

This informational packet was provided by Alison O'Connor, Larimer County Extension, as a courtesy to the Estes Valley Community Garden (EVCG) and its Gardeners, following Ms. O'Connor's presentation on April 5, 2016 at the Estes Park Senior Center.

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Thank you.

**Estes Valley Community Garden Board**

## Starting Your Garden from Seed

The Science of Germination and Culture of Seedlings



Alison O'Connor  
Larimer County Extension  
csuhort.blogspot.com

## Advantages of Starting Your Own Seed

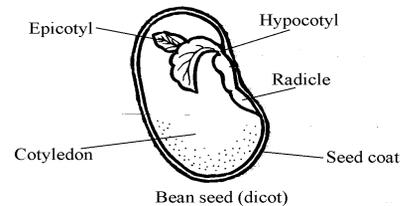
- Better and earlier results
- Guarantee the provenance of your plants
- Greater variety
- Less expensive?

## What we'll cover today:

- The biology of seeds
- Anatomy of a Seed Packet
- Seed Starting Equipment and Supplies
- When to Start Your Seeds
- How To Start Your Seeds
- Seedling Culture
- Terminology to know
- Things that can go wrong
- Storing seed year-to-year

## What is a Seed?

- A tiny dormant self-contained storage unit in a suspended state of development



## Planning Tools

- Rough sketch of your vegetable garden and its dimensions
- Calendar
- Knowledge of when to plant (based on your location) for days to harvest
- Your notes from previous years about what did well...and what did not

## The Secret of Seed Catalogs

- Everything sounds awesome...but not everything will grow in Estes Park
- Everything will look perfect—they have professional photographers
- It's easy to go overboard and buy too much
  - Remember the size of your garden!
- Keep your selections to 80 days to harvest or less!

## 10 Easiest Seeds to Grow

1. Beans
2. Cucumbers
3. Radish
4. Pumpkins
5. Cosmos
6. Peas
7. Lettuce
8. Squash
9. Sunflowers
10. Zinnias

## Determinate

- Patio Tomato (small, bush type)
- Fruit tends to come on at one time (canning)

## Indeterminate

- Much larger plants
- Flower and produce throughout the season

## Open Pollinated

- Plants pollinated by insects, wind, animals
- Retain diverse, strong genetic heritage
- CAN reproduce true to seed
- CAN spontaneously cross pollinate

## Heirloom, Heritage

- Varieties growing reliably for at least 50 years  
– not disease resistant
- Reproduce true to parentage

## Hybrid

- Produced by crossing parent plants naturally or artificially
- Create desired characteristics in offspring ( i.e. disease resistance)
- Do not reproduce true to seed

## Treated or Inoculated

- Legumes (peas, beans) and corn can be treated with fungicide to prevent rot
- Legumes may be inoculated with rhizobia to encourage N-fixation
- There are certified organic seeds that have been treated

## Genetically Modified

- Altered at the gene level to produce characteristics such as sterility or pest resistance
- These crops are not available to home gardeners
- They are limited to just large scale agriculture
- “No GMOs” = marketing gimmick
- If truly concerned, then buy USDA certified organic seed

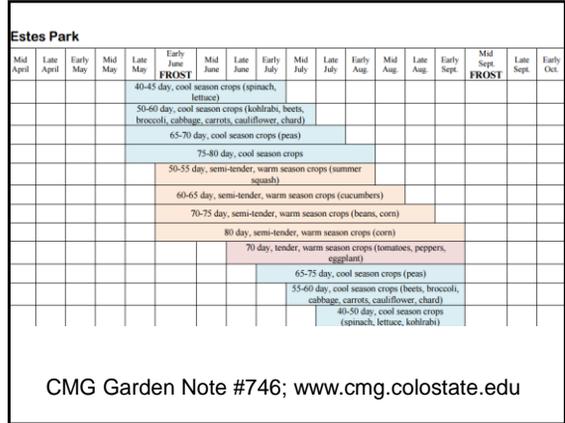
## When Do I Start Planting My Seedlings in the Garden?

- Seed Starting Rule #1: Don't Plant too Early!
- WHEN is governed by the last frost date for the area (for the summer garden)
- OR ambient soil temperature (for the spring garden)
- Consult your seed packets and catalogs for planting out dates and count backwards

### Last Average Frost Date for Estes Park

		Spring Frost Probability			Fall Frost Probability		
		90%	50%	10%	10%	50%	90%
Estes Park	32" threshold	May 27	June 9	June 21	Sept 3	Sept 14	Sept 25
	28" threshold	May 5	May 21	June 6	Sept 10	Sept 21	Oct 1
	24" threshold	Apr 18	May 8	May 27	Sept 18	Oct 4	Oct 19

- Unless you're using season-extension techniques, plan on your season lasting from mid-June to mid-September (~90-100 days)
- But you can grow lots of cool season veggies on the front or back end of the season
- Or use raised beds or containers to increase the length of the growing season

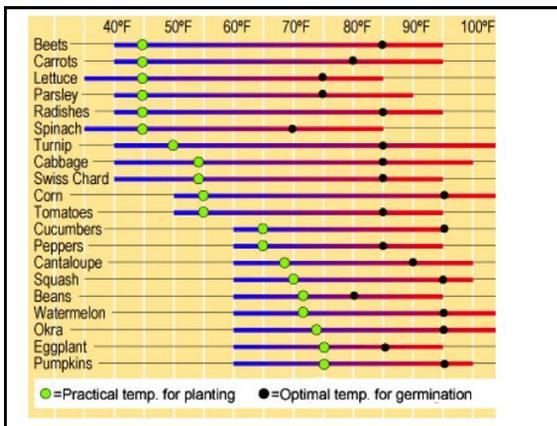


### Planting the Spring Garden

- Planting based on soil temp for seed germination
- Soil temp 40-60 degrees
- Ambient air temp
- Can thrive in less sun
- Leafy crops tend to be "sweeter" with cooler weather
- Require crop protection when temps drop

### Planting the Summer Garden

- Requires warmer soil (>65 degrees) and warm ambient air temps
- Minimum of 6 hours of full sun
- Seeds can be started indoors or outside based on seed packet recommendations
- Timing based on the variety and the specifications on the seed packet



### Planting Chart

- Here's where journaling becomes relevant
- Weather events
- What worked this year; what did not
- Specific varieties
- Save these notes year-to-year and also your planting plans
- Talk to fellow gardeners

## Seed Trays

- Find what works for you
- Must have drainage holes! Seed trays should never sit in standing water
- Can purchase covers or use other materials

## Self Watering Systems

- Not completely reliable, so you will still need to monitor the substrate moisture levels
- Could use if you're out of town for a few days

### Peat Pellets

- Good for "finicky" transplinters, such as squash, cucumbers, corn
- Expensive
- Take up more space

## Soil Blocks

- Creates your own seedling "mold"
- Labor intensive
- Eliminates the need to purchase peat pots or containers
- Spacing is important so roots don't cross blocks

## Reuse and Recycle

- Containers must be clean and sterilized
- Soapy water, 10% bleach solution
- Plastic is best
- Air dry
- Citrox
- Greenshield

## Heating Mat

- An expensive investment, but worth the expense if you're a serious gardener
- Buy a thermostat, or you will potentially cook your seedlings
- Keep at 70-75 degrees F
- Range in price (depending on size): \$20-100
- Thermostat: ~\$20

## Germination Medium

- Never use garden soil or potting soil
  - Garden soil carries insects and diseases and is too dense for tiny seedlings to push their way through
  - Potting soil generally too dense as well
  - Too much water retention
- Purchase a seed starting medium
  - Fine texture
  - Lightweight
  - Drains well
  - May be difficult to moisten
  - May contain peat moss, coir, perlite, vermiculite or fertilizer

## Planting the Seeds

- Fill cells with moistened medium
- Gently tamp—do not pack down
- Gently sprinkle/place seeds on top
- Gently sprinkle with ¼" medium or vermiculite
- Gently tap the tray to ensure seed to soil contact
- Spritz with water
- Label with the plant name and date
- Keep the seed packet in your records

## Moisture

- Spritz lightly after planting
- Dome or plastic application to create a terrarium effect
- Monitor soil moisture as the seeds sprout

## Light requirement

- 12-16 hours per day for seedlings
- Without supplemental light, success will be limited
- Fluorescent lights are inexpensive and work as well as "grow lights"
  - Two cool white fluorescent bulbs
  - Keep them 2-4" above the seedlings (so the plants don't stretch)
  - Install a timer so the lights are only on for 12-16 hours a day
  - The seedlings need darkness to develop properly

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## Watering

- Your biggest challenge
- More water does not make seeds grow or germinate any faster
- Mist
- Water from below for uniform watering and to keep seeds in place

## Fertilization

- Begin fertilizing when true leaves emerge
- Apply via irrigation (fertigation)
- Use any complete fertilizer (example: 10-10-10)—follow the label on the fertilizer label for mixing instructions
- Do not mix in a stronger concentration!
- When plants are young, consider a ¼ rate and increase as plants grow larger

## Strengthening Seedlings

- Use a fan in the area to increase air flow to prevent disease problems and increase seedling strength
- Air flow mitigates potential moisture problems
- Touch

### Thigmomorphogenesis

- Thigmo: touching; Genesis: change
- Can occur from wind, water spray, snow load or rubbing other plants
- Results in stocky, sturdy plants—your goal

## What Can Go Wrong?

- Poor germination
- Mold on medium surface
- Yellowing leaves
- Leggy plants
- Leaf discolorations
- Discolored roots
- Seedling death

## Damping Off

- A seedling disease
- Young seedlings without many leaves or a large root system are most susceptible
- Caused by fungi *Rhizoctonia* sp. or water mold *Pythium* sp.
- Signs of damping off:
  - Seedlings fail to emerge from the media
  - Cotyledons are soft, water-soaked and mushy
  - Seedling stems are thin and thread-like
  - Young leaves wilt and turn gray or brown
  - May have white, webby mold present

## Prevention of Damping Off

- Clean and sanitize seed trays and equipment
- Use clean, sterile soilless media
- Wash your hands
- The disease favors cool, wet conditions—monitor media moisture and heat mat temperatures
- Low light, overwatering, high salts from over fertilizing are all associated with increased damping off

## Review: Success Tips for Seed Starting

- Use clean dry seed that are good varietal choices for your location
- Chart planting, journal results
- Use clean, sterile, well drained containers
- Use sterile soilless medium
- Provide adequate moisture, light, warmth
- Provide good circulation
- Harden off before transplanting



<http://www.ext.colostate.edu/>

**The Colorado Master Gardener Program**

Contact a CMG Volunteer about your yard and garden question  
Search online yard and garden publications




<http://www.cmg.colostate.edu/index.shtml>    <http://www.ext.colostate.edu/ptlk/index.html>



Colorado Gardening for Everyone  
\*\*Advice and Observations from your CSU Extension Horticulture Agents and Specialists\*\*

**CO-Horts**

<http://csuhort.blogspot.com>