

“How” To Have a Successful Garden

I. Knowing and understanding the site

- sun, shade
- winds
- plot design (tall, short, shade, sun plants)
- well-draining or wet
- zone (we are in 5b) and Microclimates
- Allopathic plants: There some so be aware of trees like Black Walnut’s which release compounds toxic to most garden plants.
- Keep it close to the house!

II. Garden Soil

- Need good aeration for root development. In nature
 - ✓ Heavy clays are tough to grow in (compacts/too dense for root growth).
 - ✓ Sands are good for aeration but don’t hold nutrients or moisture well.
 - ✓ Silts are the material in between (mucky when wet).
 - ✓ “Loamy” soil is best - it is a mixture of Clay, Sand and Silt.
- Good to add organic matter for soil nutrition (compost) but not more than 1/3 or you get all green and no fruit!
- Raised beds can use what’s called Mel’s mix (Mel Bartholomew’s Square Foot Gardening) 1/3 compost 1/3 vermiculite 1/3 peat – makes for good aerated soil
- Living soil: A teaspoon has over one billion microbes including bacteria, fungi, and protozoa. (example: mycorrhizae fungi symbiosis; exchange of fungus-derived nutrients for plant-derived carbohydrates, enabling the colonization of mineral nutrient-poor environments).
- Many soil insects as well as many earthworms are good!
- pH Alkaline/Acid 0 (acid) to 14 (alkaline) (most garden veggies like 6.5 to 7.5 (neutral) some like potatoes like 5 to 6, blueberries 4) Amendments to increase acidity: sulfur, alkalinity: lime (amendments tend to buffer back eventually)

III. Composting

- A Basic Compost pile or bin is a layered mixture of:
 - Coarse dry “brown” stuff (carbons) some examples: straw, dried leaves, shreds of newspaper
 - Mixed with “greens” (nitrogens) some examples: fruit scraps, vegetable scraps, coffee grounds grass and plant clippings
 - 2/1 ratio (2 part carbon to 1 part nitrogen)
 - Hot (aerobic bacteria – needs oxygen) or cold composting (aerobic bacteria needs no oxygen) both work – hot is quicker but requires frequent turning
 - No animal products in general (meat, fish, or poultry) unless you want rodents and other wild animals like raccoons, or pet poop which can carry pathogens (egg shells are fine)

- Vermicomposting is the use of worms to break down composting materials into “worm castings” or worm poop (which makes for great fertilizer). Red wigglers (*Eisenia fetida*) and redworms (*Lumbricus rubellus*) are the preferred species for home composting.

IV. Vegetables, Herbs and Flowers: Early, Mid, Late Season Crops

Cool (Spring and Fall) and Warm (Summer) Season Crops:

- Cool Season Crops (not affected by light frost, light snow): Broccoli, Brussels sprouts, Cabbage, Kale, Kohlrabi, Leek, Pak/Bok choy, Peas, Radishes, Spinach, Turnip, Garlic & Shallots (plant in fall for stratification), Onions, Asparagus
- Cool Season Crops (affected by any frost): Beets, Collards, Carrots, Cauliflower, Celery (mild winter climates lots of sand) Swiss Chard, Potatoes, Parsnip, Mustard greens, Lettuce, Coriander (cilantro)
- Note: many “Cool Season” greens like Lettuce will “bolt” (go to seed or flower) in warmer conditions and will taste bitter. Most cool season plants taste sweeter in when harvested in cool season
- Warm Season Crops: Tomato, Pepper, Eggplant, Cucumber, Squash including Zucchini, Pumpkin, New Zealand Spinach (vine), Sweet Corn, Bush and Vine Beans, Watermelon, Cantaloupe, Sweet Potato (needs long, hot, frost-free season) Basil and most Herbs
- Flowers: **slightly cold tolerant** annuals (early spring transplants): Geranium, Pansies, Sweet Alyssum, Snapdragon, Dusty miller, Petunia. **Cold intolerant** (after frost: 45*-50* evenings): Begonia, Impatiens, Coleus, New Guinea Impatiens, Sweet Potato.
- Annuals and Perennials – Most vegetables and herbs grown here are annuals. Examples of perennial vegetables: Rhubarb and Asparagus (both cool season plants – 2 to 3 years to establish).
- Soil pH
 - Potatoes grow best in an acidic soil between 5.2 and 6.0 (use a little sulfur when planting)
 - Garlic, Shallots, Leeks, and Onions (Alliums) like it slightly acidic
 - Plants like Blueberries, Azaleas, and Rhododendrons are “acid-loving” and need soil around 5.5
 - Hydrangeas: 5.5 and lower for pink, 6.5 for blue

V. Sowing from Seed & How to Read a Seed Packet

- Make sure to read the seed pack!
- Where to buy: big box stores, nurseries, seed catalogs
- When to Sow (know your last frost date)
- Seed Depth (generally 1 to 3 rule)
- Seed Spacing
- Sowing (soil to seed contact, optimum temps, light)
- Days to germination, soil temps, light requirements & seed viability (germination rates)
- Starting Indoors (light, warmth, moisture, damping off, hardening off plants)
- Thinning out seedlings
- Days to maturity
- Saving seed packs in fridge for future viability

VI. Open-Pollinated, Heirloom, Hybrid and Determinate vs Indeterminate Seeds

- **Open-pollination** is when pollination occurs by insect, bird, wind, humans, or other natural mechanisms.
 - Seeds from open-pollinated varieties produce plants and fruit that are identical to their parent.
- An **heirloom** variety is a plant variety that has a history of being passed down within a family or community, similar to the generational sharing of heirloom jewelry or furniture.
 - (Note: All heirloom varieties are open-pollinated but not all open-pollinated varieties are heirloom varieties.)
- **Hybridization** is a controlled method of pollination in which the pollen of two different species or varieties is crossed by human intervention.
 - Hybridization can occur naturally through random crosses, but commercially available hybridized seed, often labeled as F1, is deliberately created to breed a desired trait.
 - The first generation of a hybridized plant tends to grow better and produce higher yields than the parent varieties.
 - However, any seed produced by F1 plants is genetically unstable and cannot be saved for use in following years. Not only will the plants not be true-to-type, but they will be considerably less vigorous.
- **Determinate or Indeterminate:** Tomato plants can either be determinate or indeterminate.
 - Determinate plants will produce tomatoes that all ripen around the same time (generally bush type) no “suckering” required”.
 - Indeterminate plants will continue putting on new growth and new fruits throughout the growing season (generally vine type) remove “suckers” for less vines and more fruit.

VII. Transplanting Plants from Pots

- Check compatibility (similar to seeds; make sure to read label for; sun/shade, moisture level, soil conditions)
- Dig the hole 2 x the size of root ball
- Prepare the soil (add amendments and fertilizer)
- Carefully remove the plant from the pot
- Loosen the edges of the root ball (so root growth outside of root ball)
- Place the roots in the ground (general to same depth of pot for most as to not cause stem rot – except those with “advantageous” roots like tomatoes which can be planted any way along the stem for more root growth) – *Side note: Because Tomatoes have advantageous roots they are also some of the easiest “cloning” plants”
- Water in new transplants!

VIII. Garlic, Shallots, Onions, Potatoes and Bulbs

- Garlic, Shallots – Fall planting for cold “stratification” - plant pointy side of clove up!
- “Hardneck” garlic for this area
- Onions seed, sets or bulbs? Long day, intermediate, short day or “bunching”
- Potato “seed” – nursery/store bought seed or your own; cutting between eyes, cure or let scab in a cool area of home for a week
- Bulbs: 2 to 3 x the size of the bulb, as a general rule, plant big bulbs about 8" deep and small bulbs about 5" deep

IX. Pollination

- **Self-Pollinated** Night shade vegetables (Tomatoes, Peppers, Eggplant and Tomatillo) have both male and female parts within the flower and are self-pollinated
 - If they aren't setting fruit, it's usually because it's too hot or too cold.
 - Sometimes you can just "shake" your tomato plant to get it to pollinate
- **Cross Pollinated** Melons, Cucurbits (the cucumber family), and Squash have separate male and female flowers for pollinating.
 - Typically the ones that look like they have a small fruit at the bottom are females.
 - The male flowers just have a regular stalk below the flower.
 - If you have flowers that look like they are bulbing but fall off it's usually because they are not pollinated.
 - Look for a "male" flower to pick off (like picking a flower) and make the male and female "kiss" and you'll get pollination.
- Side note: **Self-Unfruitful Pollinated** Apple, Pear, Plum, and Cherry trees have at least two different varieties of the same fruit trees (ex. gala and granny smith) to pollinate.

X. Covering Plants - Protecting Seedlings from Early Spring Frost

- Household items like milk jugs or 2 liter bottles with bottoms cut off – take them off in morning when temp rises
- Make clear plastic "tents" (make sure to make a slit for ventilation and be careful of days with cool nights with warm afternoons – temps can rise 30*- 40* inside as opposed to outside!)
- "Row cover" (or Reemay)
- Store bought products like "Walls of Water" or Styrofoam "Cones"
- Build "Cold Frames"

XI. Mulch, Mulch, Mulch!

- Types:
 - Straw (no seeds!)
 - Grass clippings (untreated)
 - Wood chips, Shredded bark, and Sawdust (these tie up nitrogen until they break down)
 - Cocoa Bean hulls (break down nicely to feed soil – can harm pets if eaten)
 - Leaf Mulch (shredded leaves are what is used in botanical gardens)
- Less in spring, More in heat of summer (up to 3 inches)
 - Control: hot sun and morning/eve temperature spikes
 - In early spring too much can keep the cold in ground
- Other Benefits
 - Moisture and humidity control (especially in summer)
 - Soil splash (which is a vector for disease and pathogens),
 - Weed control
- Black plastics can be for added heat in spring and removed in early summer (and replaced with other mulch) for plants that like a warm root zone like peppers and melons.

XII. Watering Your Garden

- Morning is best (evening moisture on leaves is a vector for bad fungi and bacteria)
- Avoid wetting plant leaves when you can for same reasons
- Water deeply – don't just "flood and leave"
- Water Consistency (tomato and other veggies can cracking from inconsistent watering)
- Finger test or keep an eye in leaves for wilting (wilting is an indicator)
- Might need water your plants up to 2 to 3 x a week during really hot weather

XIII. Fertilizing Your Garden

N-P-K (Macronutrients) and Micronutrients

- N= Nitrogen; "for greening up" (vegetative growth and general health) Some organic types: blood meal, feather meal and liquid "fish fertilizer".
- P= Phosphorus: for healthy roots and promote blooming (fruit set)" Some organic types: rock phosphate, bone meal, bat guano.
- K= Potash/Potassium "for general health and disease resistance" Some organic types: kelp (seaweed), wood ash (very lightly) greensand (available in nurseries), muriate of potash, or potassium chloride.
- Micronutrients and Secondary elements (many are already in the soil) "for essential health; building cell walls, supports chlorophyll production, and building proteins" Secondary elements include nutrients like calcium, magnesium and sulfur. Micronutrients (or Trace elements) for general health include minerals like sulfur, iron, manganese, copper, manganese, molybdenum, zinc.
- Organic vs Chemical Fertilizers
 - **Organic Fertilizers:**
 - **The Negatives**
 - They can be expensive.
 - Slow to break down taking much longer for the plant to access (could take a few months if conditions are not conducive).
 - NPK and Macro ratios aren't always accurate.
 - **The Positives**
 - Improve the soil structure,
 - "Feed Soil"
 - Increase soils ability to hold water and nutrients
 - Because they are slow-release it's difficult to over fertilize (and thus harm your plants) and is no toxic buildups of chemicals and salt.
 - **Chemical Fertilizers** (like Miracle Grow)
 - **The Positives**
 - Relatively Inexpensive
 - Nutrients are available to the plants immediately (improvement can be seen in days).
 - They are manufactured to the exact ratio of nutrients desired.

- **The Negatives**

- Do nothing for long term soil structure
- Though they do break down “overuse” long term can lead to buildups of chemicals and salts that can be deadly to soil organisms and can affect your soil long term and thus plant health.

XIV. Garden Maintenance & Managing Pests Organically

- By law you cannot spray chemical herbicides or pesticides on someone else’s property without a license (including “Community Gardens”)
- Use store bought organic insecticidal soaps, horticultural oils, powders and general home products to make homemade recipes (next slide) which have to be applied frequently.
- Beneficial Insects: lady bugs, green lacewing, praying mantis (example: adult lady beetles eat aphids, mites, and mealybugs, and their hungry larvae do even more damage to garden pests! (other organic and chemical controls can harm “beneficial’s” just as well as unwanted pests)
- Use “row cover” (Reemay) for insect control (allows air and water in but not insects)
- Rotating Plants: Plants that are in same place every year can breed diseases and harbor soil and other insects. They can also drain the nutrients from the soil (which means smaller plants smaller harvests). Divide your plants into these four basic groups: legumes, root crops, fruit crops, and leaf crops and rotate seasonally.
- Companion Planting
 - Not much “university based research” some call myths other gardeners swear by it
 - Beans “fix” or put nitrogen into the soil
 - Native American’s used “three sisters” – corn, beans squash)
 - “Carrots Love Tomatoes” book is one of the more well-known books on the subject
 - Alliums (Garlic, Onions, Shallots Chives) are said to repel aphids
 - French Marigold are said to repel slugs, thrips and nematodes
 - Chervil (French parsley) is used by gardeners to protect vegetable plants from slugs
 - Yarrow (Achillea) attract “Beneficial Insects”
- Trap Cropping
 - Again, not much “university based research”
 - Nasturtiums and Nettles attract aphids
 - Old Farmer’s Almanac suggests placing geraniums close to plants you don’t want Japanese beetles to destroy. Japanese beetles are drawn to the geraniums, which are toxic to them.
 - 2’ – 3’ tighter mesh fence to keep out Rabbits 5’ – 6’ tall fences keep out Deer
 - Fences (with Gate) : 2’ – 3’ tighter mesh fence to keep out Rabbits 5’ – 6’ tall fences keep out Deer

Basic Organic Fungicide:

- 1 rounded tablespoon of baking soda (baking soda leaves an alkaline residue on plant surfaces which inhospitable fungi spores)
- 1 tablespoon of horticultural oil (or vegetable oil) to make cling to leaves
- 1 teaspoon of Mild Soap (Dawn, Ivory, should be biodegradable with no phosphates or bleach)

Basic Organic Insecticide:

- 1 tablespoon of neem oil (best), horticultural, or vegetable oil to make cling to leaves
- 1 teaspoon of insecticidal soap or mild dish soap (Dawn, Ivory, should be biodegradable with no phosphates or bleach)

Note: Apply sprays on all sided of plant leaves including undersides and always apply sprays on dry cloudy day or cool of the early morning to prevent leaf burn

Other Organic Insect Controls:

- To Control; Aphids, Slugs, Grubs, Ants, Mites, and most caterpillars (larve); Diatomaceous earth – Apply dry as a powder or wet as a spray (4 tablespoons of diatomaceous earth into a 1-gallon jug of water; shake to dissolve the powder. And spray)
- To Control; Slugs: fill a low bowl; or cut a plastic cup down to 2-1/2 inches and fill halfway with Beer, Coca Cola or Mountain Dew and set it in the garden overnight. Slugs are attracted to the sweetness and will drown in cup.

XV. Maintenance & Managing Pests w/ Store bought Herbicide (Homeowners Only)

- Always read labels and use proper proportions (more isn't better)
- Watch out for windy conditions (overspray can harm other plants)!
- Only buy enough for a season or two (potency weakens with time)
- Pre Emergent Herbicide (prevents germination)
- Post Emergent (gets on leaf stomata and is systemic)
- Differences between “broad leaf weed killer” and products like “round up” (dicot vs monocots vs total vegetation killer)

XVI. Gardening Methods:

- Conventional Rows
 - Good if you have lots of room – walking space!
 - Allows you to grow large quantizes of food
 - Practical if you are growing a lot of “vine” crops (Tomatoes, Peas and Beans)
 - Allows Corn to pollinate easily
- Raised Beds
 - Get to choose soil
 - Easier to weeds out
 - Prevent soil compaction
 - Provide good drainage
 - Helps serve as a barrier to pests such as slugs and snails
 - If you build them high enough they can be easier on backs and knees due to less bending and stooping
- Container Planting
 - Any “good draining” container will work (including homemade ones)
 - Use good a friable soil mix like mel's mix or “potting mix” (never topsoil)
 - Keep in mind *plant and roots grow proportionality* - plant size is determined by pot size (bonsai growers “root prune” to maintain size)
 - Containers require more frequent watering and fertilizing

- For aesthetics you can use the “thriller, filler, and spiller” method of
 - Thriller = Large “attention-getting” plants
 - Filler = “Fills in” the pot and adds a texture contrast or colorful counterpoint
 - Spiller = “Spills” over the side of the container, softening its edges as it flows to the ground
- Square Foot Gardening
 - Developed by Mel Bartholomew based in the French style of “Intensive farming”
 - Intensive growing method = more plants in a smaller space (in a 2’x8’ SFG bed you can grow 10 tomatoes and 6 pepper plants - in traditional row gardening, you could only have 5 tomatoes or 7 pepper plants)
 - More concentrated growing space means less amendments/fertilizers
 - Great for beginners
- Straw Bale
 - Set up a garden quickly virtually any where
 - Inexpensive
 - Easy
 - Straw is better than hay
 - Must “condition” to set them up (need a high nitrogen fertilizer and lots of moisture for up to 2 weeks to prep)
 - Need regular watering and fertilizing (especially at the beginning)
 - Bales can grow self-seeded weeds (which are easy to pull out) and mushrooms
 - Messy at end of season (from decomposition)
- Lasagna / Deep Mulch Gardening
 - A garden created by multiple layers of straw, hay, compost, leaves and or other “organic” matter
 - Very low maintenance garden
 - Good moisture control
 - Watering and weeding are reduced through the heavy layers of mulch. Fertilizer will not be needed due to the abundant nutrients in your compost.
 - Need to “condition” or “cook” up to 3 weeks
 - If you do plant from seed you have use some soil on top to get good “soil to seed contact”
 - Good video on it <http://video.wpt.org/video/2236210419/>

XVII. Lawn / Turf Basics

- Cool season grasses are standard in this region (Kentucky Blue, Rye and Tall and Shade Fescues) avoid warm season grasses like Zoysia and Bermuda
- Cool season grasses go dormant during summer – need only ½” water every two weeks - If you force it to “stay green” by watering it weakens grass (thus need lots of inputs)
- Aeration in spring and fall to mediate compaction – roots need water and air
- 1/3 rule (try not to cut more than 1/3 of grass)
- If using broadleaf weed killers follow label instructions and only purchase enough for a season or two (chemical potency degrades with time) – Make sure granular products stick to foliage

XVIII. Planting Tree and Shrub Basics

- Trees & Shrubs
 - Right plant right location
 - Dig hole at least 2x size of rootball
 - Remove from pot (If burlap and wired or rope remove and lay in hole) - exercise roots
 - Plant at same height as the pot it was grown in
 - Put same loose soil back in hole
 - Water (especially for first 2-3 weeks) and regularly for two years to establish

- Trees
 - When planting pay attention to flare (if visible it is a good planting height)
 - If possible wrap trunk to prevent winter cracking
 - Stake tree to keep from blowing over
 - Mulch but no “volcano mulching” (to avoid disease and insects damages)
 - Water (especially for first 2-3 weeks) and regularly for two years to establish

XIX. Places to Find Help

- Local Extension Office (ask for the Master Gardeners)
 - U of I Extension (Lake County) 100 US-45, Grayslake, IL 60030 - (847) 223-8627
 - UW Extension (Kenosha County) 19600 75th St #2, Bristol, WI 53104 - (262) 857-1945
- Local University Extension offer classes and other hands on seminars as well as websites like U of I Extension’s “Hort Corner”
- Plant Selector Websites (Extension Websites, Botanic Gardens, and Arboretums)
- Nurseries that you patronize (usually have a botanist, horticulturalist or seasoned gardeners on staff)

XX. Q & A