



# Get Things Started

A program of  **Citizens' Greener Evanston**  
Act Locally. Breathe Globally.



## Growing your own transplants

March 18, 2023

Robert Crown Library Branch







# Things to Consider When Starting Plants

Temperature, including frosts and differing cultural needs for cool & warm conditions

Light levels

Your available space, conditions, and personal time

When to direct sow vs. when to use transplant starts

# The Basics of When to Start What ... and Why

- Know when to plant out transplants: Either side of the first frost-free date *based on variety*
- Plan to start seedlings based on how many weeks in advance you need to sow to get ideal size plants for transplant date
- Keep sowing for succession
- Use the Spring Sowing & Planting Dates chart to figure timing—covered in detail later



## Spring Sowing & Planting Dates

Vegetables

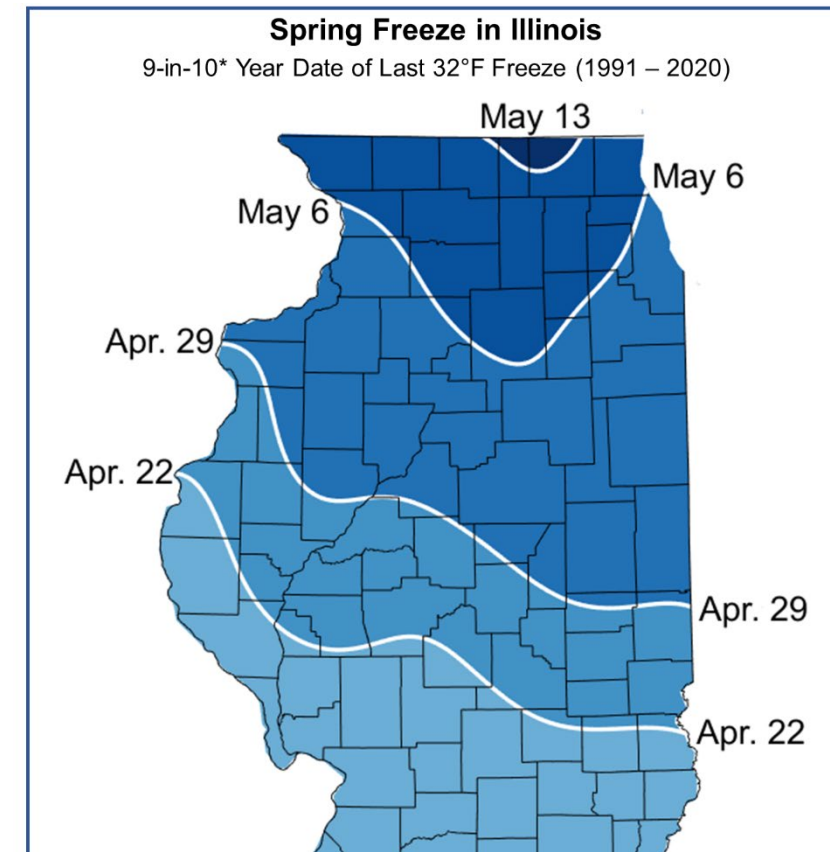
from [http://www.johnnyseeds.com/e-pdseedstart.aspx?source=W\\_InteractiveTools\\_122014](http://www.johnnyseeds.com/e-pdseedstart.aspx?source=W_InteractiveTools_122014)

Enter spring frost-free date (include year):					5/10/2016^	
Crop: Sorted by when to start	Number of weeks to start seeds before setting-out date	When To start inside		Safe time to set out plants (relative to frost-free date)	Setting-out date	
		From	To		From	To
Onions	8 to 10	2-Feb	16-Feb	4 weeks before	12-Apr	
Parsley	9 to 10	9-Feb	23-Feb	2 to 3 weeks before	19-Apr	26-Apr
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Peas*	3 to 4	16-Feb	8-Mar	6 to 8 weeks before	15-Mar	29-Mar
Corn salad/mache	4 to 6	16-Feb	22-Mar	3 to 6 weeks before	29-Mar	19-Apr
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Collards	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
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Broccoli	4 to 6	15-Mar	29-Mar	2 weeks before	26-Apr	
Swiss chard	4 to 6	15-Mar	29-Mar	2 weeks before	26-Apr	
Eggplant	8 to 10	15-Mar	5-Apr	2 to 3 weeks after	24-May	31-May
Cauliflower	4 to 6	15-Mar	12-Apr	2 weeks before	26-Apr	10-May
Artichoke	8	15-Mar		on frost-free date	10-May	
Tomatoes	6 to 8	22-Mar	12-Apr	1 to 2 weeks after	17-May	24-May
Peppers	8	29-Mar		2 weeks after	24-May	
Basil	6	5-Apr		1 week after	17-May	
Corn*	2 to 4	12-Apr	10-May	0 to 2 weeks after	10-May	24-May

# Historical Frost Date Information

Nearest Climate Station	Altitude	Last Spring Frost	First Fall Frost	Growing Season
CHICAGO BOTANIC GARDEN, IL	629'	May 2	Oct 11	161 days

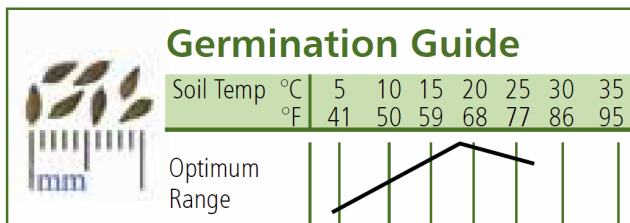
- <https://stateclimatologist.web.illinois.edu/data/frost-dates/>
- Last and first frost dates are 30% probability.
- Climate is changing and year-to-year variability.
- Latest date for 32 degrees at CBG was May 27 (1981-2010)
- Your garden's microclimate may vary from this.  
Wind and low areas (frost pockets) make a huge difference.
- Different plants need different levels of warmth to survive and to thrive. Some are fine with 28 degrees. Others will suffer if less than 35.



# Soil Temperature

- Soil temperature needed for germination *per plant type* is available in catalogs from superior suppliers.
- High Mowing and Fedco have useful charts
- Johnny's has detailed graphs throughout catalog

## LETTUCE



# Planting Chart



Cut out this page & bring it with you!

\*Spacing requirements may vary. Due to the wide variety of tools and techniques available to both gardeners and commercial growers, this chart should only be used as a guide.

CROP TYPE	Seeds/Unit, M=1,000	Plant Spacing for direct sowing or transplanting	Seed Planting Depth	Row Spacing	Direct Sow or Transplant	Soil Temp (°F) for germination	Start Transplants (before setting out)	When to Plant Out
Artichokes	625/oz	12-24"	1/4"	5'	TP	60-80°	10-12 weeks	After last frost
Bean, Bush, Dry	75-220/oz	8 seeds/foot	1"	18-30"	DS	60-80°	n/a	After last frost
Bean, Bush, Snap	75-220/oz	8 seeds/foot	1"	18-30"	DS	60-80°	n/a	After last frost
Bean, Pole	75-220/oz	8 seeds/foot	1"	5'	DS	60-80°	n/a	After last frost
Bean, Soy	75-220/oz	8 seeds/foot	1"	18-30"	DS	70-90°	n/a	After last frost
Beet	1.5-2.5M/oz	15 seeds/foot	1/2"	12-18"	DS	60-85°	n/a	As soon as soil can be worked
Broccoli	5.6-9.4M/oz	10-16"	1/4-1/2"	18"	DS or TP	65-85°	4-6 weeks	After last hard frost
Broccoli, Sprouting	4-9M/oz	3 seeds every 12"	1/2"	18"	DS	50-65°	n/a	After last frost or in late summer
Brussels Sprouts	7M/oz	18-24"	1/4-1/2"	30"	DS or TP	65-75°	4-6 weeks	As soon as soil can be worked
Cabbage, Chinese/Napa	5-9M/oz	10-16"				Soil Temp (°F) for germination	Start Transplants (before setting out)	When to Plant Out
Cabbage, Fresh Market	5-9M/oz	10-18"						
Cabbage, Storage	5-9M/oz	18-24"				60-80°	10-12 weeks	After last frost
Carrot	11-37M/oz	15-40 seeds/foot				60-80°	n/a	After last frost
Cauliflower	5-10M/oz	12-18"				60-80°	n/a	After last frost
Celery/Celeriac	50-70M/oz	6-10"				60-80°	n/a	After last frost
Chard, Bunching	1.2-2.5M/oz	8-12"				60-80°	n/a	After last frost
Chard, Baby	1.2-2.5M/oz	40 seeds/foot				60-80°	n/a	After last frost
Collards	6-9M/oz	8-12"				60-80°	n/a	After last frost
Corn	100-200/oz	2 seeds every 12"				60-80°	n/a	After last frost
Cucumber, Greenhouse	1-1.3M/oz	20"				70-90°	n/a	After last frost
Cucumber, Pickling	1-1.3M/oz	8-12"				60-85°	n/a	As soon as soil can be worked
Cucumber, Slicing	1-1.3M/oz	12-24"				60-85°	n/a	As soon as soil can be worked
Eggplant	5.5-7.5M/oz	12-18"				65-85°	4-6 weeks	After last hard frost
Fennel	5-7M/oz	6-8"				50-65°	n/a	After last frost or in late summer
Garlic, Softneck	50 cloves/lb	6"						
Garlic, Hardneck	40 cloves/lb	6"						
Greens, Baby Leaf/Salad	16-24M/oz	60 seeds/foot in 2-4" b						
Greens, Arugula, Full Size	15M/oz	60 seeds/foot in 2-4" b						

# Warm vs. Cool Crops

Some plants thrive in cooler air and some require warmth to thrive. Trying to grow out of season can stunt growth or just not succeed. Don't set out warm-season or frost sensitive seedlings too early.

- *Frost-tolerant cool-season crops*
  - Asparagus, Broad Beans/Fava Beans, Broccoli, Brussel Sprouts, Cabbage, Collard, Garlic, Kale, Kohlrabi, Leek, Lettuce, Onions, Peas, Radish, Spinach, Turnip
- *Cool-season crops affected by frost*
  - Beets, Carrots, Cauliflower, Celery, Chard, Chinese Cabbage, Mustard, Parsnip, Potato, Swiss Chard
- *Warm season crops which need heat*
  - Basil, Beans (Bush Snap, Pole & Dry), Cucumber, Eggplant, Melons, Peppers, Pumpkins, Squash, Sweet Potato, Tomatoes

# Cool followed by Warm followed by Cool

Sow early cool-weather crops followed by warm-weather crops

Use the number of days to maturity and the crops' desire for cool vs. warm weather to plan plantings where different crops follow each other

- For example, spring spinach can be followed by summer bush beans; then plant kale in August for fall use.

Sow cool-weather crops in early spring, and again in late summer for fall crops.

- The fall crop of greens can follow a planting of early cucumbers or could follow something like beets or potatoes or onions, which could have been either spring or early summer plantings.
- Starting fall greens inside can be easier than direct sow and make timing flexible.
- Fall greens are much less likely to bolt, although sometimes hit by an early frost.
- Many fall greens are hardy and will be sweeter with a light frost; some will survive most winters and be a delight in early spring.



# Two Approaches:

## *direct sow vs. transplant*

### When to Transplant

- Spring transplants:
  - Long-season warm veggies like tomatoes, peppers and eggplant require climate-controlled head start
  - Controlling soil temperature and moisture provides predictable germination for a wide range of plants.
  - Avoiding wind and frost damage and pest pressure gives plants a most secure start
- Summer and fall transplants:
  - When your garden is full of larger plants, you can start replacements inside
  - When conditions outside are too hot and dry, you can get plants to germinate inside



### Direct Sow Advantages

- Less disturbance
- Fewer supplies, energy/inputs, work

### Best to start outside (either):

Beans, Beets, Carrots, Cucumber, Garlic, Gourds, Melons, Okra, Peas, Pumpkins, Radish, Rutabaga, Shallot, Squash, Turnip, Zucchini

### Best to start inside (either):

Basil, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Chives, Dill, Eggplant, Greens, Kale, Kohlrabi, Leeks, Onions, Parsley, Peppers, Rhubarb, Spinach, Swiss Chard, Tomatillo, Tomato, Most Herbs

# Given a choice, how do I choose ... Direct vs. Transplant?

New beds and lasagna-mulch with immature compost may give poor germination if direct sown.

## Direct Sow Advantages

- Depending on conditions, direct-sown plants *might* catch up to transplants.
- Direct sow *in between* rows of crops you will harvest in a few weeks.

## Direct Sow Disadvantages

- If uneven germination, you end up with gaps where failed or a need to thin if too many germinated.
- If you have problems with slugs (or cutworms) transplants are more likely to survive while direct-sown tiny seedlings may get devoured.

## Transplant Advantages

- Controlled conditions lead to superior germination and less stress.
- To maximize yield, sow most of your spring starts inside. (Tap-root veggies are an exception, especially carrots.)
- Long days-to-maturity and warm season varieties need to time and the heat.
- Later in the season having transplants ready to go—to “pop in”—can improve use of space and yields.
- Summer lettuce and spinach and cilantro may be easier to start in the cool of a house or basement.

# Starting Your Own Transplants from Seed

Now we will focus on the H O W s of growing transplants inside!





# Things to know before you start

In general,  
think like a  
seed in nature  
and mimic  
ideal natural  
conditions

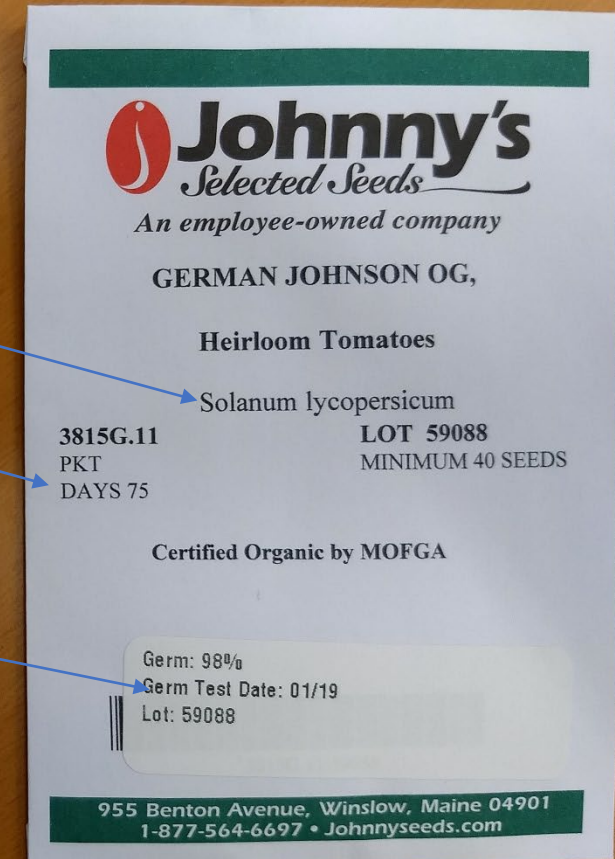
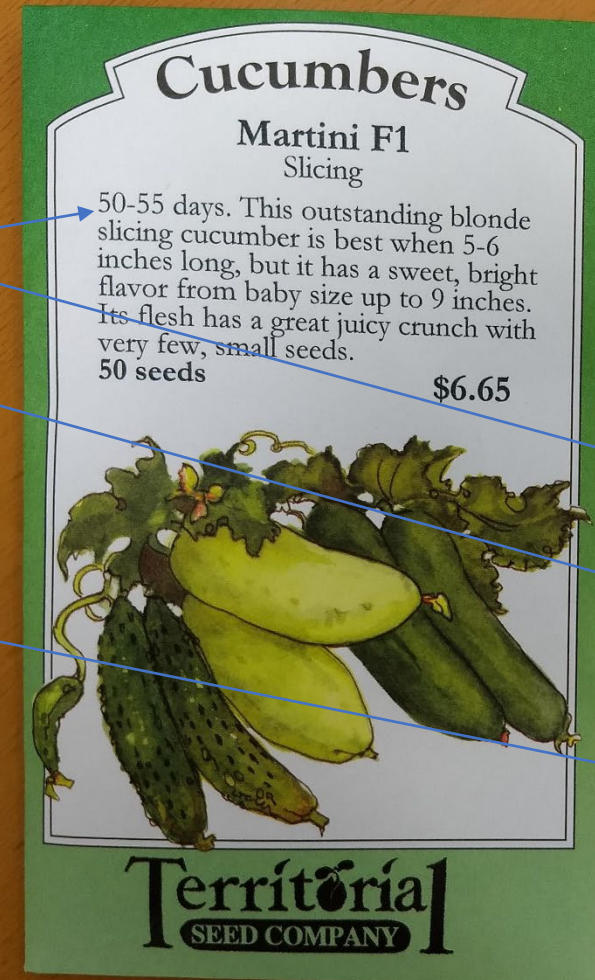
- Determine what you want to grow
- Determine when to sow: Figure out the number of days before transplant date and determine transplant date for each type of plant
- Germination needs: Learn the temperature and light needs and other special techniques for good germination of each plant type
- Plan and set up your space
- Control moisture and air circulation
  - Seeds need both air and water to germinate.
  - Slow-germinating seeds are most vulnerable.
  - Keep soil light and porous, with lots of organic matter, to avoid crusting and improve drainage. After germination, avoid too much water.

## Resources?

Seed packets  
Seed catalogs  
Seed  
company  
websites

# How to Read a Seed Packet

- Variety & Species
- Latin name
- Days to maturity
- Harvest tips
- Disease and pest info
- Germination test



# How to Read a Seed Packet

- Transplant/Direct sow
- Days to germination
- Depth
- Spacing IN row
- Spacing of rows
- Thin to

Martini F1

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Packed for 2017

Seed Depth	Seed Spacing	Soil Temp for Germ.	Days to Germination	Thin Plants to
1/2"	4-6 per hill	65-90°F	4-13	1-2 per hill

**Sowing Indoors**-Not recommended, but seeds may be started indoors as long as great care is taken to transplant no later than 3 weeks after sowing.

**Sowing Outdoors**-Direct sow when soil temperatures reach at least 60°F. This avoids the cool weather that is conducive to powdery mildew. Keep the seed bed moist but not wet. Space hills 3-4 feet apart in all directions.

**Growing Tips**-Mulches and/or floating row covers can greatly improve growth. Consult our catalog for additional information. Cucumbers can be trained to trellis to save garden space.

**Fertilization Tips**-Apply 1/2-1 cup of our complete fertilizer into the soil around each plant to provide the nutrition necessary for optimum production.

**Insect Prevention Tips**-Control striped and spotted cucumber beetles with a natural insecticide for as long as beetles are evident.

**Seed Specs**-Min. germ. standard: 80%. Usual seed life: 3 years.

Please read our seed guarantee before opening this envelope.

PO Box 158, Cottage Grove, OR 97424  
Phone Orders: 800-626-0866  
Web: www.TerritorialSeed.com

(Open carefully, resealable flap)

**TOMATO** *Solanum lycopersicum*

**SEED SPECS:** Seeds/oz. (varies): Avg. 13,400. Avg. Planting Rate: 785 seeds to produce 667 plants needed to plant 1,000 ft. row.

**Transplants:** Avg. 33 plants/pkt., 850 plants/1,000 seeds.

**CULTURE:** *Transplant (recommended)* - Sow 1/4" deep in flats or cold frames about 5-6 weeks before plants can be set out, after frost danger. Keep soil temp. 75-90°F/24-32°C until emergence. When the true leaves are emerging, transplant into pots or cell-type containers, or 2-3" apart in flats. Grow seedlings at 60-70°F/16-21°C. Water only enough to keep mix from drying. Fertilize moderately with fish emulsion or a balanced soluble fertilizer. To harden seedlings, reduce water and temperature for a week before transplanting outdoors. Transplant after frost danger 18-24" apart for determinates, 24-36" for unstaked indeterminates, and 18-24" for staked plants. Abundant soil phosphorus is important for high yields. Excess nitrogen causes rampant growth and soft, late-ripening fruits. Once the soil is thoroughly warm, a mulch may be applied.

**Direct seed** - Extra-early varieties may be direct seeded outdoors around last frost date.

**Pruning & Staking or Caging:** Determinate varieties may be pruned and supported with cages, stakes, or basket-weave; indeterminate varieties should be pruned and trellised for high-quality yields. See website for more info.

**Mulch & Row Covers:** For earlier crops in cool regions create extra warmth with IRT (infrared transmitting) poly mulch and row covers (See catalog).

**HARVEST:** Harvest ripe fruits regularly.

**DISEASES AND PESTS:** All varieties (unless otherwise noted in catalog) are susceptible to early blight, particularly the early determinate ones. To reduce blight, keep seedlings healthy and growing steadily before transplanting out and use containers of sufficient size so that the plants do not become root bound. We also encourage trialing of our blight tolerant varieties. Use wilt resistant varieties where wilts are a problem. Discourage disease with crop rotation and good sanitation. Use B.t. for hornworms. See catalog for controls.

**TOMT**



# Determining your quantity needs

- Be realistic!
- Easy to grow too many tomato plants
- Hard to grow too much basil



# About seeds, seed types

## Different plant families have different seed types

- Seed leaves: number and shape
- Seed size & shape

- A seed is more than a package of genetic material: It's a fully formed structure made to last until conditions are right
- Need for light, dark, heat, cold
- Annuals vs. perennials frequently have different needs



## Useful terms to know:

- *Seed coat*—hard protective
- *Radicle*—future root—emerges first
- *Seed leaves* vs. true leaves

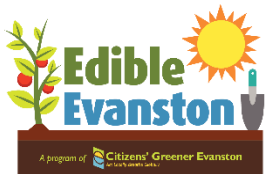
# Are your seeds “good”?

## Seed viability

- Seeds can last more than a single year, but it depends on the plant type.
- Alliums (onions) are notorious for short life.
- I have had decade-old tomato seeds be fine.
- Both germination rate and seed viability decline with age of the seed.
- Viability refers to the seed’s ability to produce a vigorous seedling.
- Viability typically declines before germination rates decline, so it is possible for old seed to still germinate yet produce weak seedlings.

<https://www.highmowingseeds.com/blog/seed-viability-chart/>

<https://www.johnnyseeds.com/on/demandware.static/-/Library-Sites-JSSSharedLibrary/default/dw913ac4d0/assets/information/seed-storage-guide.pdf>



Seed Type	Viability under proper storage	Seed Type	Viability under proper storage
Artichokes	1-5 years	Kale	4 years
Arugula	3 years	Kohlrabi	4 years
Beans	3 years	Leeks	1 year
Beets	4 years	Lettuce	5 years
Broccoli	3 years	Melons	5 years
Brussels Sprouts	4 years	Mustard	4 years
Cabbage	4 years	Okra	2-3 years
Carrots	3 years	Onions	1 year
Cauliflower	4 years	Peas	3 years
Celery/Celeriac	5 years	Peppers	2 years
Chard	4 years	Pumpkins	4 years
Collards	5 years	Radish	5 years
Corn	2 years	Rutabagas	4 years
Cress	5 years	Spinach	2-3 years
Cucumbers	5-6 years	Summer Squash	4-6 years
Eggplant	4 years	Tomatoes	4 years
Endive/Escarole	5 years	Turnips	5 years
Fennel	4 years	Watermelon	4 years



# Planning and timing

- Determine frost-free date
- Figure transplant date desired
- Check the packet, catalog or chart to determine the number of weeks before your transplant date to start your seeds
- Edible Evanston has a chart from Johnny's Seeds available as a handout and on our website
- Every week check the chart to learn what you should be starting.



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### Vegetables

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Corn*	2 to 4	12-Apr	10-May	0 to 2 weeks after	10-May	24-May	
Okra*	4 to 6	12-Apr	10-May	2 to 4 weeks after	24-May	7-Jun	
Cucumber	3 to 4	19-Apr	3-May	1 to 2 weeks after	17-May	24-May	
Melons	3 to 4	26-Apr	3-May	2 weeks after	24-May		
Pumpkins	3 to 4	26-Apr	3-May	2 weeks after	24-May		
Squash	3 to 4	26-Apr	3-May	2 weeks after	24-May		
Watermelon	3 to 4	26-Apr	3-May	2 weeks after	24-May		

# Timing tips & how to use the chart

*continued*

Re-sort your seeds during the season by when and where you want to sow them: Each week inside, plus early and late direct sow outside

Plant family tip!

Not in the chart?  
Find one that is similar

e.g. Asian greens like pak choi are brassicas and have similar needs to kale & mustard.

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# Plan your area, supplies and equipment

## Space needs

- Remember that potting-up will increase the amount of space needed under lights
- Often germinating seeds need only bottom heat and frequently do not need light until sprouted. Therefore, you can germinate in a different space.
- Frost-tolerant plants can go out in protected area to harden off early
- Flats can go out under row cover or in cold frames prior to planting out to free indoor space for others.

## Where to set up

- Under-utilized space like basement or extra room in house is commonly used
- Access to electricity essential
- Can be unheated as long as you supply bottom heat to warmth-loving plants and the space is frost-free.
- Decent air circulation is a plus to keep plants healthy. (A fan helps!)
- Standard flats are 11x21, so work with surfaces that accommodate that size



# Equipment and supplies

- Soil
- Heat/Temperature Control
- Light
- Containers
- Labels



# Soil

- Different opinions on need for fertilizer components and on need for it to be sterile. (Having it sterile can prevent damp-off, a fungal disease. But active biology is desired.)
- Soil-less medium
  - Peat-based
  - Coconut-Coir based
  - Compost based
- Purchase specialty mix



## SOIL BLOCK POTTING MIX RECIPE

Each batch makes about 2½ cubic feet, which fits comfortably in a wheelbarrow. We mix it up in a cement mixer.

1. Add to the cement mixer in this order:
  - 1½ five-gallon buckets of peat moss (sifted to ½ inch)
  - ½ cup of lime
  - ½ cup of blood meal
  - 2 cups of alfalfa meal
  - 1 cup of rock phosphate
  - 1 cup of kelp meal
2. Run the cement mixer for about two minutes, then add:
  - 1 five-gallon bucket of perlite
  - 1½ five-gallon buckets of compost (sifted to ½ inch)
3. Run the cement mixer for another two minutes or so.

### Make your own from

Peat moss or coconut coir

Perlite or vermiculite

Compost or worm castings

### Can add:

Greensand, kelp meal

Soft rock phosphate

Cottonseed meal, dried whey,  
bloodmeal or alfalfa meal

Mycorrhizal powders

Lime to balance acidity of peat

# Temperature

*Warmth for germination, if needed*

- Heat mat (smaller ones usually do not require a separate thermostat) — about \$25 each to fit a flat
- Box with incandescent bulb for warmth
- Radiator with plenty of spacers to avoid overheating

Be sure to check temperature requirements of seed you are planting!

- Often *growing plants* will no longer need added heat
- Fluctuations in heat for larger seedlings can cause bolting

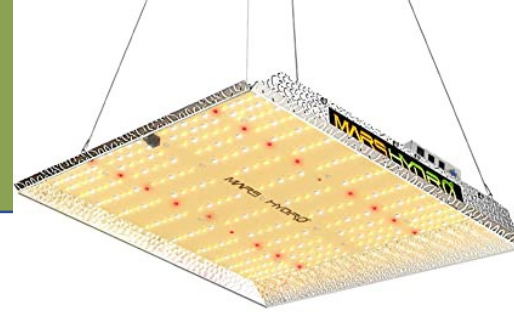




# Light

## *Light for growing once germinated*

- Old fluorescent shop-light (<\$20)
- LED shoplights tend not to be full-spectrum or in 6400K range
- Specialty T5HO and full-spectrum LEDs now easy to find
- Fluorescent tubes should be cool AND warm set of 2
- Very bright south window.  
Frequent rotation required
- Use reflectors to maximize light





# Troubleshooting: Relationship of heat and light

## *Too much heat without enough light*

- Heat causes most plants to grow faster
- Warm growing conditions without enough light will lead to weak, leggy seedlings
- Crowding (not thinning) and too much moisture or fertilizer also can cause this

## *If you are working with limited light:*

- Keep it cool
- Use heat and high light-levels for warmth-loving plants which need it most
- After germination, don't overwater. But if using heat, check water needs frequently.



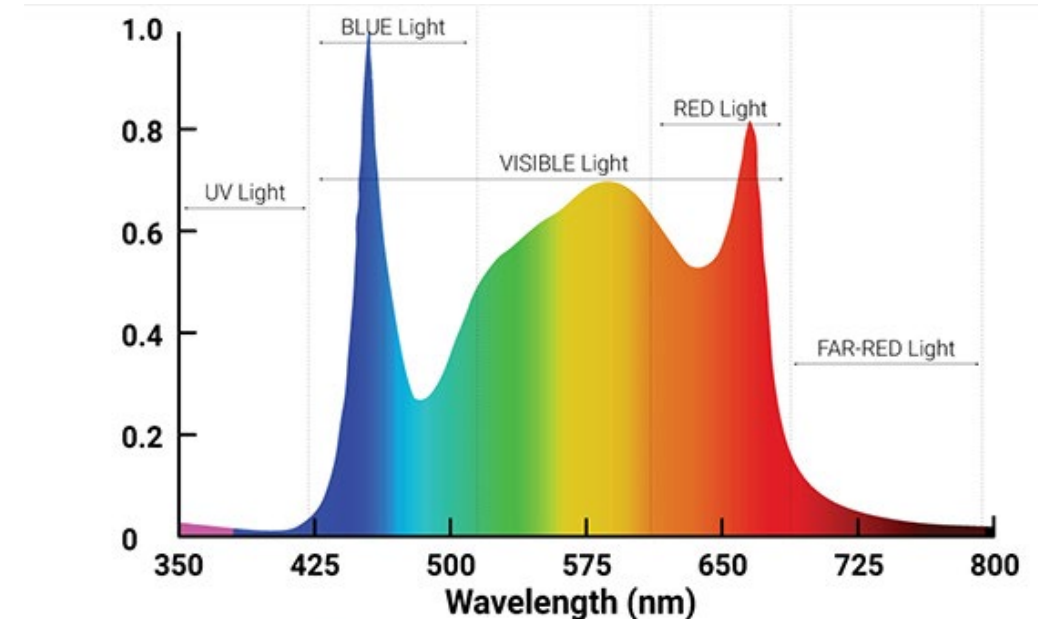
# Light characteristics to consider

## *Intensity, distance, color, timing*

- Intensity is brightness. It is not lumens, and is not watts: it's plant usable light.
  - What matters is: The amount of light that actually reaches your plants.
  - Distance:
    - Too close*, and heat can be a problem depending on the source. Also, distribution may be uneven.
    - Too far*, and intensity fades to nothing.
- Traditional grow lights should be about 4–6 inches from seedlings.  
New high-intensity LEDs may be better spaced farther.

# Color, wavelength, Kelvins, etc. ...choosing from the array of options

- Generally, choose full spectrum
- “Burple” lights were popular, but now white full spectrum solutions are available
- Blue lights (or full spectrum light) is suitable for starting seeds and leafy greens, as well as non-flowering house plants.
- Red light (or full spectrum light) is needed for promoting bud formation in flowering plants. It also promotes shorter plants (stockier, tighter nodes).
- White lights or mixed/balanced/full spectrum light bulbs are suitable for most plants at any stage of growth.



## UV Light (10nm-400nm)

While it won't contribute to photosynthesis and is still under research, UV light has been shown in studies to increase production of terpenes and anthocyanins which can enhance the color profile, aroma, and flavor of your flowers.

## BLUE Light (400nm-525nm)

Contributes to photosynthesis and has effects on the plants morphology, causing it to grow stockier and more dense. Many HID lighting technologies are weak in producing these spectrums.

## VISIBLE PAR Light (400nm-700nm)

This is the spectrum range which can be used by the plant for photosynthesis and thus is the most important range of light for growth. 400nm-700nm is the currently accepted range, many scientist have conducted tests showing far-red light also contributes to photosynthesis and advocate expanding it to 400nm-750nm.

## RED Light (600nm-700nm)

Contributes to photosynthesis and has effect on the plants morphology, causing the plant to stretch. Red light is particularly useful as it is the most efficient light to produce using LEDs, meaning you will get the most light per watt of power used.

## FAR-RED Light (700nm-750nm)

Recent research has shown this previously ignored section of the spectrum can have immense benefits for plant growth. It has been seen to increase leaf size which can increase a plants ability to absorb light ultimately increasing overall growth. Contrary to prior belief, it has also been shown to contribute to photosynthesis.



# Timers

*Mine run  
6 am to  
9 pm.*

- Seedlings do best with 16-18 hours per day, so 6 to 8 hours of darkness
- How much darkness a plant gets is critical, depending on the plant stage.
- Seedlings are less finicky about having darkness, but as plants grow and get more nodes, daylength change will trigger tendency or ability to flower/bolt, or for onions, bulb.
- Outdoor Grounded Daily Mechanical Timer with two outlets to run everything



I use a  
Westek  
TM1613DOLB

# Containers

- Trays to hold seedlings and allow bottom watering
- Tray lids or plastic bags for germination period
- Used six-packs and other seedling pots
- Peat pots/jiffy pots/cow pots
- Tofu or mushroom containers and toilet tubes; deli or yogurt containers
- Don't use egg cartons or tiny things
- Berry-style ventilated, and lettuce mix unvented containers
- Soil block maker and NO pots at all





# Labels

- Something waterproof to note at a minimum:
  - plant type
  - variety
  - start date(add more data to the label so you don't have to look it up later)
- Popsicle sticks will work, but wood may lead to mold. Cut up old milk containers.
- Paper labels are not great but work.
- Pencil is the best thing to write with.  
Does not run or fade and can be erased if needed.





# Cleanliness is *not* required!

- Old advice was to wash everything in 2% bleach solution or 3% hydrogen peroxide (like from drug store) to prevent disease.
- This is unpleasant and bad for your body, and it's not required.
- Active good biology, good airflow, and *not* overwatering is much more important!
- Sterile soil is not an advantage!

# Step-by-step how-to: 1

- Moisten mix.  
Use warm water and moisten until very damp yet still crumbly
  - Best to do this a day or more ahead and then adjust moisture as needed
  - Peat moss will NOT absorb cold water when it is dry.
  - Use warm water
- Fill pots to top; bang lightly to settle. Top off as needed.  
Keep filled to brim
- Soil blocks are much wetter and very dense. Drips a bit when squeezed.
- Choose soil blocks or biodegradable pots for plants with sensitive roots to avoid transplant shock
- The extra density of soil-block media provides a longer time before plants run out of nutrients/need potting up

# Step-by-step how-to: 2

- Seed spacing and depth based on seed type.  
Read packet or reference chart
- Rule of thumb based on seed size (2 to 3 x diameter)
- Make depressions with label or a pencil, etc.
- One to three seeds max per cell usually:
  - Based on germination rate and willingness to thin/transplant.
  - Some things work as multi-sown clumps
- Tips for controlling seeding rate  
—clean cut, crisp folded-ridge on packet and tapping.
- Cover seed, unless needs light.  
(Then might use a bit of vermiculite to keep moist.)

# Step-by-step how-to: 3

- Bottom water
- Maintain humidity during germination. Use bag or lid (much better). Then reduce humidity

Germination period ends with emergence of first TRUE leaves, not seed leaves.

- Water, humidity and air circulation are all needed during growing

Do not overwater after germination!

Fertilization needs:

- None initially—it's in the seed.
- Then infrequent dilute use of compost tea, fertilizer (fish emulsion is good) or sea-weed extract.





# Handling larger seedlings

- Pot up/transplant and/or thin as they grow
- Do not let get root bound
- Split by pricking out as soon as have true leaves.  
Do not do this for plants that don't like root disturbance.
- If indoors a long time, fertilizer needs increase
- Yellowing or drying out probably means high time to pot up
- Soil ball method, etc.





# Harden off before planting in garden

- Indoor conditions are mild, and plants need gentle exposure to toughen tissue
- Start a few hours a day (2–3) in a protected, partly shady location
- Do not let freeze; bring indoors at night
- Wind is especially tough on plants grown indoors
- Increase exposure to sun and wind over 1 week to 10 days
- Use of row cover or shade cloth allows for transition period with less moving
- Avoid significant temperature fluctuations





# Plant out when appropriate

Some plants hate root disturbance when transplanting, others don't mind.

- e.g. Squash dislikes root disturbance, so, use soil blocks or peat pots or toilet tubes and don't disturb roots, while onions can be pulled apart and abused and bare-root transplanted.
- Tear back any paper/peat pots to prevent wicking moisture
- Plant deep—bury any stem at least up to cotyledon leaves
- Coleman's transplant tool—insert, pull soil towards you, place plant, remove tool



# Troubleshooting and special techniques



# Seed storage for increased life

- Proper seed storage conditions are cool and dark.
- The moisture content within the seed greatly affects germination rates.
- Seeds should be stored in original packaging, below 50 degrees F, in a dark place where moisture content will stay stable.
- I use a de-humified basement.
- If you use the refrigerator, put in a glass jar with desiccant.
- When retrieving seeds from cold storage, allow the container to reach room temperature before opening it to prevent condensation from forming.

# How many seeds?

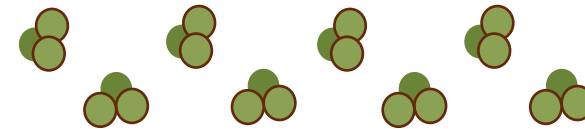
Generally, our goal is to sow or thin to a single plant.

What is the seed germination rate going to be?

With old or hard to sow seeds you may want to sow more and then thin.

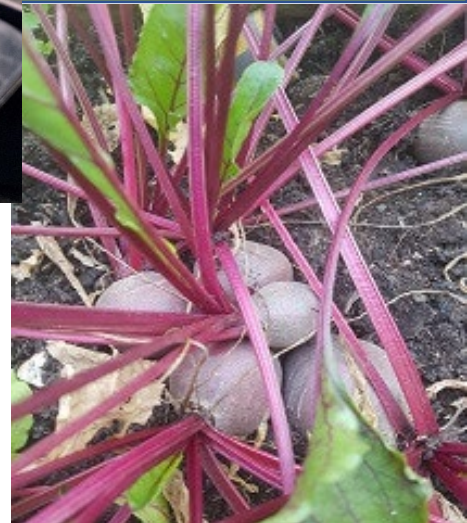
A special technique for some crops is multi-sowing: a very, very different approach to thinning and spacing, but still generally is planted in normal rows.

Groups fit best if staggered in their rows:



Multi-sowing works surprisingly well for crops like beets and radish, chard, spinach, onions and leeks.

The idea is to sow a few seeds together (3 to 6). When planting out, *do not thin*, but leave large gaps between groups, resulting in more plants per sq. ft.



# Seeds with special needs

- Pre-treating is required for some seeds
- Many hard-to-germinate seeds benefit from warm-water soak
- Seaweed soaking (or water) can help reluctant seeds
- Scarifying, or filing or nicking seed coat: Speeds germination of tough seeds.
- Stratification or pre-chilling or humid chilling is needed for some seeds to germinate. Many perennials and wildflowers need this to simulate nature.
- Lettuce and spinach do better, especially in summer, with pre-chilling. Keep seed sealed in glass in the refrigerator in the summer. Watch out for condensation!
- Lightness or darkness during germination—check packet or quality catalog



# Multiple sowings of something on a regular basis

A garden is, frankly, not a “set it and forget it” thing, especially if you want to grow leafy greens.

The goal should be to have a continuous fresh supply that’s enough for your household, but not more than you can handle.

*This means a grow less, more often.*

- Most greens tend to bolt, don’t store terribly well, and crop rather quickly. Frozen lettuce? Canned lettuce? Dried lettuce? Um, no!
- Don’t end up with too much of one thing.



**Above: NO! Don’t end up with too much all at once**

**Below: Better! Multiple rows started over time, but still too much lettuce**





# Why they Bolt and What to Do About It

## Too little sleep and stress!

The biggest triggers for bolting are stress and day length.

**Stress** causes plants to focus on reproduction

- Common factors are lack of water, tight spacing, poor soil health

Plants native to non-equatorial regions are sensitive to **day length** (actually, it's night length).

- Many are triggered to flower by shortening nights (longer days)
- A few are triggered by shortening nights, so after solstice.
- If you interrupt the darkness, you will disturb the cycle.

**A few controls & exceptions for daylength-based bolting**

- Very young plants too small to set flower will often not bolt.
- Pinch or cut back brassicas regularly to force them back into vegetative mode.
- Plant very early (under protective cover) *or* wait until after solstice.
- Use the space in your garden anticipating bolting is likely to occur.



# Thank You!

- Time for questions and more demonstrations.
- Select up to 5 packets of seeds from the min seed swap!

