

Organic Raised Beds*

*(or other dedicated space)

High yield, low fuss - no synthetics!



Goals and Summary

Identify and understand universal techniques which are both **easy** and **attainable** - and when used together, will allow for **larger** organic yields with minimal effort.

Easily accomplished by keeping **three core components** in mind:

1. Engineering the physical grow space
2. Engineering the plant/soil microbiome
3. Maintaining both of the above - including ensuring proper planting / harvesting



We're fortunate to live in a time where we can compare well-documented efforts at small-scale food production and cherry pick them to our liking. Most common approaches incorporate some version of the above 3 items, whether it's no-till, keyhole, sandwich & lasagna, permie, hugelkultur, french intensive, biodynamic - etc!



Physical Grow Space



Soil Microbiome



Maintenance

Three core components



Engineering Physical Grow Space (Beds)

- Keep weeds out and substrate in
- Ensure H₂O drainage
- Any desired “extras” (sub-irrigation, +/- H₂O retention, etc.)



Engineering Soil Microbiome

- Stratifying carbon (browns) and nitrogen (greens)
- Start with heavier items and bigger layers, thinning as you move up
- Soil/mulch top for immediate planting



Maintaining / Planting / Harvesting

What are your goals for your space? What obstacles will you need to overcome?

- Like tomatoes and peppers but not work? High canopy / big fruits will block aerals and shade soil keeping it cooler (less watering). Use w/ mulch or something similar for less effort
- Like Jackson Pollock / want to make Ratatouille? Try French Intensive/Biodynamic. Products available for that if desired (seedling square).

Engineering the physical grow space



Materials: Landscaping fabric, newspaper, cardboard, tarp / H₂O Bottles (optional)

1. Line the ground of your empty beds with a barrier to keep ground weeds out

- “Landscaping fabric” is ~\$15 roll (will cover several beds).
- Stacks (1-2”) of old newspaper is an alternate with a bonus - it will decompose and kill off any prior ground weeds. Thin cardboard can be used - mixing both is best.

2. Determine your bed’s individual “water flow” by observing and correcting areas where water pools or sits. You want to make sure water drains *slowly*, but *surely* (like a pot, nothing special). You do *not* want your soil to dry completely.

- For beds that suffer from chronic dehydration, a layer of plastic on the sides can help retain moisture. Combine this with a few extra layers of mulch on the top.
 - Arid climates or areas without water availability should consider a sub-irrigated system (add a reservoir to the bed so that it can be filled when there is no rainfall - typically done cheap/free with recycled water bottles, etc.
 - Add an overflow valve to outdoor beds or containers with SIP to prevent overfilling.



Engineering soil microbiome



Engineering soil microbiome



Necessary Materials include enough of **carbon** and **nitrogen** elements to fill your beds:

Carbon = “Dried Browns” (Woody material like branches, twigs, dried tree or palm leaves, etc.)

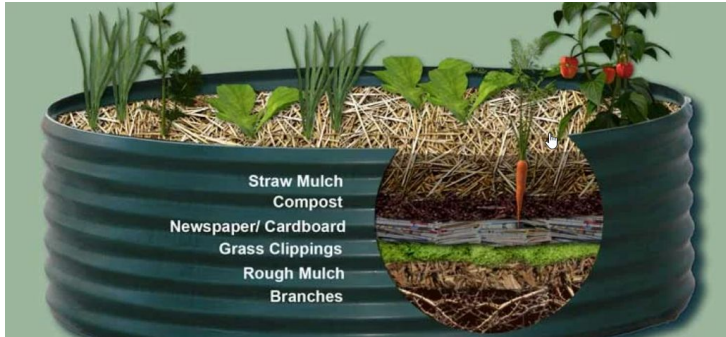
Nitrogen = “Wet Greens” (Anything with chlorophyll like plant/kitchen scraps, grass, coffee grounds, etc.)

Optional Materials: Water-retaining substrate (coir, hydroton, perlite, vermiculite, rice hulls, - can use biochar if desired. *Avoid Bark Fines or Bark-Fines Enriched Mulch)

Easy example:

You may get as fancy as you like RE dialing in number and composition of layers

1. **Layer 1:** (on top weed barrier / infrastructure floor): Completely “cover” the ground with woody material - use your biggest logs or twigs here. It’s ok if you can still see the barrier, we just want consistency across the bed.
2. **Layer(s) 2-n:** Alternate thin, sheet-like layers of Wet Greens and Dried Browns using your bigger items for the bottom layers
3. **Layer n+1:** add 1-3” of topsoil and depending on your preferred planting style, additional mulch (light to heavy is fine). Can also use Coir or other bulky substrate. Mix in additional water-retaining amendment if concerned about quick-drying soil.
4. **That’s about it!** You’ll need to top off / “recharge” the bed annually at most, which we’ll cover in **Maintenance**



Engineering soil microbiome



What is Lasagna Gardening?



A no dig, no till garden made by layering

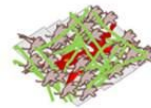
Also known as “sheet composting,” this time and labor saving technique builds a garden bed quickly. The organic materials are layered like a lasagna. These layers rot in place, and create a bed that can be planted immediately!



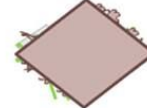
LAYER 1:
10-15 sheets of overlapped newspaper or 1 layer of thick cardboard to kill the grass and weeds.



LAYER 2:
Add a layer of woody material like small to medium sized branches and twigs.



LAYERS 3-8:
Add several alternating layers of greens (fresh material like vegetable scraps, fresh cut grass, manure) and browns (dried materials like dried leaves, straw, paper).



LAST LAYER:
If you want to plant it right away, cover the top of your pile with a layer of 1-3 inches of compost or soil.

The difference between those browns and greens:

Greens are rich with nitrogen. Greens are fresh, “wet” organic materials. Fruit and vegetable scraps, fresh cut grass, coffee grounds, seaweed, and manures are all considered green.

Browns are carbon rich. Browns are dried organic material like straw, woody material, paper, dry fall leaves, and sawdust.



Planting, harvesting, and maintenance



Materials: Seeds, trowel, trimmers/clippers, planting guide (optional), trellising or vaging (optional-ish)

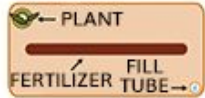
Annual Materials: **Dry browns** and **wet greens** for more compost layers. Plan on 2-3 layers; you won't need larger branches or logs again.

- Planting:** The initial mechanism of planting is no different provided you choose to top with potting soil. If not, you will need to wait for the bed to be “ready,” which can take 3-6 months for a large *new* bed.
 - Planting Patterns:** Completely depend on one's goals, climate, tolerance for labor, etc. Most anything *can* grow in raised beds if you so desire!
 - Space Needs:** Plants will compete for space and mostly play fair, but there are some known incompatibilities (Resources slide). Generally, the concern is more about *avoiding pests*. If you break up grouping of crops with herbs and flowers, pests will have a harder time locating them to begin with.
 - Companion Planting:** Is very useful for pest control. One example: certain herbs (dill, cilantro), attract certain predators (ladybugs) that eat certain pests (aphids), who in turn learn to avoid said herbs. Chicago is fortunate to have a healthy population of these - so much so that if you plant to attract them, aphids are an afterthought at most. There are other beneficial insect relationships covered on the “Resources” slide.
- Harvesting:** Gently lift the plant out until the roots are exposed while trying to avoid disturbing the soil. Cut the plant out at the roots when you feel them pulling tight. If you're replanting sooner than later you can treat this hole with a mycorrhizal amendment to mitigate the “damage.” Don't worry if you mess up; remember: the less soil disturbance the better, and practice yields improvement!
- Annual Maintenance:** Plan on adding a *minimum* of 2-3 new layers annually; you won't need larger branches and can make do with fall leaves for your dry browns.
 - Add to the Pile:** More active growers may continuously replenish to ensure a constant supply - this is generally the differentiator for a notably productive garden. If you decide to do this make sure to *end* with a carbon layer (mulch) on top sufficiently thick so that it covers the decomposing nitrogen layer...this will discourage gnats and flies
 - Supercharge it:** If you're actively composting you might consider brewing a [Compost Tea](#) every few months as a method of adding more immediately-available nutrients.
 - Biological Amendments:** Can be added.
- That's it!** If done correctly the life of the bed should be considered perpetual in terms of available nutrients.

Planting, harvesting, and maintenance



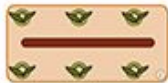
PLANT & FERTILIZER PLACEMENT CHART



A. 2 Plants
(2 per row)



B. 4 Plants
(2 per row)



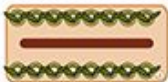
C. 6 Plants
(3 per row)



D. 8 Plants
(4 per row)



E. 10 Plants
(5 per row)



F. 16 Plants
(8 per row)

Troubleshooting: Soil, Disease, & Pests

It's beyond the scope of this deck to cover the universe of potential problems. Below are quick tips for further research - which has never been easier!

Materials: Neem Oil, Castile Soap (Dr. Bronners), Chili Flakes/Powder, The Internet!

Soil Troubleshooting: Can be seen as either an “easy fix” when there is an issue with drainage or something related to the engineered grow space, and a “potentially involved fix” when there are issues with your microbial life being “off.” The prior requires observing what is interfering with the soils ability to live and breathe and adjusting accordingly. Dry climate? Seal parts of the bed (sides) to retain moisture. Soggy soil? Install a runoff channel under the bed using plastic hose or PVC pipe. Microbiome issues are tougher, and those not familiar should feel comfortable defaulting to a professional resource like a local nonprofit or garden center.

Pest Control: Regardless of how many ladybugs you attract through smart pair planting, you will at some point get pests! The best advice I can offer is to **take a picture** for easier identification via the channels listed on the resources page. For anything that can't be solved via pair planting or by nature taking it's course - first try spraying the plant with diluted castile soap (maybe mix with chili peppers - you can find recipes online). Step two - which should always be the last and final option - is to apply something called Neem Oil, a “heavy” essential oil used in organic production. It is as “extreme” of a solution as an all natural one can be, and most experts (including the Chicago Botanical Gardens recommend it as a last resort).

Disease troubleshooting: Similar to soil microbiome, disease should be addressed by those familiar. An oft-cited “hack” that tends to work is to switch your crop (i.e., grow a *different type* of X plant next cycle)



Resources

1. **Chicago Botanical Gardens** operates a hotline M-F to assist with the identification and treatment of plant disease/pests: +1 (847) 835-0972 (or email - ideally with pictures, to plantinfo@chicagobotanic.org). Their website offers a large library of resources as well: <https://www.chicagobotanic.org/plantinfo>
2. Searching **Farmer's Almanac** is a great resource once you've identified your issue, there are often novel or lesser-known organic solutions to common problems - including biological remedies (i.e., [mosquito dunks](#))
3. The **Garfield Park Conservatory** offers hands on learning and education around cultivation and [composting](#)
4. **Burpee** (seed company) has a great brief read on [companion planting](#)
5. Forums like **Reddit** have thriving and dedicated groups devoted to gardening as well as more niche areas. Places like <https://www.reddit.com/r/gardening/> contain thousands of posts to search and are generally responsive and thorough in providing help.

A grey pit bull dog is lying on a wooden deck, looking up and to the left with its mouth open and tongue hanging out. The dog is surrounded by lush green plants in black fabric planters. In the background, there is a metal railing and a striped awning. The scene is outdoors on a balcony or deck.

THANK YOU!

-Clark & Franklin
www.clarkadisney.com