Fall Gardening Basics

September 2018

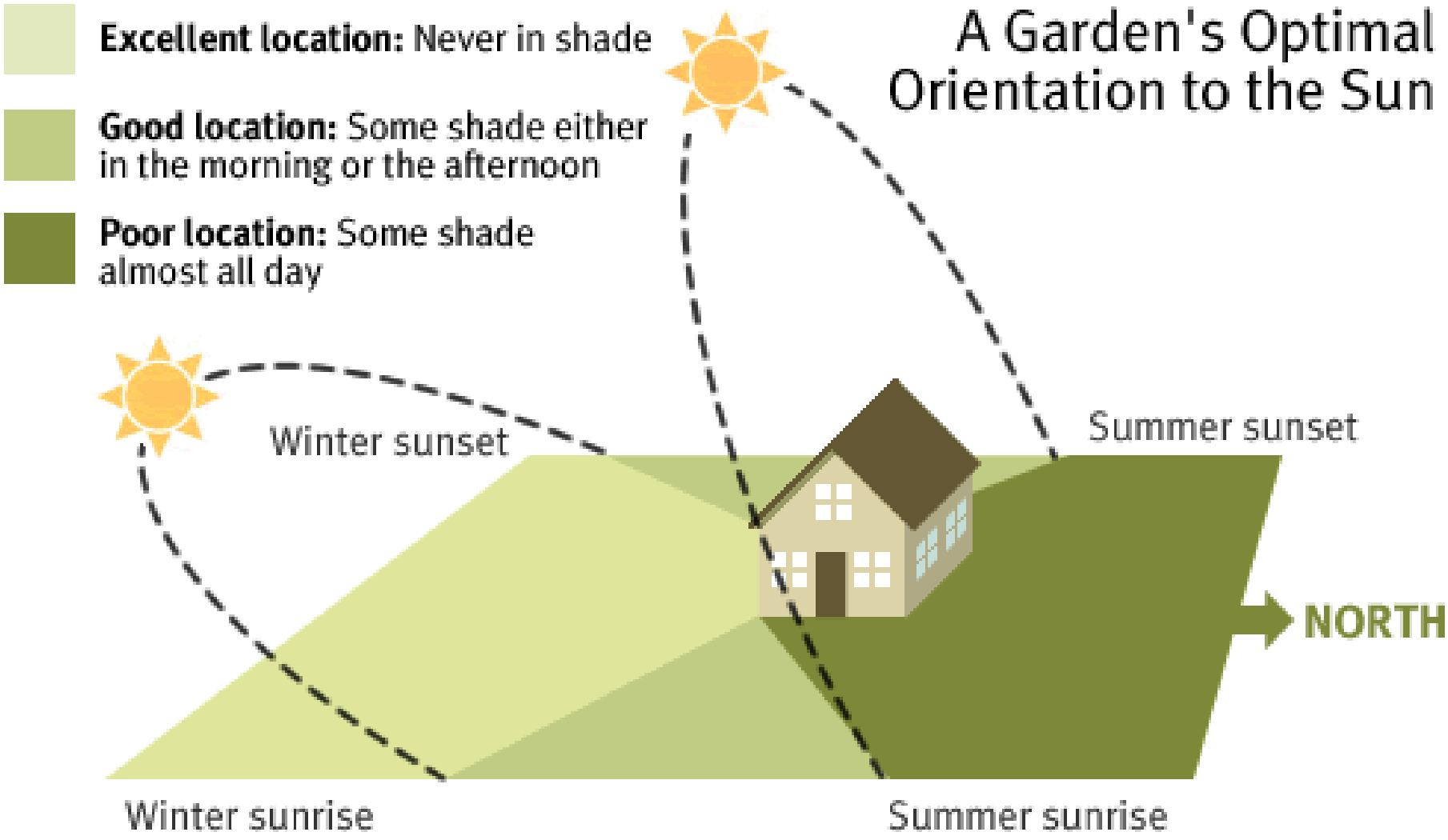
University of California
Agriculture and Natural Resources

UCCE Master Gardener Program
Monterey and Santa Cruz Counties

What You Will Get

- Basic knowledge of how to begin with fall vegetable gardening
- How to succeed with what, when and how
- How to start now to get a jump on a spring garden
- Hands on soil prep and planting activities

Site Selection – Let There Be Light

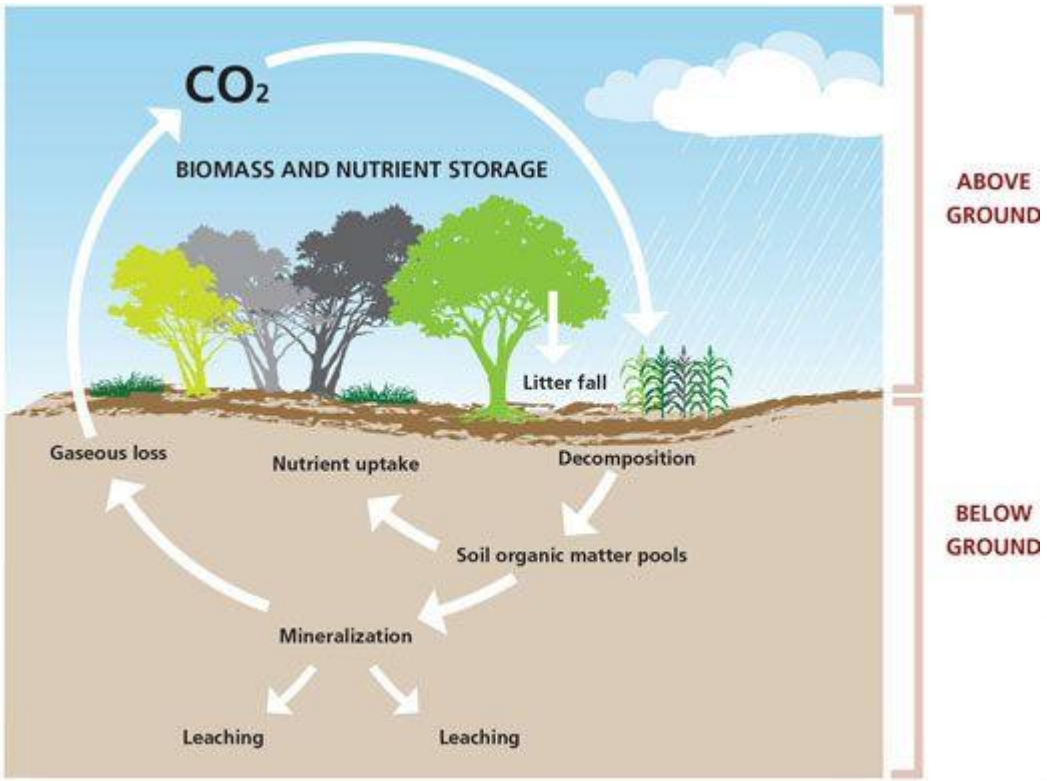


“Humankind owes its existence to a six-inch layer of topsoil and the fact that it rains.”

~Anonymous

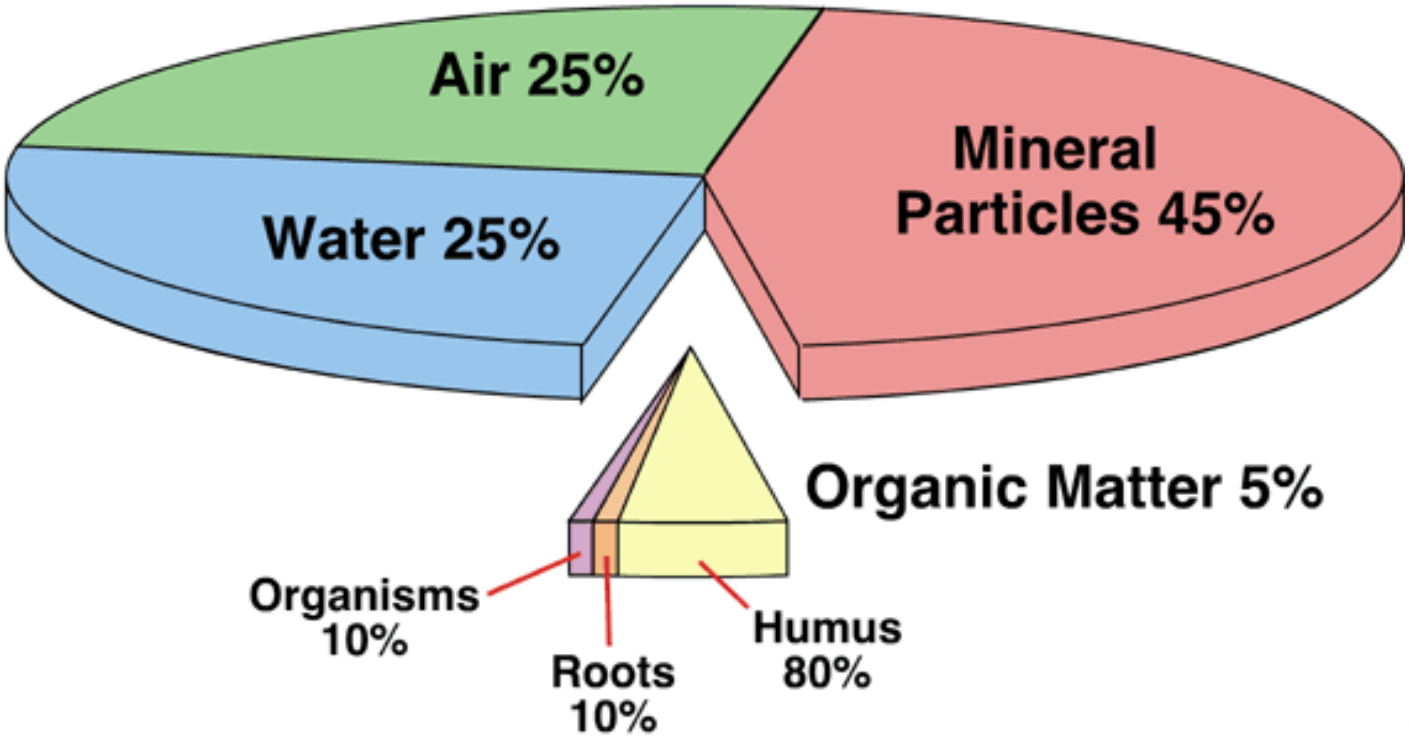
Why Should I Care About My Soil?

- Your life depends on it
- It's the second largest carbon sink (3%)
- Sustainably higher yields
- Easy to work
- Conserves water
- Fewer weeds
- Diverts landfill



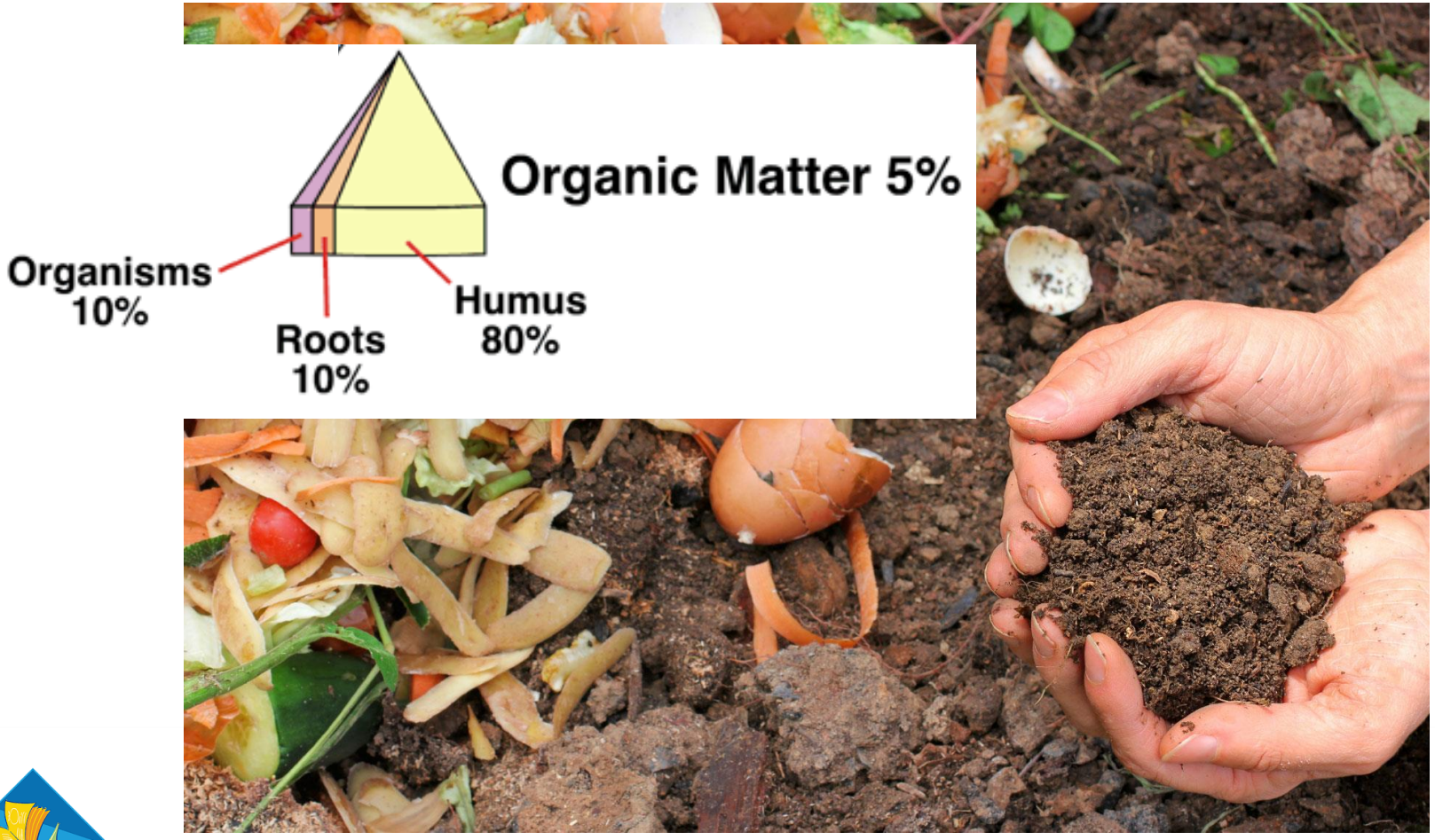
Soil Science in a Nutshell - Physical

What is soil? Components



Soil Science in a Nutshell - OM

So what matters about organic matter?



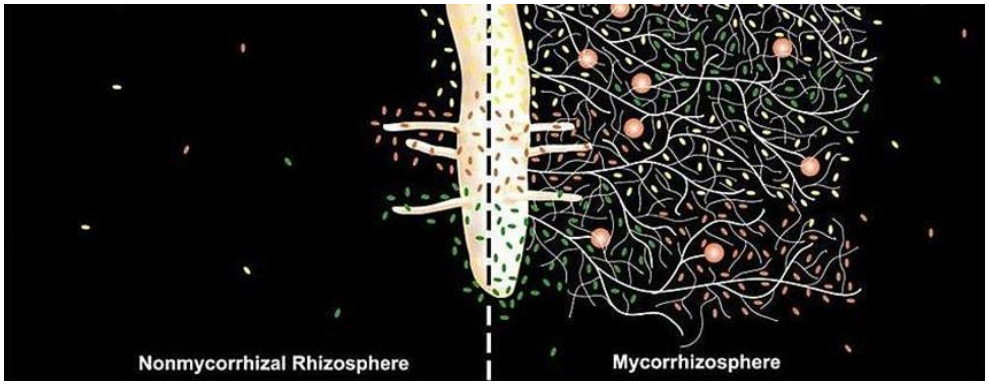
Soil Science in a Nutshell - OM

Microbe jobs

Decomposers
Worms and macro-fauna eat plant residue, aerate soil, excrete nutrient rich casts

Saprophytes
Bacteria and fungi eat decaying plant material, recycle into nutrients and humus, make nutrients available to plants

Symbionts
Form beneficial associations with plants such as nitrogen fixing bacteria and mycorrhizae root extensions



Soil Science in a Nutshell - OM

What lives in 1 Gram of healthy soil?

Bacteria	3,000,000 to 500,000,000
Actinomycetes	1,000,000 to 20,000,000
Fungi	5,000 to 1,000,000
Yeast	1,000 to 1,000,000
Protozoa	1,000 to 500,000
Algae	1,000 to 500,000
Nematodes	10 to 5,000

Soil Science in a Nutshell - OM

Review: Benefits of Organic Matter

Chunky	makes space for air and water
Delicious	provides food for decomposers
Sticky	produces compounds that improve particle aggregation which improves soil structure
Balance	corrects soil pH towards neutral
Nutritious	makes nutrients in solution available to the plant
Retain	aggregate structure holds pockets of water, like a sponge
Drain	chunky spaces help water ultimately drain through
Store	puts a little carbon back in the soil (aka sequestration)
Resist	diverse biome improves immunity to certain soil borne diseases
Reduce Loss	mulching helps retain water, protect soil surface and reduce weeds

PRACTICAL APPLICATION

Fertilizer vs. Soil Amendment?

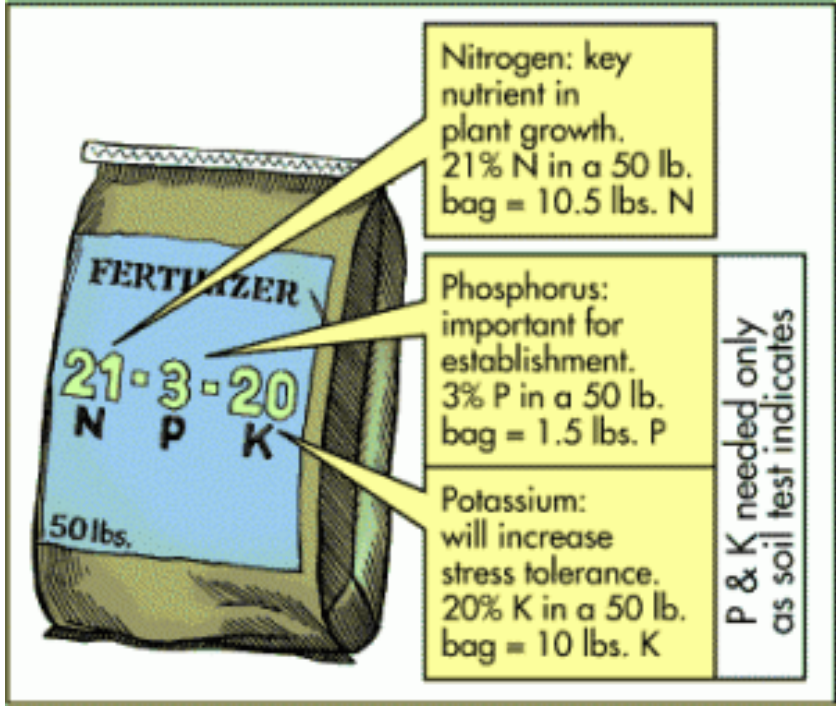
First it helps to know the difference between soil amendments and fertilizer.

Fertilizer	Soil Amendment
DIRECTLY affects the plant through the growth stage through nutrients	INDIRECTLY affects the plant by improving soil physical and chemical properties
Bone meal	Manure
Fish Emulsion	Compost
Cottonseed meal	Worm Castings
Kelp meal	Leaves and grass clippings
Chemical fertilizer	Peat moss
Etc.	Etc.

* Not organic

About Fertilizer

- Not too much in fall!
- Slow release powder at soil prep



For Nitrogen	For Phosphorus	For Potassium
-Fish emulsion or liquid fish fertilizer (Brands include Brown's Fish Fertilizer, Neptune's Harvest) -Organic granular fertilizers favor nitrogen, and some brands make blends that are N heavy (try Symphony, McGeary's and Harmony brands) -Feather meal, blood meal	-Rock Phosphate -Bone Meal	-Azomite is mined from marine deposits, and is rich in potassium. -Greensand

How Can I Get Some Organic Material?

Sources

- Make your own compost
- Garden supply and landscape stores (bagged or bulk)
- Municipal green waste compost (the dump)
- Horse stables
- Worm castings
- Coffee grounds

Materials for your compost pile

- Get some chickens or rabbits
- Compostable produce scraps at grocery stores
- Spent brewers grain at micro breweries
- Organic materials exchange
  http://www.omexchange.org/listings

Organic Materials Handout

How Much Amendment?

Never Enough

- It takes years
- Add more 1-2 times a year
- 6 inch layer is a good start
  example: 6 inches over 100 Sq. ft. = 25 two cubic ft. bags or 1.85 cubic yards
  Coverage calculator:
  http://www.harvestpower.com/products/landscape-calculator/

Type of soil I have	Amount of composted organic material
Limited organic matter	4-6 inches each planting season
Lots of organic matter	1-3 inches each planting season

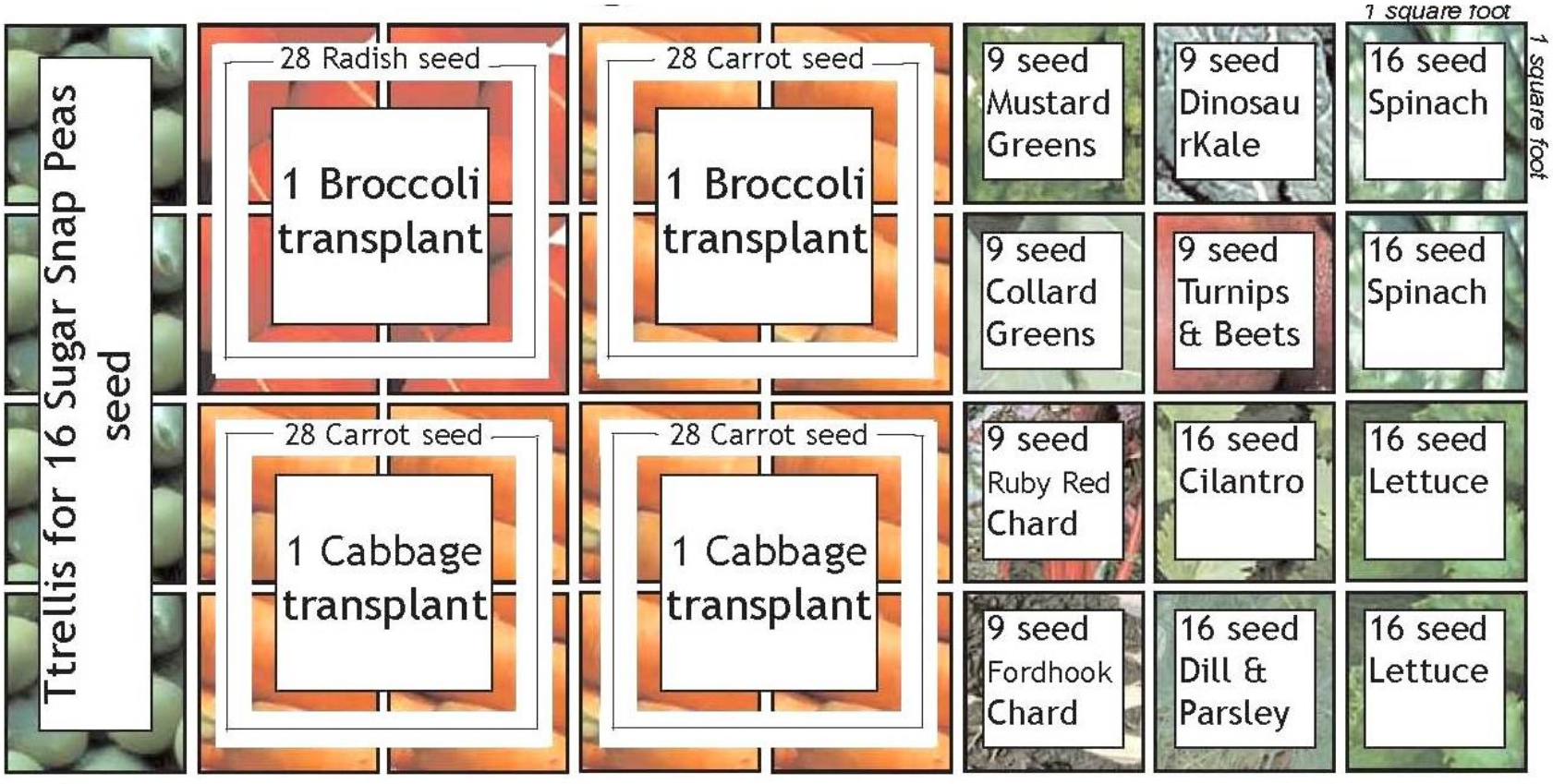
Basic Tools


POLYURETHANE
COILHOSE PNEUMATICS
GARDEN FLEXEEL
POLYURETHANE

Nice to Have Tools

Start SMALL!

Sample Starter Small Fall Garden Plan



Soil Improvement Strategies

Trade off Time – Money - Effort

The Sweat Equity

1 week

- Collect/invest in composted organic materials
- Double Dig
- Plant

The Low Effort

1-3 month

No-Dig plans

- Lasagna garden
- Straw bale garden

The Long View

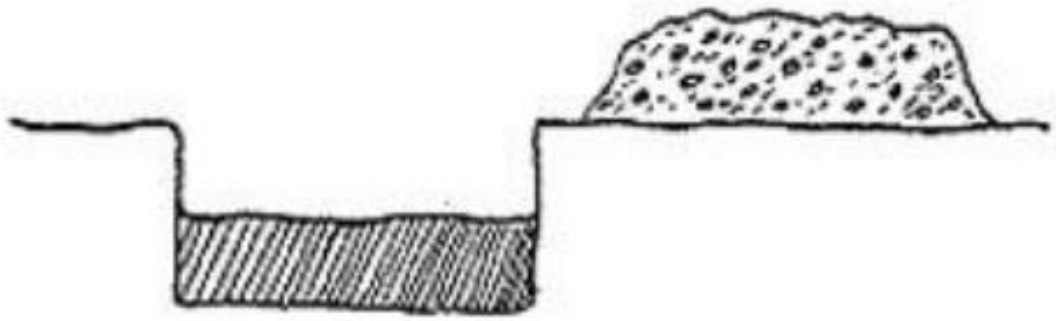
6-9 month

- Plant a **cover crop**, water & let it grow
- Chop it down, turn it under, wait 3 weeks
- Plant

Detailed video on double digging

Double Digging

- Also known as "French intensive" or "deep bed" method,
- Performed only one time,
- Loosens soil to depth of about 2 feet,
- Requires shovel, garden fork and a lot of muscle.




Straw Bale Garden

Soil Steward Tips

Maintain soil structure

- Cultivate (dig) when soil is moist but NOT soaking wet or bone dry
- Till or turn only when required to incorporate organic material, plant or weed – once per season
- Don’t compact the soil – i.e. walk on it
- Keep soil covered – planted, mulched or both
- Add compost 1-2 x year
- Rotate crops
- Minimize use of chemical herbicides, fungicides, fertilizers


WHAT TO PLANT

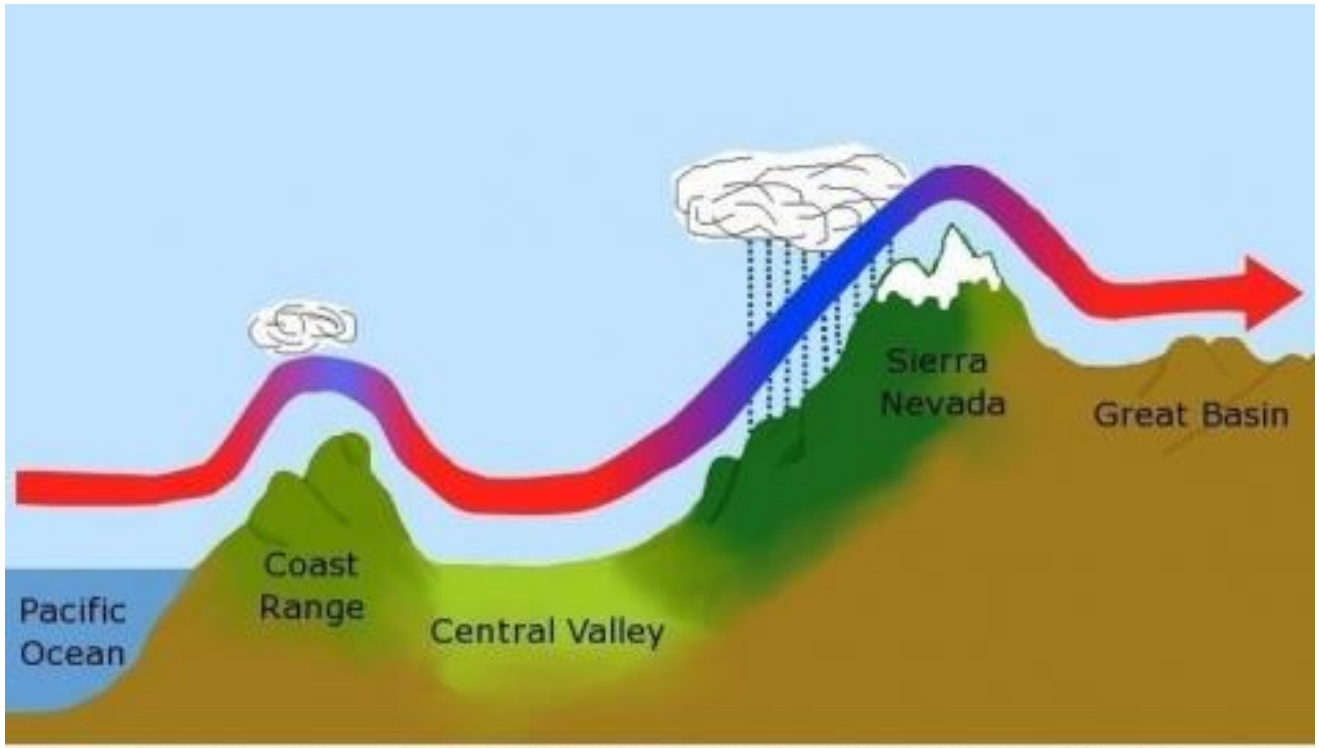
Cool Season Crops

	Hardy Crops	Semi-hardy Crops
Trans-plant	Broccoli * Brussels Sprouts Cabbage * Collards Onions * Rutabaga	Artichoke (globe) * Cilantro Cauliflower * Celery * Parsley Chervil * Dill * Chives
Direct seed	Kale * Kohlrabi * Peas Radishes * Spinach Turnips	Arugula * Asian Greens * Beets Carrots * Endive * Lettuce Potatoes * Swiss Chard

Microclimates

USDA Zone Map

- Solar Exposure
- Wind
- Humidity
- Slope
- Rainfall
- Temp



Temperature changes as air flows west to east across California. This is largely a result of orographic effects (i.e. effects of change in elevation) as air passes first over the Coast Range and later over the Sierra Nevada.

Transplanting
Direct Seeding
Thinning

See Handout

About Watering

- Morning is best
- No sprinklers
- Can be dry, even if it's cold out
- How much is enough?

- "Leaky pipe" soaker hose
  low investment drip
  for first garden

Need a Stretch Break?

Defending Your Garden

Fall Assaults

- Snails
- Slugs
- Earwigs
- Caterpillars
- Gophers
- Birds
- Deer

IPM Process

1. Inspect regularly
2. Know your host plant
3. Prevent problems before they become problems
4. Identify the pests
5. Analyze the situation
6. Strategize the solution(s) and apply
7. Monitor success over time

Cultural

Environmental Control

- Garden hygiene
- Solarize soil
- Sterilize tools
- Plant Selection

Physical

Exclusion Barriers

- Netting
- Row covers
- Collars
- Sticky barriers
- Fencing
- Underwire
- Bagging fruit

Physical

Mechanical Control

- Hand picking
- Washing
- Trapping
- Weeding

Invertebrate Pests

	Type	Host	Damage stage
	Slugs & Snails	Range of plants	Adult
	Earwig	Range of vegetable plants and weeds	Adult
	Cabbageworm	Leafy vegetable plants, especially brassicas	Larvae
	Sow bug & Pill bug	***Not a pest! Eats decaying vegetation***	

Burrowing Mammals

	Type	Damage	Management
	Gopher	Eats roots or takes whole plant	Trap, exclude, bait
	Mole	Eats grubs, disturbs soil surface	Trap, bait, ignore
	Vole (aka field mouse)	Eats flowers, leaves and fruit	Trap, exclude, bait

Gopher Management

Low Impact Management

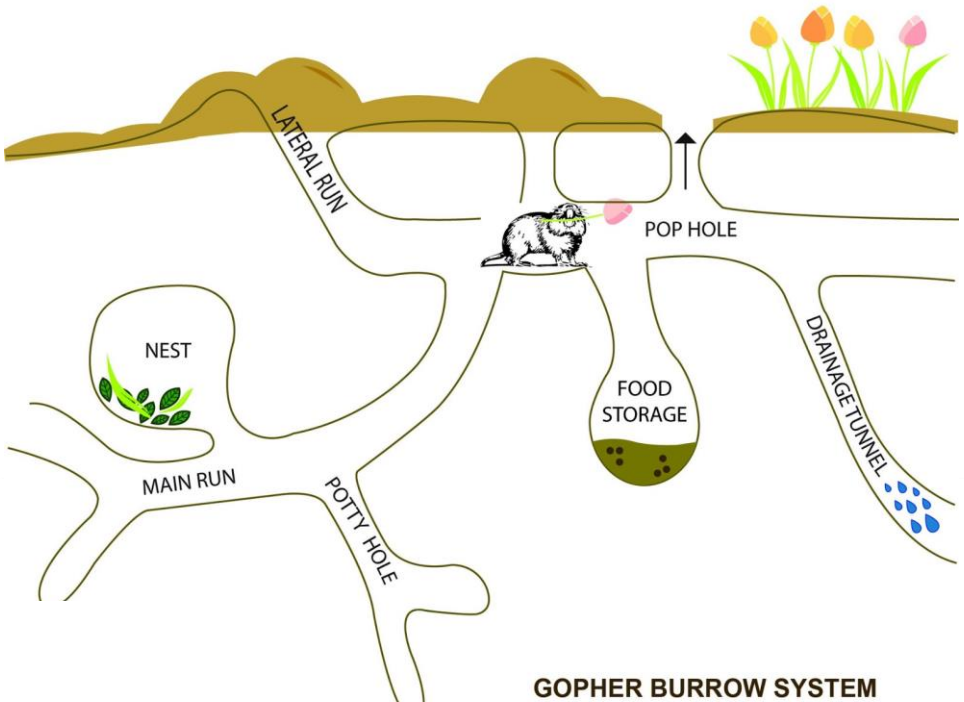
- Cultural – gopher resistant plants?
- Physical Exclusion – underwire beds, baskets, underground fence (not chicken wire)
- Traps – cinch, box, pincher
- Biological Control - owls, snakes, , and coyotes

Gopher Trapping Tips

Find the Run

- Probe between 2 mounds to feel run
- Use post hold digger to get to run
- Set & stake traps both directions
- Cover and check every 12 hours

How to find the tunnel



Traps

- Macbee
- Cinch
- Box
- **Gophinator**

How to set a gophinator

Birds – Know Your Pest

- Need to identify species?
- Each has different tastes
- They also eat insects and snails/slugs; weight pros and cons
- Most are protected from harm

More info at
http://ipm.ucanr.edu/PMG/PESTNOTES/pn74152.html

Birds – Physical Controls

Keep them out:

- Frame and netting over seed beds and crops
- Inverted wire baskets on individual plants
- Grid of string
- Paper bags over fruit/veggies

Birds – Physical Controls

Scare them away:

- Scarecrows
- Shiny things
- Moving things
- Balloons with eyes
- Noisemakers
- Best used only when most needed
- Move OFTEN!

Deer in your Garden?

In their natural habitat

In your garden

Deer Behavior - Know your Pest

- Travel in familial groups for generations
- Range of 3-5 miles, bed down within 1 mile of water
- Eat 5 pounds of vegetation per day
  - 90% leaves and stems of woody and herbaceous plants, vines, fruits, berries, acorns, nuts and garden vegetables
  - 10% grass
- Drink 2-4 quarts of water per day
- Feed in early morning or late evening
- Heavy feeding in spring and summer-metabolism slows in late fall and winter

More info at
http://ipm.ucanr.edu/PMG/PESTNOTES/pn74117.html

Cultural and Physical Controls

- **Frighten them away**
  - Dog in the yard
  - Main predator is the mountain lion
  - Startling devices rarely work--deer habituate
    - Water cannons
    - Lights and sounds

- **Repellants -** Require frequent application, home remedies not scientifically proven

Physical Barriers - Fences

The most effective intervention

- Effective but costly
- Need to be 7-8 feet high
- Tight to the ground
- Fence extensions with smooth wire or plastic mesh
- Wire cages work for small areas
- Double fencing or slanted fencing on hillsides

Ana

Study

http:

Use t

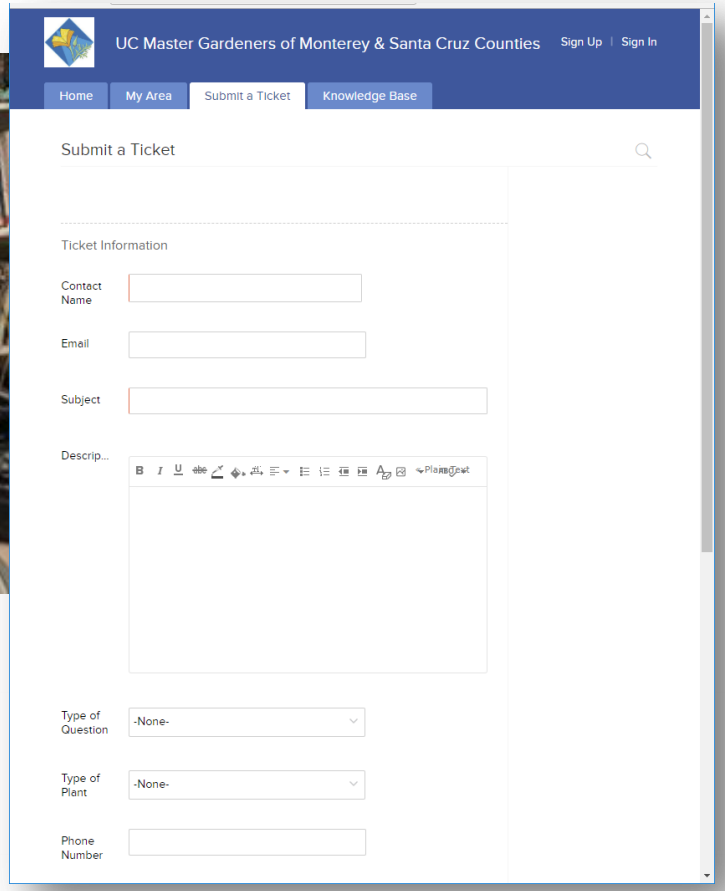
- Sea
- Loc
- Loc
- Use

IPM

Stumped? Ask a Master Gardener

Ask the Master Gardener Hotline

http://mbmg.ucanr.edu/hotline/



PLANNING FOR SPRING

Winter Cover Crops

Why cover crop?

- Protect soil
- Fix nitrogen
- Encourage soil microbes
- Break up hard soil
- Suppress weeds
- Add biomass

Which cover crops?

- Fava Beans
- Bell Beans
- Hairy Vetch
- Austrian Peas
- Winter Rye
- Kodiak Mustard
- Soil Builder Mix

Cover Crop Process

The Long View

6-9 month

- Plant a **cover crop**, water & let it grow
- Chop it down, turn it under and wait 3 weeks
- OR compost the greens
- Plant

Winter Dreaming, Garden Planning

Questions?

Raffle Prizes!

WIN a Starter Basket!

WIN some Alpaca Manure!

Help Us Improve!

Our follow-up survey provides the tools we need to improve the quality of our program.

Please respond to the short survey you will receive in a few weeks.

OUTDOOR EXERCISE

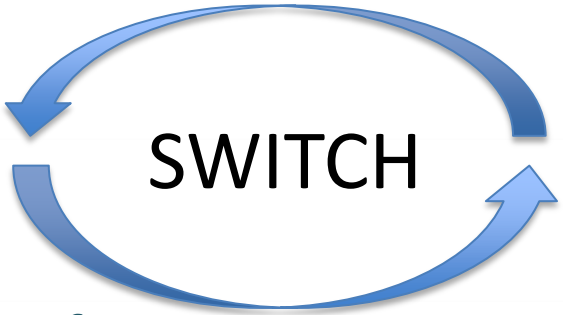
Split the class, ½ go with Bridget and ½ go with Delise

Double Dig Demo – Bridget

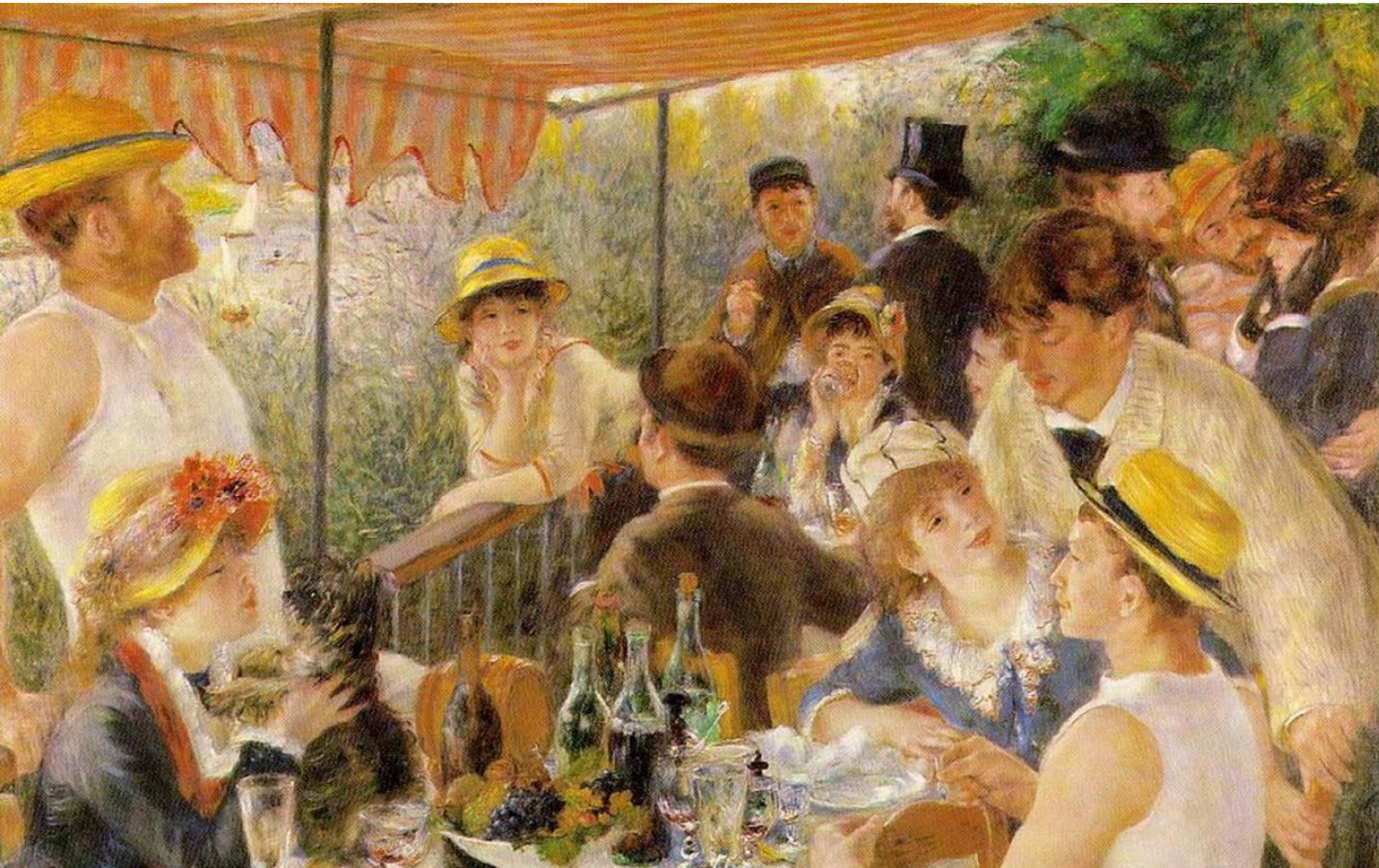
- Dig a trench
- Loosen soil beneath
- Add compost
- Move soil from next area into trench
- Rinse. Repeat

Lasagna Garden Demo - Delise

- Layer materials
- Water in between
- Topsoil on top
- Plant Broccoli, carrots and radishes



Q&A Mixer




SAMPLE NO.
NAME
LOCATION/NOTES
1
beta
williamsburg Bk backyard
2
Alix
Bedstuy (H2A/ Bklwy)
3
Nery
Fort Tryon Pk.
4
Nery
INWOOD Pk.
5
Lee
Kensington, Bk
6
Ellie
Maria H. Bushwick
7
Ellie
CCNY
Ellie
Tradeschool

APPENDIX

Resource Links

Fall Gardening class presentation	http://mbmg.ucanr.edu/Read_An_Article/Class_Handouts/
Organic Materials Exchange	http://www.omexchange.org/listings
Amendment Calculator	http://www.harvestpower.com/products/landscape-calculator/
Lasagna Garden How-to	https://www.thespruce.com/how-to-make-a-lasagna-garden-2539877
Straw bale How-to	https://modernfarmer.com/2013/07/straw-bale-gardening/
Double digging video	https://www.youtube.com/watch?v=tNiuWCp9QpY
USDA Zone Map	http://planthardiness.ars.usda.gov/PHZMWeb/
How to set a gophinator	https://youtu.be/aqMzKAty5Lw
IPM Website	http://ipm.ucanr.edu/
Square foot spacing guide	https://gardentherapy.ca/wp-content/uploads/2013/04/Square-Foot-Planting-Guide.jpg
Master Gardener Hotline	http://mbmg.ucanr.edu/hotline/

Square Foot Garden Planting Guide

 Tomatoes 1	 Peppers 1	 Onions 9	 Head Lettuce 4	 Carrots 16	 Leaf Lettuce 16	 Cucumbers 2	 Cabbage 1
 Hot Peppers 1	 Winter Squash 1	 Sweet Potatoes 1	 Potatoes 2	 Pumpkins 1	 Cauliflower 1	 Corn 2	 Peas 8
 Beets 9	 Eggplant 1	 Spinach 9	 Garlic 4	 Radishes 16	 Melons 1	 Celery 2	 Turnips 9
 Brussel Sprouts 1	 Kale 2	 Summer Squash 1	 Rosemary 1	 Cilantro 9	 Sage 1	 Chives 1	 Parsley 2
 Bush Beans 4	 Pole Beans 4	 Basil 2	 Bok Choy 1	 Parsnips 9	 Dill 9	 Oregano 1	 Thyme 2

Numbers represent the number of plantings per square foot

Fun Fact!

At least one soil microbe acts as an anti depressant.

Mycobacterium vaccae

What About MY Backyard? Outside!

Try these ideas things out

- Dig in some cover crops
- Build a lasagna garden bed
- Question and Answer

Remember! You can always address questions to the

Master Gardener Hotline
http://mbmg.ucanr.edu/hotline/
831.763.8007

Deer Resistant Plants

- **Pungent Plants**
  - Herbs
  - Lavenders
  - Salvias (many, not all)
  - Alliums-Society Garlic
- **Fuzzy Plants**
  - Wooly Lamb's Ear
  - Jerusalem Sage
  - Lugwort
  - Brunnera
- **Poisonous Plants**
  - Foxglove, digitalis
  - Euphorbias
  - Oleander
  - Daffodils
- **Fibrous, Spiky, Distasteful Plants**
  - Cactus
  - Succulents
  - Gravelia
  - Manzanita