

Start Your Own Plants from Seed

Many gardeners grow some things from seed, but often only by directly sowing seeds in the garden.

Today we will focus on growing transplants inside.

Why we start inside and transplant

- Our northern climate means a shorter growing season due to day length, air and soil temperature, and moisture
 - Fruiting plants like tomatoes and peppers take too long to mature otherwise
- Frost sensitive and heat-loving plants do best as transplants
- Less disease and pest pressure inside
- Control the environment: soil, temperature and moisture
- Better use of precious garden space during growing season for succession
- Improved weed control, as many weeds germinate alongside desired seed

Advantages of starting your own transplants

People have different motivations

- Ability to grow many more types of vegetables and select from dozens of varieties not easily available as plants
- Low cost of transplants after initial investment
- Timing is in your control
- Control of seed type and all inputs for organic or other desires
- Pride of ownership—it feels good!

Selecting what to grow

- Huge range of types (from Artichoke to Watermelon) and varieties
- Select varieties for what solves problems or interests you, such as:
 - Disease resistance
 - slow-to-bolt
 - days to harvest, early/late (some of each is desirable to spread harvest)
 - flavor, color
 - plant form: determinate/indeterminate, vining or bush, etc.
 - Zone, day length, warmth and other climate issues
 - Recommendation of local growers

- Breeding method
 - Open-pollinated & heirlooms.
 - Can save seed, but spacing rules apply for true-to-type of variety results.
 - Heirlooms just are older open-pollinated types
 - F1 Hybrids
 - often good vigor or special characteristics.
 - Traditional crossing of two varieties.
 - Can't save seed and have breed true
 - Open-source vs. patented traditional breeding
 - GMO is really not an issue
 - Organic seed and coatings

Determining your quantity needs: be realistic

- Easy to grow too many tomato plants
- Hard to grow too much basil



Things to know before you start

- In general, think like a seed in nature and mimic ideal natural conditions
- Plan and set up your space and get an idea of what you want to grow
- Figure out the number of days before transplant date and determine transplant date for each type of plant
- Learn the temperature needs for germination of each plant type
- Moisture control is critical
- Seeds need both air and water to germinate. Slow-germinating seeds are most vulnerable. Keep soil light and with lots of organic matter to avoid crusting.

About seeds, seed types

- A seed is more than a package of genetic material; fully formed structures made to last until conditions are right
- Dicotyledons, Monocots (Allium, Grasses)
- Radicle—future root—emerges first
- Seed leaves vs. true leaves
- Seed coat, hard protective



- Seed size & shape varies by family (cotyledon/seed leaf shape does, too)
- Need for light, dark, heat, cold
- Annuals vs. perennials frequently have different needs

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
- Every week check the chart to learn what you should be starting.
- TIP: 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



Supporting & Sharing **Edible Evanston**
Local Food for All Evanstonians

Spring Sowing & Planting Dates

from http://www.johnnyseeds.com/e-edibleevanston.aspx?source=W_interactiveTool_112014

Crops 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	
Peas/pea	8 to 10	6-Feb	23-Feb	2 to 3 weeks before	19-Apr	26-Apr
Beans	8 to 10	16-Feb	1-Mar	2 weeks before	29-Apr	
Peas*	3 to 4	16-Feb	6-Mar	6 to 8 weeks before	15-Mar	29-Mar
Corn seeds/mache	4 to 6	16-Feb	22-Mar	3 to 6 weeks before	29-Mar	19-Apr
Spinach	4 to 6	16-Feb	22-Mar	3 to 6 weeks before	29-Mar	19-Apr
Celery & celeriac	10 to 12	23-Feb	6-Mar	1 week after	17-May	
Caulards	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Kale	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Kohlrabi*	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Mustard*	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Cabbage	4 to 6	1-Mar	12-Apr	4 weeks before	12-Apr	19-May
Lettuce	4 to 5	6-Mar	22-Mar	3 to 4 weeks before	12-Apr	19-Apr
Beets*	4 to 6	15-Mar	29-Mar	2 weeks before	26-Apr	
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	30-Apr	10-May
Artichoke	8	15-Mar		on frost-free date	10-May	
Tomatoes	8 to 9	22-Mar	12-Apr	1 to 2 weeks after	17-May	24-May
Peppers	8	26-Mar		2 weeks after	24-May	
Basil	6	5-Apr		1 week after	17-May	
Corn*	2 to 4	26-Apr	10-May	2 to 2 weeks after	24-May	24-May
Cucurbit	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	2-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	

* Usually direct-sown, but may be started indoors
 ** Specifically recommended for direct seeding outdoors
 *** We have left current crop failures in the list because they may be available next year.
 Note: Dates are the same from year to year, but this table requires a year for computation simplicity.
 * Frost free date based on data from <http://www.laws.llnwd.com/jms/1stsecl/frost-free.htm> ... Similar data also at <https://www.ncei.noaa.gov/climate/normal/cim20suppl/1stsecl/L.pdf>



Growing Your Own Transplants from Seed

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		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
Leeks	8 to 10	16-Feb	1-Mar	2 weeks before	26-Apr	
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
Spinach	4 to 6	16-Feb	22-Mar	3 to 6 weeks before	29-Mar	19-Apr
Celery & celeriac	10 to 12	23-Feb	8-Mar	1 week after	17-May	
Collards	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Kale	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Kohlrabi*	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Mustard*	4 to 6	1-Mar	15-Mar	4 weeks before	12-Apr	
Cabbage	4 to 6	1-Mar	12-Apr	4 weeks before	12-Apr	10-May
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Plan your area, supplies and equipment

Space Needs

- Remember that potting-up will increase the space needs under lights
- Often only germinating seeds need bottom heat and they 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
- It can be unheated as long as you supply bottom heat to warmth-loving plants
- Decent air circulation is a plus to keep plants healthy
- Standard flats are 11x21, so work with surfaces that accommodate that size

Equipment and supplies

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



Soil

Different schools of thought on need for fertilizer components and on need for it to be sterile. Having it sterile can prevent damp-off, a fungal disease.

- Soil-less medium
- Purchase specialty mix
- Make your own from
 - Peat Moss
 - Perlite or vermiculite
 - Compost or worm castings
- Can add:
 - Greensand
 - Colloidal Phosphate
 - Cottonseed meal, dried whey or dried blood
 - Lime to balance acidity of peat

Temperature

Warmth for germination, if needed

- Heat mat (smaller ones usually do not require a thermostat) (\$30)
- 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



Light

Light for growing once germinated

- Fluorescent or LED shop-light/work-light. (<\$20)
- LED may not have the ideal spectrum
- Fluorescent tubes should be cool AND warm or full spectrum if possible
- Very bright south window. Frequent rotation required
- Reflectors to maximize light



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
- Newspaper pots
- Tofu or mushroom containers and toilet tubes
- Dixie cups or yogurt 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.
- 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

- Not a material thing, but essential for success.
- Washing everything in 2% bleach solution or 3% hydrogen peroxide (like from drug store) keeps away disease.
- Protect your hands from this solution and rinse after washing

Seed with special needs

- Pre-treating is required for some seeds
 - Many hard-to-germinate seeds benefit from warm-water soak
 - Scarifying, or filing or nicking seed coat: Speeds germination of tough
 - Stratification or pre-chilling or humid chilling is needed for some seeds to germinate. Many perennials and wild flowers need this to simulate nature.
 - Lettuce often does better, especially in summer, with pre-chilling and it can help spinach as well. You can keep seed sealed in glass in the refrigerator in the summer. Watch out for moisture!
- Lightness or darkness during germination—check packet or quality catalog

Step-by-step how-to:

- Moisten mix. Use warm water and moisten until very damp yet still crumbly
- Peat moss will NOT absorb cold water if it is dry.
- Fill pots to top; bang lightly to settle. Top off as needed. Keep filled to brim
- Soil blocks are much wetter and very dense.
Choose soil blocks or biodegradable pots for plants with sensitive roots to avoid transplant shock
- Seed spacing and depth based on seed type.
 - Rule of thumb based on seed size (2 to 3 x diameter)
 - Make depressions with label or a pencil, etc.

Growing Your Own Transplants from Seed

- One to three seeds max per cell usually:
Based on germination rate and willingness to thin/transplant.
- Tips for seeding—clean cut, crisp folded-ridge on packet and tapping.
- Cover seed, unless needs light. (Then might use a bit of vermiculite to keep moist.)
- Bottom water
- Maintain humidity during germination. Bag or lid. 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
- Fertilization needs: None initially—it's in the seed. Then infrequent dilute use of compost tea, fertilizer 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 once have true leaves
 - If indoors a long time, fertilizer needs increase
 - Yellowing or drying out probably means high time to pot up

Harden off before planting in garden

- Indoor conditions are mild, and 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

Plant out when appropriate

- Some plants hate root disturbance when transplanting, others don't mind: Squash dislikes root disturbance, so use peat pots or toilet tubes and don't disturb roots, while onions can be pulled apart and abused and bare-root transplanted. (Tear back to prevent wicking)
- Coleman's transplant tool—insert, pull soil towards you, place plant, remove tool