Raised Bed Gardening
Top 10 Questions

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Question #1

My soil is horrible! How can I amend the “dirt” so I can get good garden soil?

Raised Bed Gardening – create your own elevated growing environment.
Why Raised Beds?

- Create your own soil
  - Better drainage!!!
  - High Organic Matter
- Soil warms up faster in the spring
  - Early planting
- Easier maintenance
  - Smaller plots
  - Access is easier
  - Less compaction – Less foot traffic
- Soil tends to dry out quicker.
Two Ways to Raise

1- Simple Raised Beds
2- Elevated Structures built from...
   - Lumber
   - Blocks / Cement
   - Recycled materials

- Most are 3-4’ wide (easy access)
- Most vegetables need 6-8” of root depth.

Tip of the day: Avoid layering affects from bringing in “good” topsoil.
Step by Step Simplicity

Step 1- Till the existing site 6-12” deep
Step by Step Simplicity

**Step 1**: Till the existing site 6-12” deep

**Step 2**: Spread 2-3” of organic matter

1 yard of material will spread 162 ft² x 2” deep.

You will need 6-7 yards per 1,000 ft² x 2” deep.
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   Throw soil from walkways onto formed beds (8-12” deep).
   Walkways should be 14-18” wide.
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Step 5 – Add mulch to walkways to prevent muddy problems.
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Step 6 – Reapply 2-3” of organic matter every fall.

Step 7 – Take a break, You have earned it!
Question #2

- Can I add *too* much organic matter?

  Maybe..., It depends on what you use.
Organic Matter

Brown Materials

- Sawdust
- Wood chips
- Stalks, stems
- Fall leaves (oak)
- Paper products

Green

- Grass clippings
- Kitchen scraps
- Garden wastes
- Most manures
- Fruits/vegetables

*2:1 (Brown:Green) is a good standard mix for OM

*Things not to add to a garden:
- Meat products
- Dairy products
- Feces from animals that eat meat bi-products
<table>
<thead>
<tr>
<th>Carbon Source</th>
<th>C:N Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>sawdust</td>
<td>400:1</td>
</tr>
<tr>
<td>straw</td>
<td>80:1</td>
</tr>
<tr>
<td>corn stalks</td>
<td>60:1</td>
</tr>
<tr>
<td>steer manure</td>
<td>20:1</td>
</tr>
<tr>
<td>poultry manure</td>
<td>16:1</td>
</tr>
<tr>
<td>treated municipal sludge</td>
<td>10:1</td>
</tr>
</tbody>
</table>

30:1 is the “magic” threshold for mineralization to occur.
In General...

- **1/3 rule of thumb...**
  Add 1” of organic matter for every 3” of tilled soil depth.

- **1:1:1 rule...**
  For every 100 ft\(^2\) of woody material 1” deep, add 1lb (2 cups) of fertilizer (21-0-0) = 1/4 lb actual N.

- **1 for 1 rule...**
  For every cubic yard of woody material add 1 lb of actual nitrogen.
  = 4.5 lbs (9 cups) of fertilizer (21-0-0)
3 yards will cover 1,000 ft² 1” deep. If the material is woody you need 2 lbs of actual N (10 lbs of 21-0-0) (5 lbs of 45-0-0)

- 1lb (pint) of 21-0-0 per 100 ft² 1” deep
- 2/3 lb (pint) of 34-0-0 per 100 ft² 1” deep
- ½ lb (pint) of 45-0-0 per 100 ft² 1” deep
Elevated Structures

- Initially they are more expensive.
- They are more permanent.
- Cleaner to work around.
- Easier access for harvesting produce.
- No compaction.
Question #3

What building material can I use for raised bed gardens?

It depends...
Building Material Costs (2007)

- Cement Blocks - $1.20 - $1.40
- Redwood (2x6x8’) - $10.00
- Cedar (2x6x8’) - $13.50
- Trex® (2x6x8’) - $18.00
- PT Lumber (2x4x8’) - $9.00
- Recycled (4x4x8’) - $25.00
Question #4

- Is pressure treated wood safe to use for raised bed gardens?

Define “safe”...
Historically lumber was treated with organic based oils (creosote, pentachlorophenol (penta-treated))

Pressure Treated lumber:
Fir and Pine are injected with compounds using high pressure vacuum. The compounds help preserve the wood from insect damage and fungal decay.

Prior to 2001 the most common treatment was CCA (Cromated Copper Arsenate).
- Chromium – bound chemicals to the wood
- Copper – acted as a fungicide
- Arsenic – acted as an insecticide
Pressure Treated Lumber

- December 31, 2003 the EPA announced the voluntary phase out of CCA treated lumber by 2004.
  - Risk that arsenic could leach from wood, be taken up by the plants and ultimately passed to humans.
  - Root crops most susceptible.

Nowadays there are basically two safer treatments...

- **ACQ** - Alkaline Copper Quaternary (“Preserve”)
  - Most commonly sold
  - Higher Copper content
  - Very corrosive to metals

- **CA-B** - Copper Azole (Wolmanized Natural Select)
  - Azole is an organic fungicide used on fruits and peanuts

- **CBA-A** - Copper Boron acid
  - Boron acid is used in eyewash, vitamins, antiseptics
Pressure Treated Lumber

“Preservative Quality Label”
- American Wood Preservers Association (AWPA)
- Amount of product – pound / cubic ft. (pcf)
  - Above ground exterior = .25
  - Below ground exterior = .40

Cautions:
- Use stainless steel or hot dipped galvanized screws.
- Do not use aluminum brackets or fasteners.
- Do not compost sawdust
- Do not burn
Question #5

- What about copper leaching?
  - Copper is bound tightly by soil particles.
    - Plant uptake is unlikely
    - Especially clays and organic matter
  - Plants are much more sensitive to excessive copper than humans.
  - But, to be totally sure....
Use Plastic Liner

Note: “Some preservative will leach from Wolmanized wood into soil. While we strongly believe that copper azole-treated wood presents no threat to humans or plants, we recommend (not require) a liner to prevent unjustified concerns over copper azole, and because some people would rather keep copper out of their planting soil, whether or not it poses a threat”.

http://www.naturalselect.com
Question #6

- Are Railroad ties safe to use for raised bed gardens?

  Maybe....
Railroad Ties

Railroad ties historically treated with creosote
- Tar-like substance
- Can burn foliage (contact)
- Can volatize in heat
- Will not leach into soil
- Older (7-9 year old) ties are usually safe
- Dried with no visible bleeding / oozing
Question #7

- Do I use topsoil or a soil less potting mix in my raised garden bed?

Yes...
Soil Mixes

- There is not a “magic mix”

- Mixes may include one or all of the following usually in equal proportions...
  1. Loam (Topsoil)
  2. Organic material (Compost, Bark shavings, Peat moss)
     - Increase water holding capacity
  3. Inorganic materials (Sand, Perlite, Vermiculite, Pumice)
     - Increase aeration
     - Increase drainage

*Topsoil alone is too heavy and may have high clay content.
*Potting mixes are sometimes too light and can’t support the plants.
Topsoil
Organic Fraction

- **Compost**
  - Brown Materials
    - Sawdust
    - Woodchips
    - Leaves
  - Green Materials
    - Grass clippings
    - Garden waste
    - Manures

- **Sphagnum Peat Moss**
  - Dehydrated plant material from bogs
  - 10-20 x its weight in water holding capacity
  - Hydrophobic
  - pH of 4-5

2:1 (Brown:Green) is a good standard mix for compost
Question #8

What type of organic matter should I use?

FREE is always better.
Looming Landfill Statistics

8,000 lbs green-waste per year
30% landfill waste collected.
- Turn piles 1 time per week
- No supplemental nitrogen added (only grass clippings)
- Temperatures 100-150°F
- Hold for 1 year.
$20.00 per cubic yard
Consider Your Own Compost
Question #9

How do I make my own compost?
Backyard Composting
(7 Easy Steps)

1. Site: 6 hours sun, water, hidden
2. Container: 3’ x 3’ x 3’ is optimal > 2 cubic yards
3. Material: 2:1 (C:N)
4. Aeration: turn every other week
5. Moisture: 40-65%
6. Temperature: 110-150°F
7. Curing: let pile stand for 1 month (added insurance)

*If all conditions are right, compost can be ready to use in 2-4 months.
Inorganic Fraction

- **Sand**
  - Fine – Coarse
  - Builder’s sand is good for potting mixes
  - Good drainage
  - Heavy
  - Poor water / nutrient holding capacity

- **Perlite**
  - Formed by heating volcanic rock to 1,800 °F
  - Good aeration
  - 3-4 x it’s weight in water holding capacity
  - Neutral pH
  - White color
  - Substitute for sand
  - Dust can be irritating
  - Used to lighten potting mixes
Inorganic Fraction

- **Vermiculite**
  - Formed by heating mica (clay) 1,800 °F
  - Expands 20 x creating plate-like pieces
  - Neutral pH
  - Good nutrient / water holding capacity
  - Often used alone for a rooting media
  - 4 grades – 2&3 used for horticulture
  - Golden

- **Pumice**
  - Formed by cooling volcanic lava
  - Escaping gases and steam make it porous.
  - Very light weight
  - Some nutrient holding capacity
  - Floats
Just a few recipes...

- 1: Topsoil, 1: Compost, 1: VPPS
- 1: Topsoil, 1: Peat moss, 1: VPPS
- 1: Compost, 1: Peat moss, 1: Vermiculite
  (Mel’s Mix – Square Foot Garden)
- 50% Topsoil, 40% Compost, 10% VPPS
  (local nursery)
- 50% Topsoil, 35% Compost, 5% Peat moss, 5% Pumice

It’s only as hard as you make it.
Bottom Line...

- It may be easier to buy an existing mix from a reputable nursery.

- Soilless mixes can be used....

- Mixing topsoil in raised beds may be beneficial.
  - Micro organisms
  - Plant support
  - Nutrient supply

*Add organic matter each season.
Question #10

How much fertilizer do I need to use?
Fertilizer Needs

- Fertilize raised beds as you would a traditional garden
- According to each plant’s specific needs
- Generally...
  - 1-2 lbs of an all purpose fertilizer (10-10-10) per 100 ft²

*Remember, if high amounts of organic matter is added, more nitrogen may be required.
Fertilizer Requirements

Vegetables

- **Low use**: 1-2 lbs nitrogen / 1,000 ft²
  - peas, beans

- **Moderate use**: 2-3 lbs nitrogen / 1,000 ft²
  - beets, carrots, radishes, lettuce, melons, squash, tomatoes, peppers, cucumbers, broccoli, cauliflower

- **High use**: 4-6 lbs nitrogen / 1,000 ft²
  - corn, onions, potatoes

*Split the total nitrogen requirement into a couple of applications
*Never apply more than 1 ½ lbs of nitrogen / 1,000 ft² at one time.
Drip Irrigation

- Drip irrigation supplies water directly to the root zone of each plant.
- Hoses are spread about every 18-14”
- May be on surface or buried
  - Reduces evaporation
  - Reduces amount of water use

*Remember raised beds may dry out quicker because of the light-weight media.
Have fun with your new “investment”

- Inter / Companion Planting
  - “Three Sisters” (corn, beans, squash)
  - Ornamental flowers

- Succession Planting
  - Staggered plantings (carrots, radishes, corn, onions)

- Vertical Gardening
  - Tee Pees / Poles

- Season Extenders
  - Row covers / hoops
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