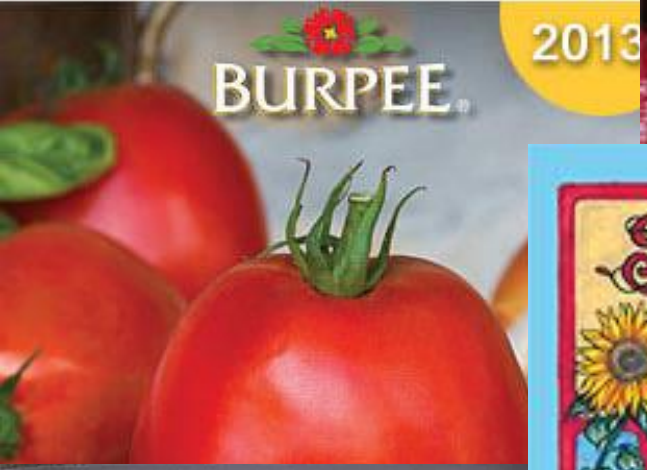
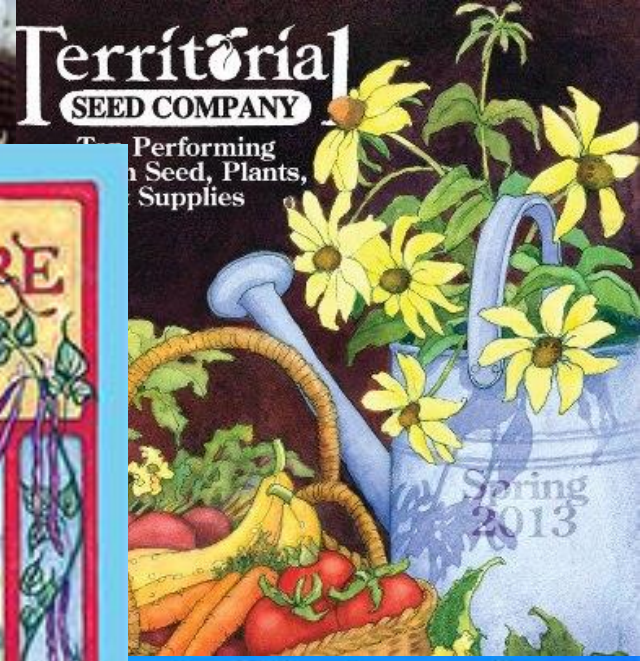
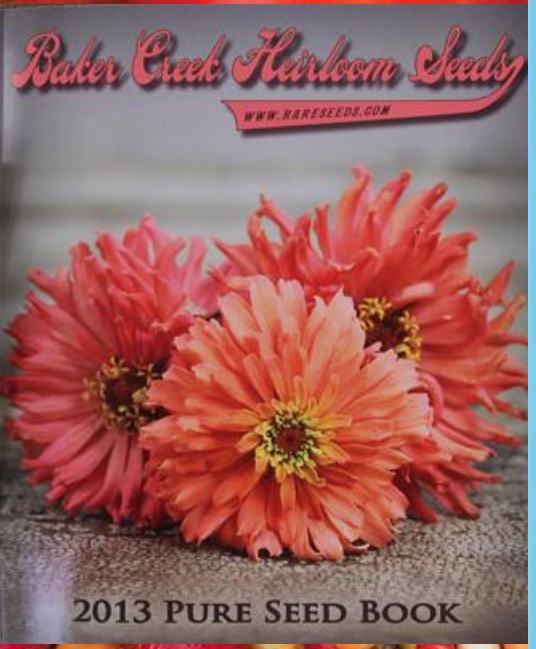
Selecting and Starting Seeds

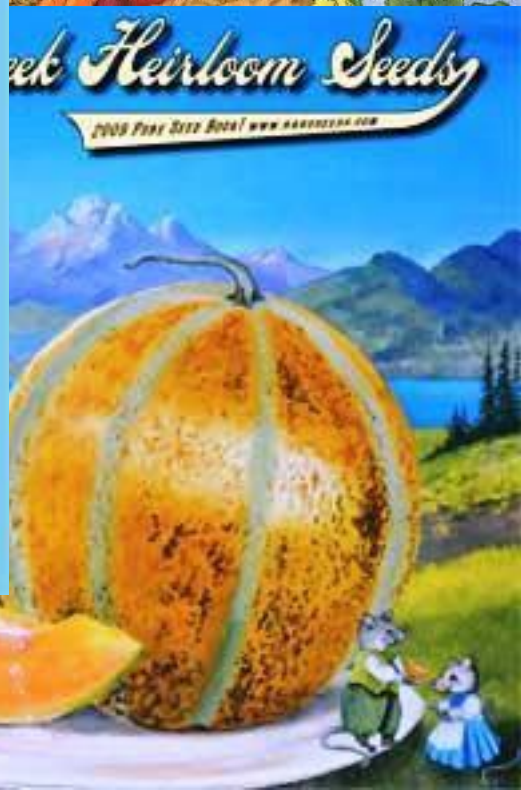
Gretel Anspach
Lifetime Master Gardener
Massachusetts Master Gardener Association


BURPEE
2013


Territorial
SEED COMPANY
Performing
Seed, Plants,
Supplies
Spring
2013


Baker Creek Heirloom Seeds
WWW.RARESEEDS.COM
2013 Pure Seed Book


Southern Exposure
Seed Exchange
2013 Catalog &
Garden Guide
"Saving the Past
for the Future"


Heirloom Seeds


SAVE 10%
BECOME A MEMBER

The tradeoff

Start seeds because:

- Much more variety
- The latest cultivars
- Cheaper in quantity
- Can get the timing right
- Really cool!

Buy seedlings because:

- Don't have to fiddle with them all spring
- Takes less space inside
- Cheaper for small quantities
- Instant gratification

Martha Washington Petunia
(may need to buy as seeds)

Rose Wave™ Petunia
(available everywhere)

A compromise

Parsley, Plain Organic

Plain, flat, deeply cut dark green leaves with more pronounced flavor than Extra Curled Dwarf. Certified Organic.

Flat-leaved variety used in salad dressings, poultry, soups and as an ingredient of pesto. Flavor is much more pronounced than that of the more familiar curled type. Certified Organic Seed.

Sun: Full Sun, Part Sun
Height: 15-18 inches
Days to Maturity: 40-60 days
Sowing Method: Direct Sow/Indoor Sow

Be the first to **write a review**

Buy This Product

Item #	Order	Quantity	Price
60265A	1 Pkt. (600 seeds)	0	$4.95

ADD TO CART

THE BURPEE GUARANTEE

WE PROMISE

If you are dissatisfied with your purchase let us know within a year, and we will refund your money or provide a replacemen

SHARE: E-MAIL Like 8

Our Experts Suggest | *Related Products* | *Growing Info* | *Videos*

How to Sow >
How to Grow

How to Sow
Sow in full sun after danger of frost. In frost-free areas, sow from fall to early spring. Sow seeds thinly and cover with 1/4" of fine soil. Keep evenly moist. Seedlings emerge in 14-21 days.

- Some seeds can be sown directly outdoors
- It will say somewhere on the web site / catalog

Direct sowing versus starting indoors

Often direct sown

- Vegetables
  - Basil, Parsley
  - Beans, Peas
  - Corn
  - Cucurbits (Cucumbers, pumpkins, squash)
  - Leafy greens (lettuce, spinach)
  - Roots (beets, carrots, parsnips, turnips)
- Annuals
  - Annual asters
  - Bachelor buttons
  - California poppies
  - Marigolds
  - Nasturtium
  - Sunflowers

Almost never direct sown

- Vegetables
  - Brassicas (broccoli, cabbage, cauliflower)
  - Celery
  - Leeks. onions
  - Solanaceous (eggplant, peppers, tomatoes)
- Annuals
  - Dusty Miller
  - Geraniums
  - Impatiens
  - Pansies / violas
  - Snapdragons
  - Wax begonias

http://extension.missouri.edu/p/G6570
includes a nice table of when to start what, also a good source for more information

What does that mean?

Arikara Sunflower – heirloom

Holiday Sunflower – OP

Sunrich Orange Sunflower – F1

Zohar Sunflower – F1, OG

Terms – Heirloom

- Definition: A cultivar that originated at least 50 years ago
  - Or else at least 100 years ago
  - Or else before 1945
  - Or maybe it's 1951
  - Or maybe it was just handed down in a family
  - Or maybe it's just not a hybrid
- For sure:
  - Implication that it has more old-fashioned goodness and less commercial viability
  - Guaranteed it's open pollinated (not hybrid)

Terms – Open Pollinated vs Hybrid

Open pollinated

AA

x

aa

First generation hybrid (F1)

Aa

2nd generation hybrid (F2)

AA

Aa

Aa

aa

Four O'Clock (Mirabilis jalapa)

Terms – Organic (OG)

- Definition: Seeds grown per the rules of the USDA National Organic Program
  - Using only certified organic fertilizers and pesticides for several years on that land.
  - Does not mean no pesticides!
- Why buy organic seed?
  - Retain organic certification on your property
  - Support the concept of organic agriculture
- Why not buy organic seed?
  - Costs more (~15%)
  - Organic not always available
  - Minute amount of residual pesticide on seed probably not even measurable on grown plant

Size	Cost Conventional *	Cost Organic *	Organic / Conventional
175 seeds (pkt)	$5.15	$5.40	1.05
1,000 seeds	$6.45	$8.75	1.36
5,000 seeds	$18.10	$35.75	1.98
25,000 seeds	$65.25	$153.50	2.35
100,000 seeds	$243.00	$496.00	2.04

* Provider beans, Johnny's Selected Seeds, January 2022

Getting started

- Decide what to grow – and how much!
- Figure out where to do this.
- Figure out when to do this.
- Get the plants, pots, growing media, etc.
- Read the seed packet
- Figure out when to start
- Get going!

What are your goals?

If your goal is	Organic	Conventional	Species	Open pollinated cultivar	Hybrid cultivar
Saving seeds	OK	OK	Yes	Yes	No
Massive production	OK	OK	Maybe	Maybe	Probably
Disease resistance	OK	OK	Maybe	Maybe	Probably
Taste / aroma	OK	OK	Maybe	Maybe	Maybe
Preserving biodiversity - food	OK	OK	Maybe	Yes	No
Preserving biodiversity - environment	OK	OK	Yes	Maybe	No
Preserving organic certification	Yes	If organic not available	OK	OK	OK

Do some research – veg

- Production:
  - Cornell Vegetable Growing Guides (http://www.gardening.cornell.edu/homegardening/sceneb771.html)
  - New England Vegetable Growing Guides (https://nevegetable.org/crops)
- Disease resistance:
  - Web search of disease trials
- Variety / Timing / Flavor
  - Seed Savers Exchange (9,153 tomato listings versus 134 in Johnny's)
  - Cornell Vegetable Varieties (http://vegvariety.cce.cornell.edu/main/login.php)
  - All American Selections
  - (calibrated) Seed Catalogs

Do some research – ornamental

- Which species?
  - Beecology project (https://gegearlab.weebly.com/plant-list.html)
  - Missouri Botanical Garden plant finder
- Which cultivar?
  - All American Selections
  - Nurseries & botanical gardens
  - (calibrated) Seed Catalogs

Deciding which cultivar to get

Yellow Pear Tomatoes

Sungold Tomatoes

Yellow Pear Tomato

"Enormous number"
"deliciously tangy".
- Burpee

"tall, vigorous vines"
"Mild flavor"
- Johnny's Selected Seeds

"loaded with hundreds of … fruit"
- Territorial Seed Company

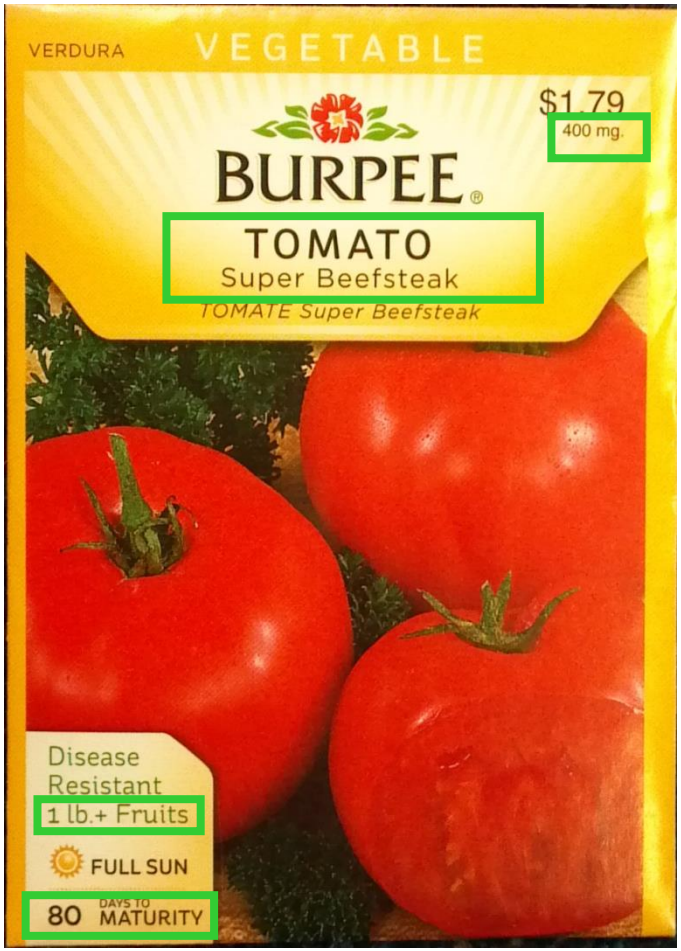
Sun Gold Tomato

"sweet-tart
"large clusters"
"sweet and delicious"
- Burpee

"Exceptionally sweet"
"Vigorous plants"
"taste can't be beat"
- Johnny's Selected Seeds

"flavor is a big hit"
"vigorous indeterminate vines"
- Territorial Seed Company

Read the seed packet!



250-380 seeds per gram: 400 mg = 100-152 seeds

When to start

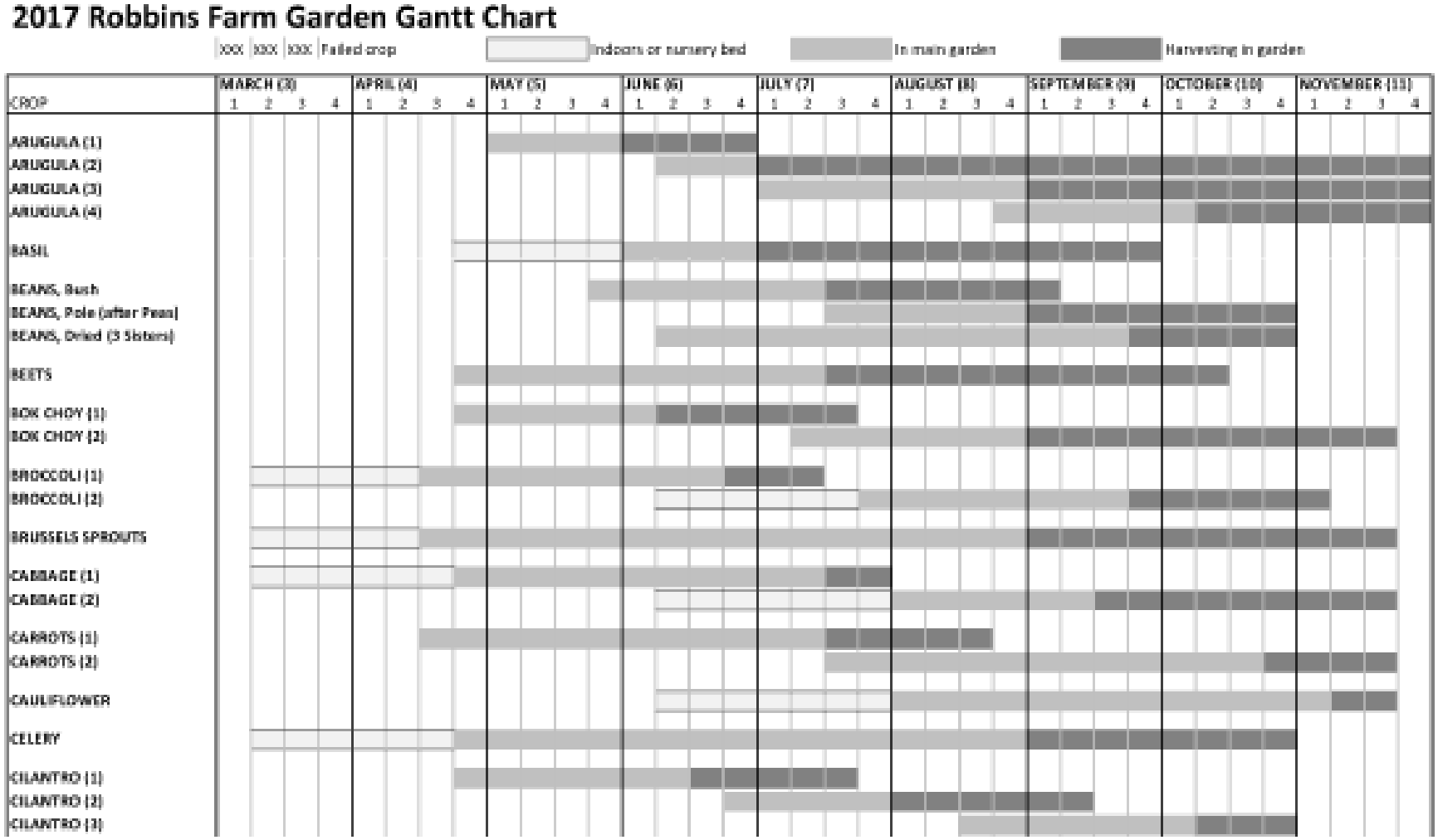
- Not too early
  - Direct seeded plants may be frost-killed or delayed
  - Indoor seeded plants can take overgrow available space
  - Plants can usually get caught up from a late start
- Consider soil temperature as well as air temperature
- Consider planting date – vacation schedule, etc.

When to start seeds

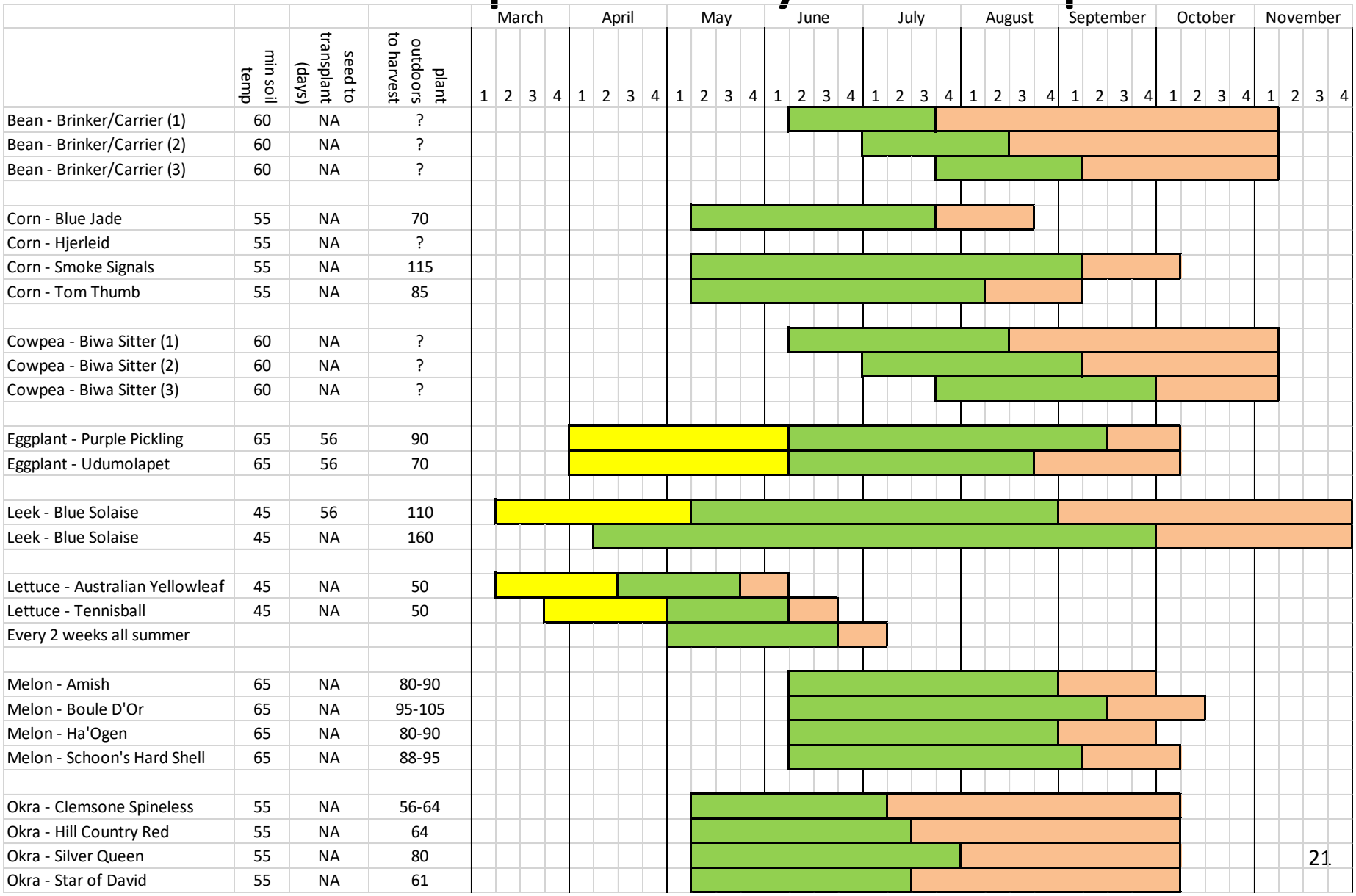
50% last frost date from derived from “NCDC freeze frost”

Estimated planting dates in zone 5 in http://extension.missouri.edu/p/G6570

Borrow someone else's schedule



And adapt it for your crops

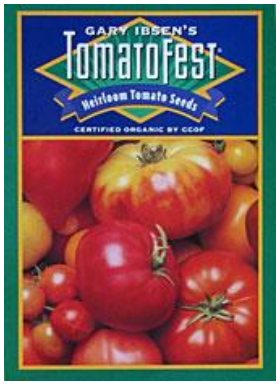


	min soil temp	seed to transplant (days)	plant outdoors to harvest
Bean - Brinker/Carrier (1)	60	NA	?
Bean - Brinker/Carrier (2)	60	NA	?
Bean - Brinker/Carrier (3)	60	NA	?
Corn - Blue Jade	55	NA	70
Corn - Hjerleid	55	NA	?
Corn - Smoke Signals	55	NA	115
Corn - Tom Thumb	55	NA	85
Cowpea - Biwa Sitter (1)	60	NA	?
Cowpea - Biwa Sitter (2)	60	NA	?
Cowpea - Biwa Sitter (3)	60	NA	?
Eggplant - Purple Pickling	65	56	90
Eggplant - Udumolapet	65	56	70
Leek - Blue Solaise	45	56	110
Leek - Blue Solaise	45	NA	160
Lettuce - Australian Yellowleaf	45	NA	50
Lettuce - Tennisball	45	NA	50
Every 2 weeks all summer			
Melon - Amish	65	NA	80-90
Melon - Boule D'Or	65	NA	95-105
Melon - Ha'Ogen	65	NA	80-90
Melon - Schoon's Hard Shell	65	NA	88-95
Okra - Clemsone Spineless	55	NA	56-64
Okra - Hill Country Red	55	NA	64
Okra - Silver Queen	55	NA	80
Okra - Star of David	55	NA	61

Cost

+

+



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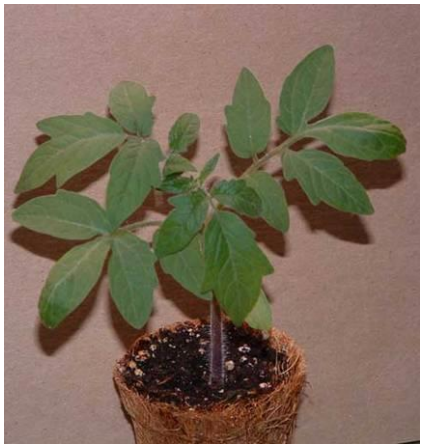


4” plastic pot

29c each

Seed starting mix

$11.50/8 quart bag

Tomato seeds

$2.49/pack

(35-40 seeds)

Number of plants	Pots	Seed starting mix	Seeds	Total cost	Cost per plant
1	$0.29	$11.50	$2.49	$14.28	$14.28
20	$16.00	$11.50	$2.49	$29.99	$1.50

Required Equipment – “Dirt”

- Seed Starting Mix a.k.a. Soil-less mix
  - Sterile – no fungus, no bugs
  - Very light – easy for seedlings to push through
  - Generally peat moss, perlite, vermiculite
- You can use potting mix
  - Generally heavier, a bit harder for seedlings to deal with
- DO NOT USE garden soil

Required Equipment - Pots

Jiffy-7

Peat pots

Newspaper pots

Seed starting One plant per pot

Plastic flower pot

20 row seedling flat

Seed starting Many plants per pot

Flower pot

Large flat

Final stage
One plant per pot

Required Equipment - Fertilizer

- Any balanced liquid fertilizer will do
  - Balanced means that the three numbers (Nitrogen, Phosphorus, Potassium) are about the same (e.g. 5-5-5)

Required Equipment – Misc.

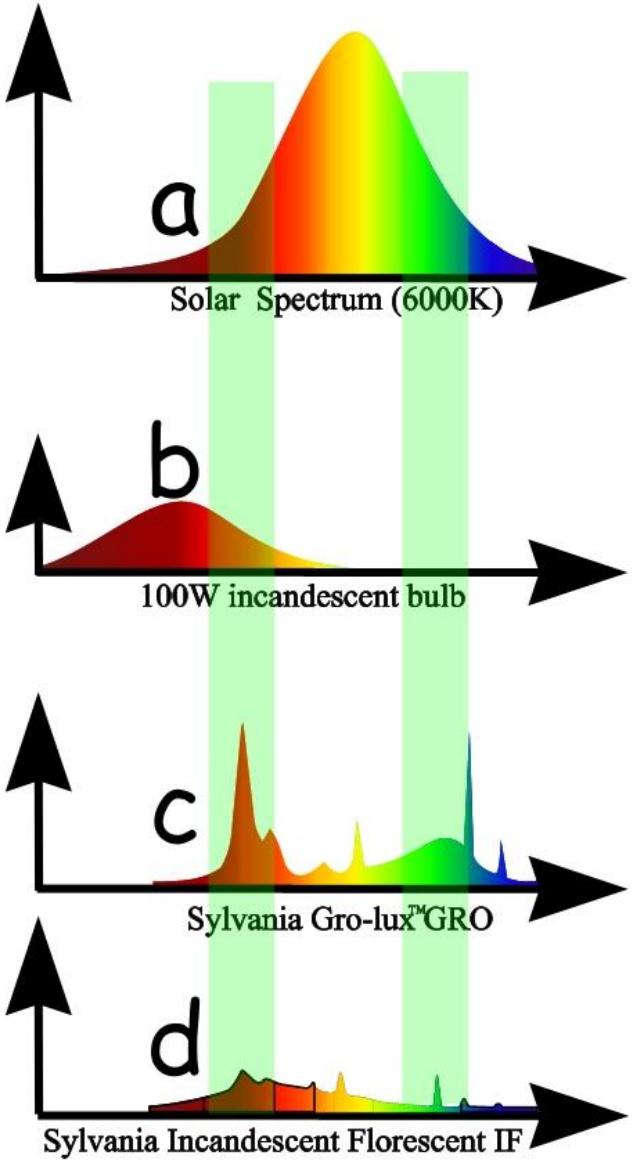
Labels

- Label when you plant, not the next day, because
- You will not remember which seeds you planted where, and
- All seedlings look alike

Watering tray

- Seedlings need to be watered a lot
- Bottom watering is best

Equipment you probably need - Light



If you have a sunny window or a greenhouse, you may not need supplemental light

Otherwise get a 4’ shop light

- Cool white bulbs
- Each light handles an area about 1’ wide x 3.5’ long
- Light is cool so it can be adjusted to almost touch the plants

http://resources.yesican-science.ca/tomatosphere/final/trans_absorption_band1.html

Another reason for artificial light

Optional Equipment - Heat

- Seeds germinate fastest if soil temperature is about 75 degrees
- Options:
  - Radiator, refrigerator with heating element on top
  - Seedling heat mat (~$25)
  - Don't bother (they'll germinate soon enough)

Plant	Advertised germination time	Actual w/ heat mat
Alyssum	7 days	2 days
Calendula	10-14 days	2 days
Chamomile	7-14 days	3 days
Geranium	14 days	3 days
Kale	5-10 days	2 days
Lettuce	2-14 days	2 days
Marigold	7 days	2 days

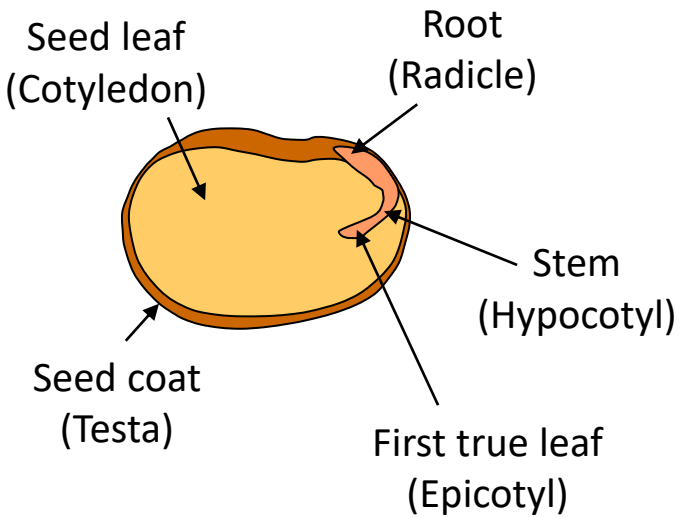
How many seeds to start?

- Consider
  - How many plants you want
    - Area
    - Plant separation
  - Germination rate
- For example

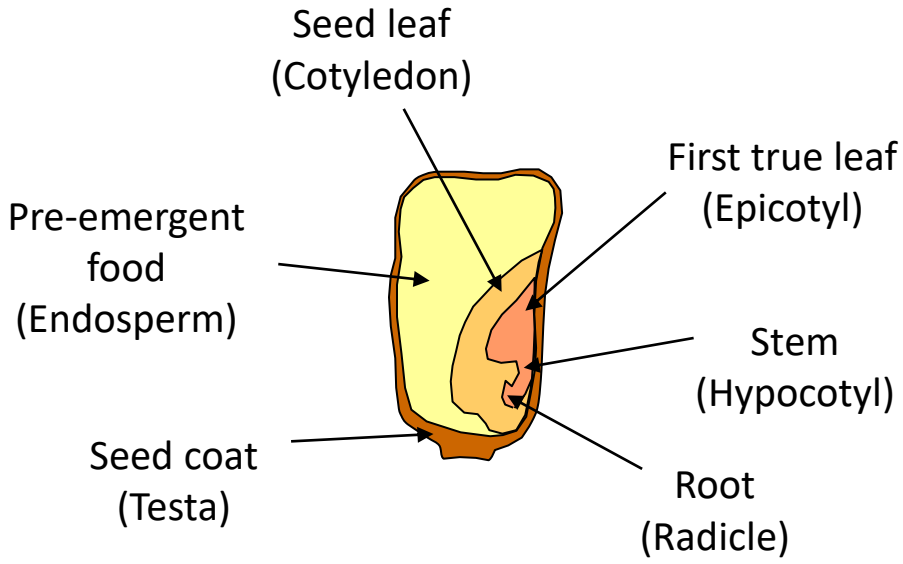
	Rows/bed	Separation in row	plants per bed-foot	Germination rate *	seeds per bed-foot		Row length	Start this many seeds
Eggplant	1	24"	0.5	60%	0.83		20	17
Leek	4	6"	8	60%	13.33		20	267
Pepper	1	18"	0.67	55%	1.22		20	24
Tomatillo	1	24"	0.5	50%	1.00		20	20
Tomato	1	24"	0.5	75%	0.67		20	13

* Germination rates from
http://www.webgrower.com/information/seed_germ_standards.html

What's in a seed?



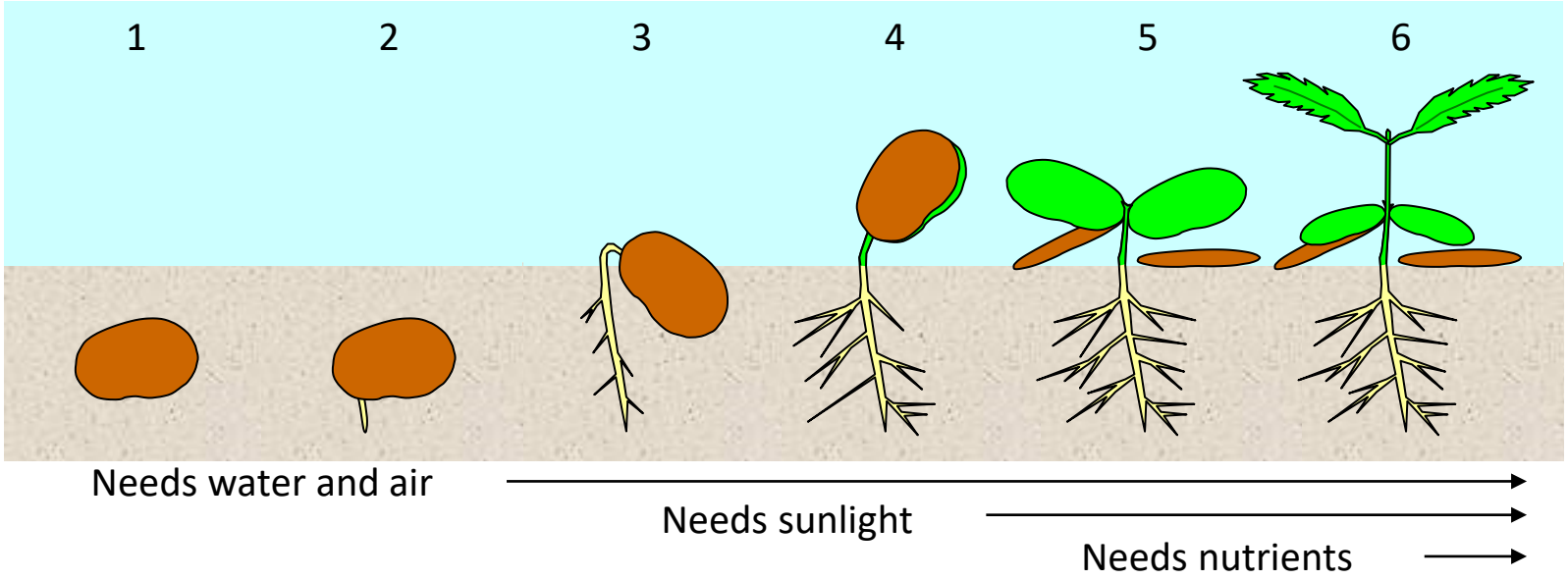
Bean Seed



Corn Seed

How seeds sprout

1) The seed is planted. The seed coat begins to absorb water.
2) The root pushes through the seed coat into the soil.
3) More roots begin to develop. The stem forms a hook pulling the seed through the surface of the soil.
4) The stem straightens out, pulling the rest of the seed above ground.
5) The seed opens and the seed leaves deploy. The seed coat may drop off.
6) The stem gets longer and the first true leaves emerge. The seed leaves eventually fall off.



Growing 1 Pepper - planting

- Start in late March or early April
- Pour hot water on a Jiffy-7 pot till the pot puffs out and looks dark
- Make sure the pot is right-side up.
- Scratch a shallow hole in the top of the pot
- Drop in 2 seeds
- Shove the dirt over the seeds and squeeze a bit to make sure there is good soil-seed contact.

Growing 1 Pepper - germinating

- Keep an eye on the pot, looking for a bit of green poking up from where the seeds went in
- If you put the pot over a heat source (~ 70 degrees) the seeds will germinate quicker.
- Add water (bottom-water) if the pot doesn’t feel cool.

Growing 1 Pepper – early growth

- Put the pot in a very bright window and rotate the pot every few days to keep the seedlings growing up. OR
- Put a fluorescent light directly above the seedlings (1 inch away)
- Water the pot when it feels warm.
- When the true leaves appear, add half-strength liquid fertilizer every time you water.

Growing 1 Pepper – the tough part

- With scissors, cut off the weaker of the two seedlings at the base.
- The alternative is to plant only one seed per pot, and throw out the pots where no seed germinated.

Growing 1 Pepper – transplanting

- When the roots grow through the side of the pot, it's time to put the seedling in a larger pot.
- Put about 1" of potting mix or seedling mix in the bottom of a 4" pot and firm it down.
- Strip the plastic mesh off the outside of the peat pot and set in the larger pot.
- Add more potting mix to fill the pot. The seedling should be planted at the same depth as before, and there should be ¼" to ½" space at the top of the pot for watering.
- Water the pot till the water runs out the bottom.

Growing 1 Pepper – more growing

- Put the pot in a very bright window and rotate the pot every few days to keep the seedling growing up. OR
- Put a fluorescent light directly above the seedling (1 inch away)
- Water the pot when the soil feels warm. Add half-strength liquid fertilizer every time you water.

Growing 1 Pepper – hardening off

- About 1 week before you want to plant the outside, start hardening the plant off.
- Place the plant outside in the shade (tree shade, house shade, shade-cloth, etc)
- Water the pot when the soil feels warm. Add half-strength liquid fertilizer every time you water.

Growing 1 Pepper – planting out

- Dump the seedling out of the pot. If any roots are wrapping around the inside of the pot, pull them loose.
- Plant the plant in moist garden soil, preferably on a cloudy day.
- Water the plant in after planting to eliminate air pockets.
- Water weekly unless it rains.

Growing 25 Peppers - planting

- Start in late March or early April
- Fill a 4” pot with moist seedling mix.
- Scatter the seeds over the top of the soil.
- Cover the seeds with ¼” of seedling mix and firm it down to make sure there is good soil-seed contact.

Growing 25 Peppers - germinating

- Keep an eye on the pot, looking for a bit of green poking up from where the seeds went in
- If you put the pot over a heat source (~ 70 degrees) the seeds will germinate quicker.
- Add water (bottom-water) if the pot doesn't feel cool.

Growing 25 Peppers – early growth

- Put the pot in a very bright window and rotate the pot every few days to keep the seedlings growing up. OR
- Put a fluorescent light directly above the seedlings (1 inch away)
- Water the pot when it feels warm.
- When the true leaves appear, add half-strength liquid fertilizer every time you water.

Growing 25 Peppers – transplant

- When the seedlings in the pot look crowded, it's time to separate them.
- Slide the root ball out of the pot and drop it gently on its side. This will loosen the root ball.
- Grab each seedling by a seed leaf and tease it out of the clump.
- Plant the seedling at the same depth it was growing in seed starting mix or potting mix in a larger pot
- If you put each seedling in a 2" pot, you will need to repot them again. If you put them in a 4" pot, it will take up a lot of space for a much longer time.

Cold Stratification

- Late fall / early winter plant seeds in damp sand or peat or 50-50 blend
- Store pot in fridge for at least 2.5 months
- Remove from fridge, add light, and start growing
- Or else plant outside in fall

<u>Recommended for</u>

Milkweed (*Asclepias*)

Lupine (*Lupinus*)

Pincushion Flower (*Scabiosa*)

Perennial sunflowers (*Helianthus*)

Spider Flower (*Cleome*)

…and many more

Soaking or Scarring

- Soak seeds overnight just before planting, or
- Scratch seed coating with sandpaper or knife

<u>Recommended for</u>

Joe Pye Weed

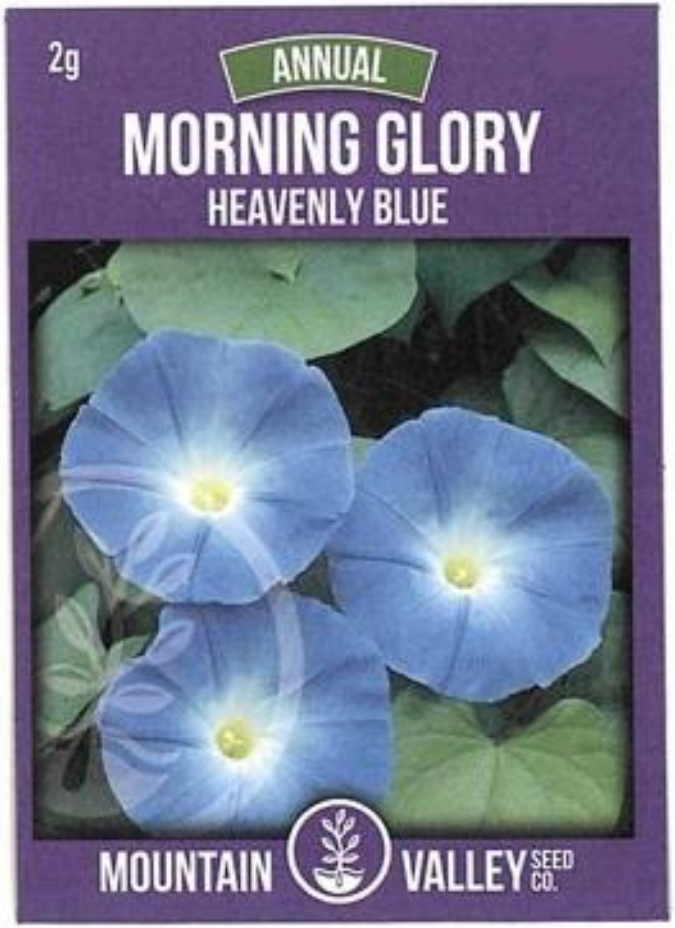
Lupine

Milkweed

Morning Glories

Nasturtiums

…and many more



To cover, or not to cover

- Some seeds require light to germinate
- Some seeds require dark to germinate
- Some are somewhat flexible

	Light (1)	Germination Temperature (2)	Growing Temperature (2)	Crop Time (3)
Annuals				
Snapdragon	L	70-75	60-65	8-10
Wax Begonia	L	70-75	60-65	10-12
Periwinkle (Vinca)	C	75-80	70-75	8-10
Celosia	C	75-80	70-75	7-9
New Guinea Impatiens	LC	75-80	70-75	8-10
Geranium	C	70-75	65-70	10-12
Petunia	L	75-80	65-70	8-10
Scarlet Sage (Salvia)	L	75-80	70-75	8
Coleus	L	70-75	65-70	8-10
Marigold	C	70-75	65-70	6-8
Pansy	LC	65-70	60-65	8-10
Zinnia	C	70-75	65-70	4-6

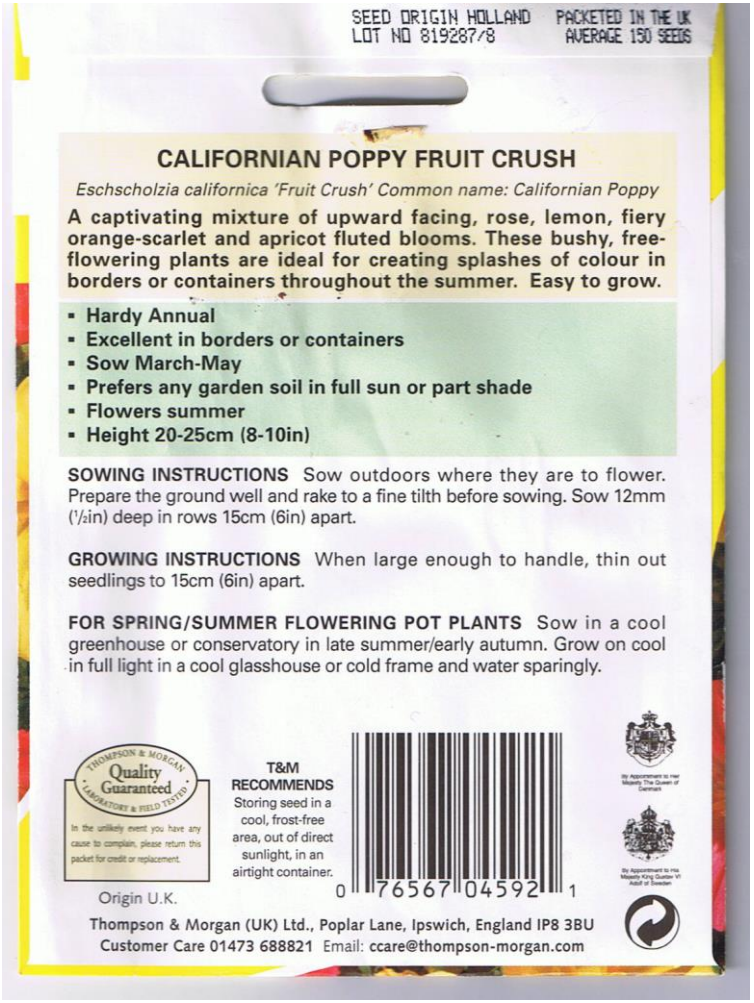
L = requires light
C – cover
LC – lightly cover

https://hortnews.extension.iastate.edu/2017/01/seed-germination-guide

Marigolds

"Sow in average soil after danger of frost" means time from seed to bloom is relatively short (6-8 weeks)

Poppies



"Sow outdoors where they are to flower" means they hate to have their roots disturbed. The "growing 1 …" approach will work. The "growing 25…" will not.

What can go wrong

- Dry seedling mix / potting soil will shed water. If you start seeds in dry mix, get a mister and keep misting the soil with warm water till it finally starts absorbing the water
- If you get the seeds wet and then let them dry out, they will die. They are very vulnerable from the time growth starts till when the first 2 true leave appear.
- If you don't give the plants enough light, they will get very gangly. You can mitigate this somewhat when the plant is bigger by pinching the plant to encourage branching, but it is better to avoid.
- If you let the plant get root bound, it will never be as strong as if you can let it grow unbound.
- If you cover the seeds with a clear dome, it increases the chances of damping-off disease.

Questions?

What is “sufficient” separation?

Allium ampeloprasum	Leeks	1 mile
Beta vulgaris	Beets, Swiss Chard	1/2 mile
Brassica oleraccea	Broccoli, Brussels Sprouts, Cauliflower, Cabbage, Kale	1 mile
Brassica rapa	Turnip	1/2 mile
Capsicum annuum/baccatum/frutescens	Peppers	500' or insect proof
Citrullus lanatus	Watermelon	1/4 mile
Cucumis melo / sativa	Melons, cuumbers	1/4 mile
Cucurbita argyrosperma / maxima / ficifolia / moschata / pepo	Squash, pumpkins, gourds	1/4 mile
Daucus carota	Carrots, Queen Anne's Lace	1/4 mile
Eruca sativa	Arugula	1/4 mile
Lactuca sativa	Lettuce	25 feet
Phaseolus lunatus	Lima beans	1 mile
Phaseolus vulgaris	Beans	almost 0
Pisum sativum	Peas	50 feet
Solanum lycopersicum / pimpinellifolium	Tomatoes	"Length of the garden"
Solanum melongena	Eggplant	1/4 mile or insect proof
Zea mays	Corn	1 mile