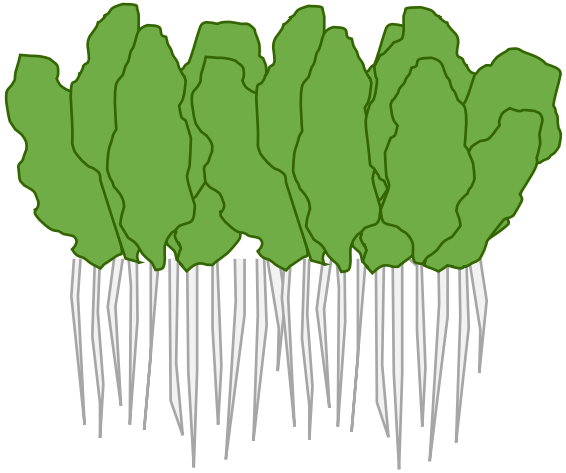
Disadvantages – conditions not always conducive to germination. Must remember to sow and have a place for seedings.



Simultaneous Seeds and Starts

Seeds are planted in the ground at the same time as seedlings started indoors are transplanted.

Seedlings give a spring/early summer crop, seeds give a late summer/early fall crop. Good way to enjoy some early and fresh and have more for larger harvest and preservation. Perfect for greens and basil!



Varieties with different days to maturity

Seeds are planted in the ground at the same time but are ready to harvest at different intervals.

"Days to harvest" based on seeding date for plants that are typically direct sown, based on transplanting date for plants that are typically started indoors.

Variety	Days to Maturity
Beefsteak	96
Early Girl	75
Sweet 100	60

Seed pre-treatments

Imbibition (soaking): Good for larger, dry wrinkly seeds (beans, peas, lupines, nasturtiums, beets, chard) - Soak 8-12 hours in water, enough to plump up seed.

Source: planetnatural.com

Scarification (abrading): Good for seeds with hard coats - Scratch coat with file or nick with a razor blade.

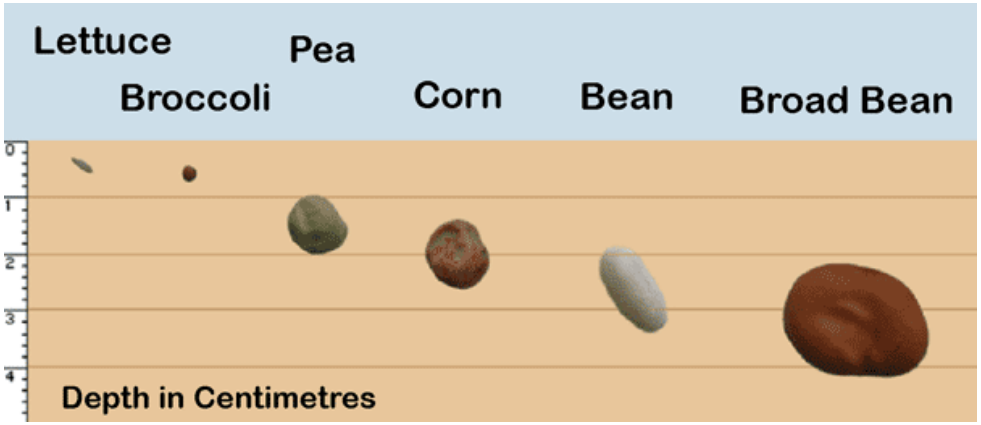
Stratification (freezing): Good for perennials that need freeze-thaw cycles to efficiently germinate.

Planting seeds (in or out)

Depth – seed should be planted no deeper than diameter. Make furrows or divots for larger seeds, surface sprinkle small seeds and cover with a bit of soil or vermiculite.

Position – Point shoot end up, if discernable.

Arrangement – broadcast, line, individual cells/blocks.



Source: www.urbanfoodgarden.org

Source: www.growbiointensive.org

Caring for seedlings

Pre-germination – keep moist and appropriate temperature.

Post-germination – remove cover or dome, change to "growing on" temp/lighting.

With growth – keep watered (be mindful of pH), move light source as needed, increase day length if required, use a fan or light touch to develop strength.
Provide weak fertilizer every week.
Pot up as needed.

Before transplant – "harden off" seedlings by putting them outside in a protected spot for a short time.
Increase time/exposure to elements over a period of a week or more.

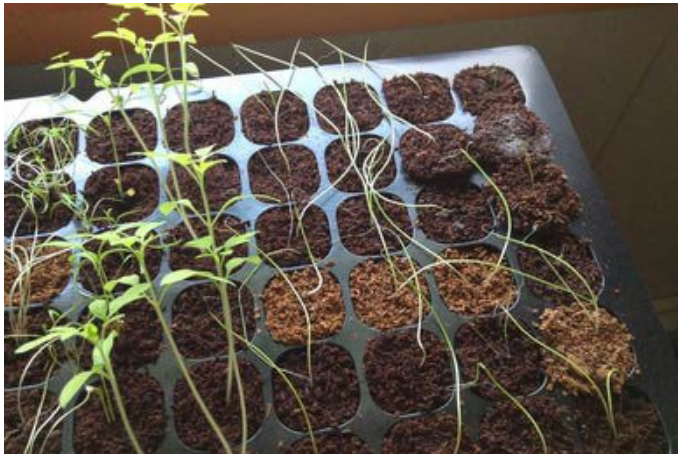
Common Problems

No germination – bad seeds, too wet or too dry, too cold or hot, needed pre-treatment.

Lanky, light colored seedlings – not enough light.

Damping off – seedlings fall over and die, usually too cold, too wet, or non-sterile pots or soil used.

Stunted, yellowing seedlings – too wet.



Source: organicgardening.about.com

Source: extension.umn.edu

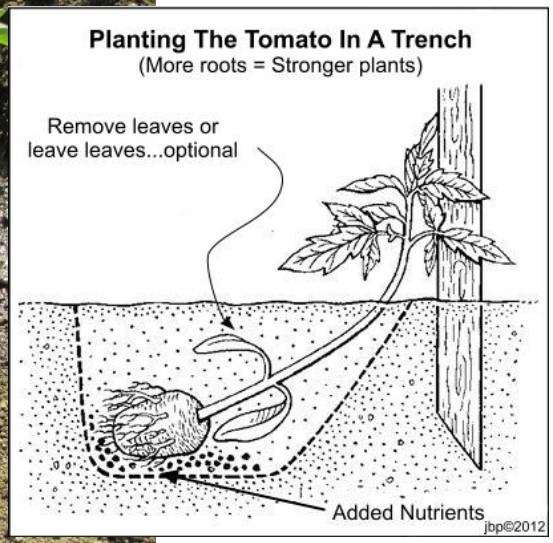
Transplanting

Timing – Err on the later side or use frost protection. Check forecast, avoid cold or hot spells or very wet weather.

Conditions – Plant when overcast or in the morning.

Supports – Stakes and trellises should be in place prior to planting to avoid future root damage.

Soil – Soil should be proper pH, loose and well-aerated. Dig hole large enough for root base (and some of stem, depending on species).



Tip: Bury tomato and cole crop stems to increase root production and add stability

Additional inputs

Inoculum/Mycorrhizae – Formulations containing beneficial bacteria or fungi.

Starter fertilizer – Depends on soil levels and crops, usually not needed.

Compost/manure – must be well-rotted and weed seed-free.

Mulch – prevents evaporation, prevents weeds. Dried grass clippings great for small seedlings.

Pest control – Mechanical: row covers, cloches. Chemical: Dusts and sprays (organic and conventional options).

Direct sowing tips

- Check forecast
- Decide how to spend your time …sowing ORthinning/transplanting
- Know your seedling morphology and expected germination time
- Be prepared to “babysit”for a few weeks
- Keep an eye out for pests and predators
- Prepare markers in advance

Season extenders

Row Covers (source: gardeners.com)

Cloches (source: gardeners.com)

Season extenders

Cold frames (source: HGTV.com)

(source: gardengatemagazine.com)

Greenhouses/tunnels (source: gardeners.com), (source:greenhousegrower.com)

Winter sowing

The best of both worlds!

- Uses recycled containers
- No lights or heat required
- Allows for extra-early garden work
- Good for perennials, self-seeders, and cold-tolerant crops/flowers
- Seedlings are naturally hardened-off at transplant time

Winter sowing

1. Cut container and poke drainage holes
2. Add moistened soil and seeds
3. Tape and label
4. Put outside with cap <u>off</u>
5. Open on nice days after germination, close at night

Source: www.gardengatenotes.com

Saving seed

- Can save seed from open-pollinated varieties
- Be careful with outcrossers, must isolate varieties for genetic purity.
- Lettuce, herbs, flowers, and greens – let flower and collect dried flower heads, separate seed from chaff.
- Beans/peas – let pods dry and collect dried seeds.
- Tomatoes, peppers, squash – soak seeds to remove fruit. Dry and store.

Source: rodalesorganiclife.com

Storing seed

- Put seeds or entire packet in storage bag or jar.
- Can organize in plastic boxes, albums, or binders.
- Keep cool, dark, AND dry...can add silica gel, tissues, or dry milk to absorb moisture.
- Can store in refrigerator, but do not freeze.
- Test germination several weeks before sowing date.


Don't judge each day
by the harvest
you reap, but
by the seeds
that you plant.
~Robert Lewis Stevenson
www.beyogabelove.com