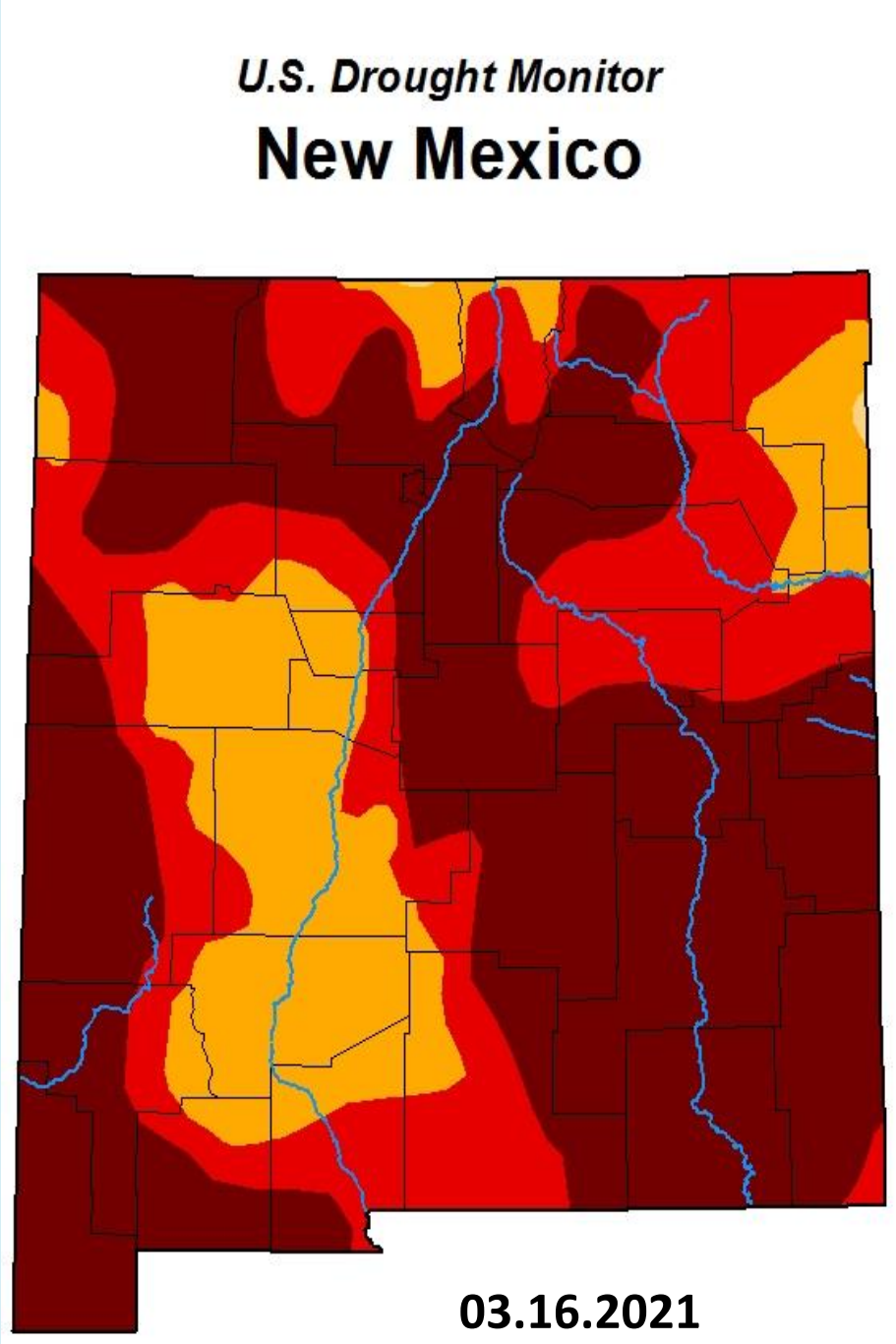
Desert Home Composting

nmcomposters.org

John Zarola, BCEMC

Location:

- Central New Mexico:
  Bernalillo and Sandoval counties
- Elevation: 5,300 ft.
- Precipitation: about 9” / year
- Frequent drying winds
- Four seasons
- Intense UV radiation in summer
- High and dry
- Current drought conditions



Currently not Composting ?

Consider - What's holding you back ?

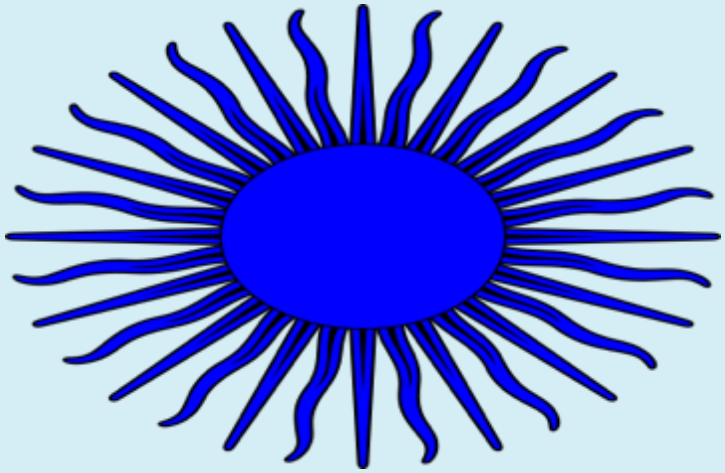
Desert Home Composting

- What is it ?
- How to do it
- Why do it ?
- How to use the product

Presentation Overview

- Climate impact
- Composting recipe/science
- Containers & practice
- Processes: cold & hot
- Management: static & active
- Soil amending with compost →

Desert Climate Considerations



- Sparse rainfall, 9” / year
- Low humidity

- Frequent drying winds. Frequent sunshine.
- Intense UV radiation in summer. Clear sky

- Day to night temperature flux - condensation
- Seasonal temperature variations - slower

Desert Composting Considerations

- Composting science is the same planet-wide.
- Materials & management - specific for desert
- Adjust composting practice to suit desert climate needs.
- **Manage evaporation of moisture.**

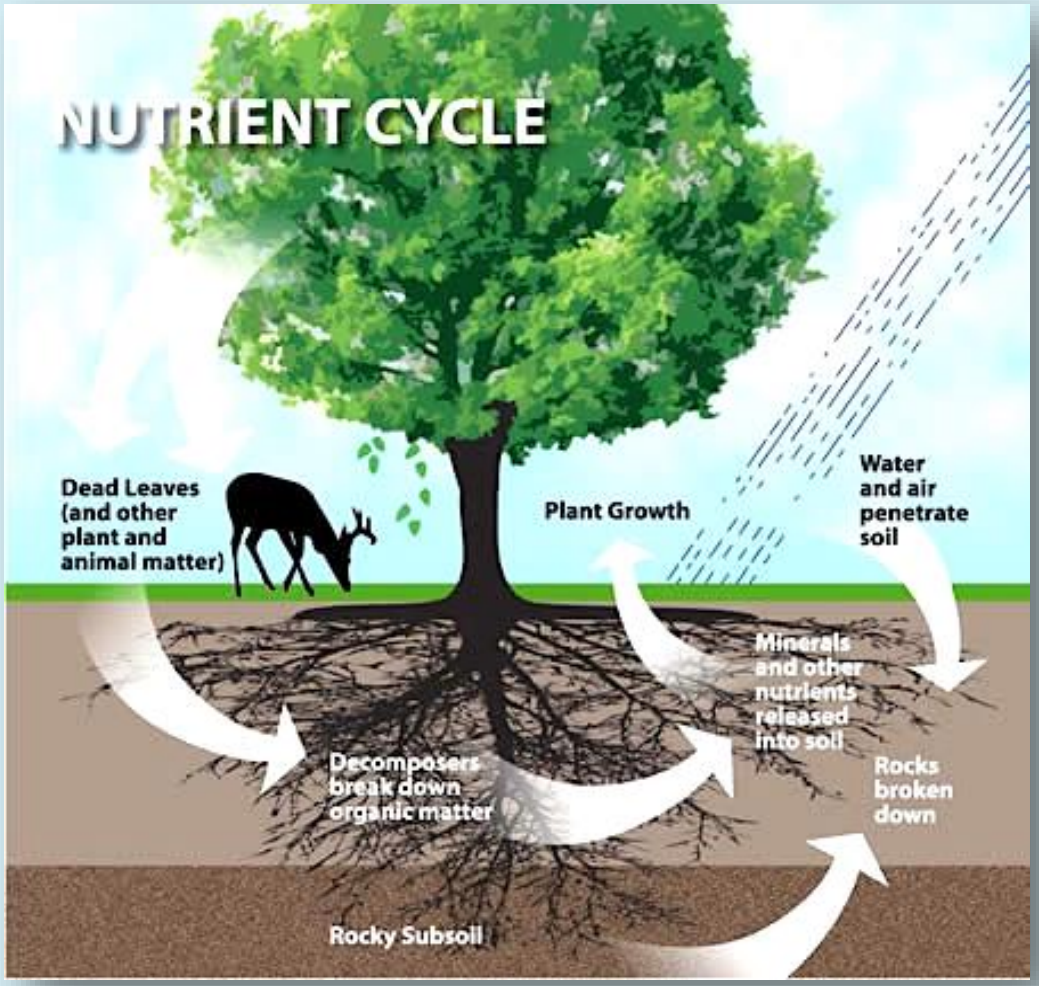
Home Composting is..

- Organizing and Managing organic material so that it biologically decomposes.

- Decomposition is the transformation of organic material to finished compost.

- By naturally occurring microorganisms in presence of air & moisture.

Natural Plant Nutrient Recycling



← **Photosynthesis**

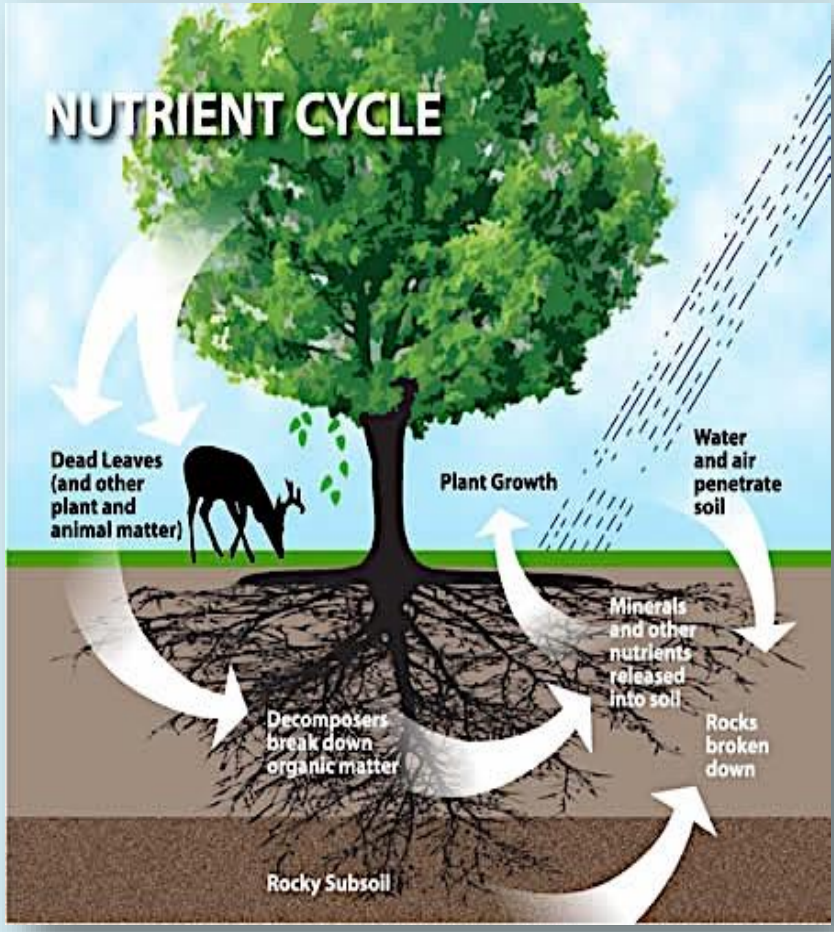
←

Decomposition

← Nutrients absorbed

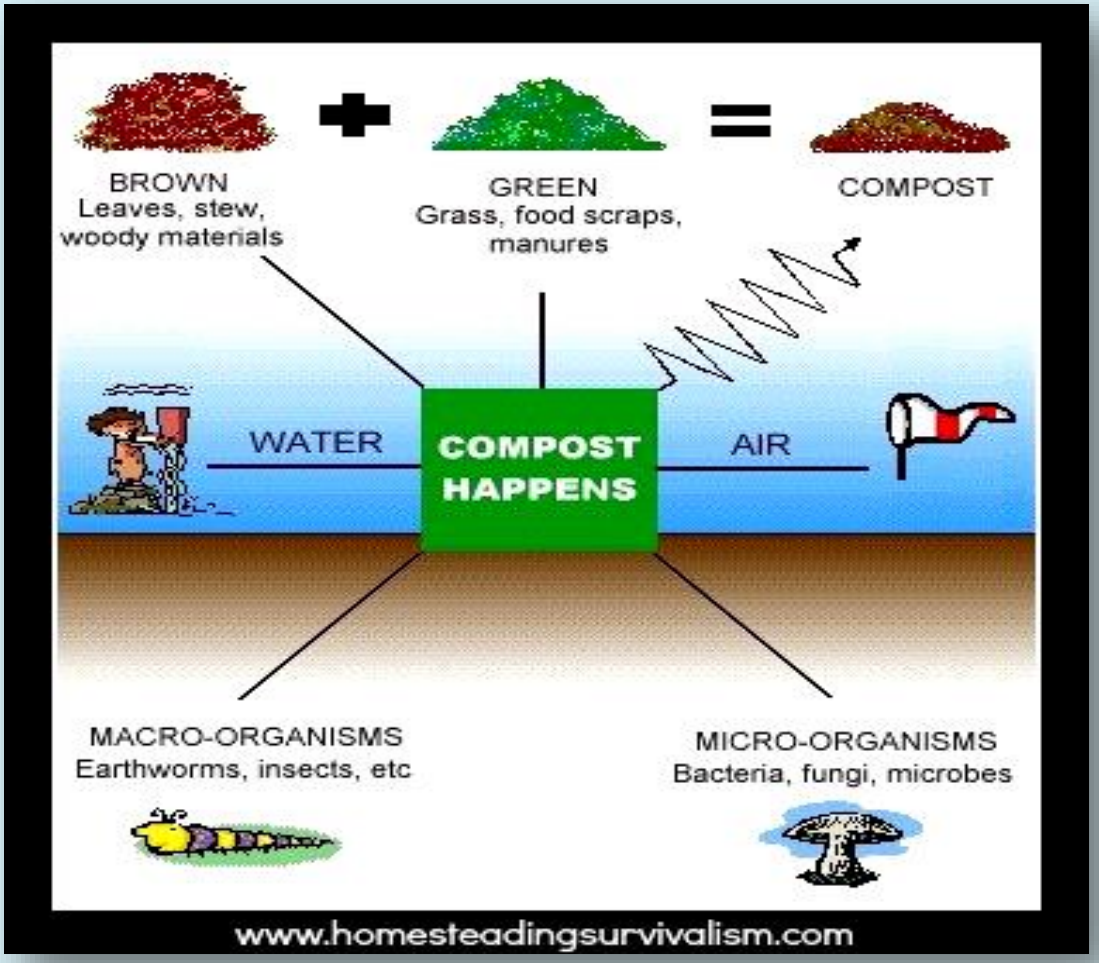
Plant Nutrient Recycling in Desert - Issues

- Low Moisture →
- Desiccation →
- Slow / no decomposition
- **Composting compensates**
- By managing moisture & air



Composting Recipe

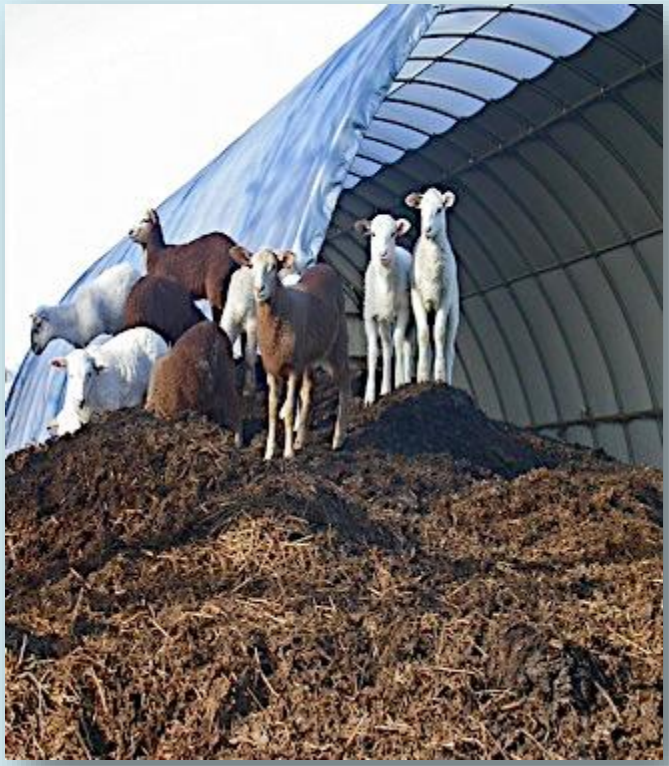
Organics + Water + Air + Time = Compost



Organic Material is

- Anything that was once alive.

- Both plant and animal



Green & Brown Organic Materials

- **Browns** – dry / **carbon**, provide microbial nutrition. Alone they decompose slowly.

- **Greens** – moist / **nitrogen**, provide microbial nutrition and protein for *reproduction* / cell wall formation.

- When mixed together then decomposition goes well – 2:1 Blend: 2 parts brown / 1 part green

Microbial Nutrition

- Browns + Greens →

  2 parts : 1 part - Blend

- Balanced Microbial Nutrition

- Decomposition happens

Browns that are Greens - Nitrogen

- Manures

Cow, horse, alpaca, llama, goat, rabbit, chicken, Etc.

- Coffee grounds

Homestead Greens & Browns

Browns - leaves

2 : 1

Greens – garden scraps

Browns – paper products

Greens – kitchen scraps

Paper Products - Browns

- **OK**: newspaper, egg carton, paper towel, napkins
  tissue, bags, filters, shredder, wrapping,
  cardboard, molded cardboard packing
  T-paper rolls.
  Cotton: q-tips, balls, menstrual pads

- **AVOID**: glossy, colored magazine
  wax / plastic coated, gift wrap
  Contaminated with chemicals, oil, paint

- When in doubt, leave it out → research

OK Additions

- Crushed egg shell
- Moldy products
- Leftover liquids: coffee, tea, soda, wine, beer
- Repurposed wash water

Kitchen Counter Holding Containers

- **Short term storage**
- Empty regularly
  and frequently – avoid odors
- Compaction of moist
  organics = odors
- Add paper products too
- Pierce bio. bags B4 dump →
- Add water B4 dumping

Vegetarian Animal Manures

- Nitrogen source (fresh)

- Salts – dilute with other organics
- Residual **herbicides**

- Residual **vermicides**
- nmcomposters.org

Nitrogen – greens: Sources

- Turf grass, weeds without seeds, cover crop clippings →
- Kitchen scrap - veg. & fruit pulp
- Coffee, hair, fur, feathers
- Manures – with urine & bedding
- Alfalfa, feather, cottonseed meals

  Fish hydrolosate, urine

Green Manure Crop ↑

London Rocket →

Avoid Adding Discussion

- Diseased plants, weeds with seeds
- Wood ash - inorganic, alkaline
- Charcoal w. accelerants ash

- Meat, fish, dairy – **scents / odors may attract critters**
- Lard, margarine, oil, nut butters – **scents / odors**

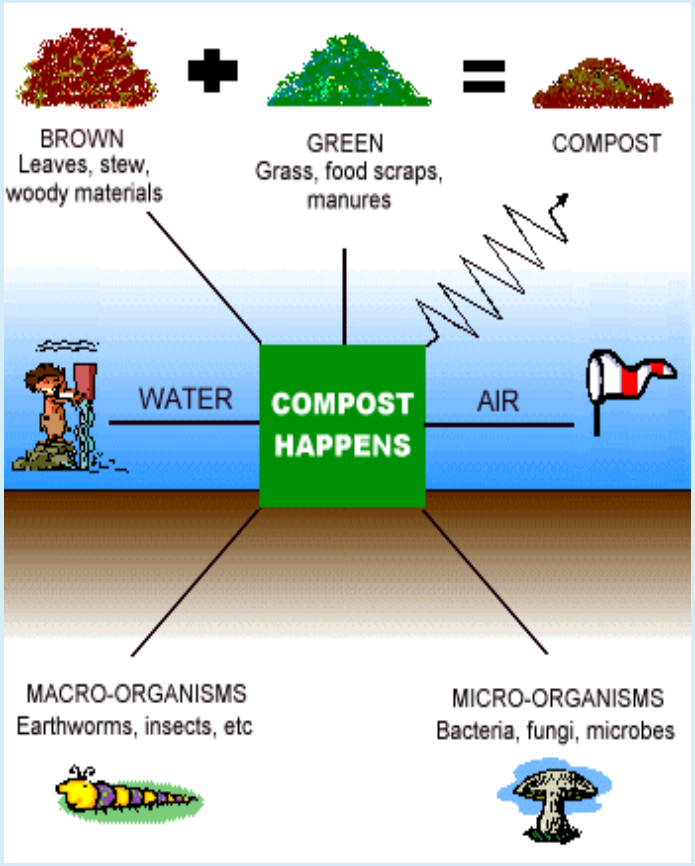
Avoid Adding

- Chemically treated wood products
- Dog, cat, pig, pet bird manure - chicks OK
- Glossy, colored & waxed paper
- Metal, glass, plastic, synthetic fibers, styrofoam
- Pesticides, herbicides, fungicides, vermicides

Not Required for Decomposition:

- Soil additions – not, but OK
- Composting worms - choice
- Manures – not - choice
- Compost starters – not- choice: Compost works too.
- Lime – not in desert

Required



The Work of Composting: manage variables

- Follow the recipe.
- **Manage the variables**

  In the recipe.
- Harvest regularly.

Manage Variables

- Moisture 50-60%
- Temperature - variable
- Air - bulking
- Browns / greens mix →
- Particle size - small
- pH – aerobic – self adjusts
- **Time to end product depends on all above**

Maintain Moisture in Setup

- About 50 – 60% throughout process.
- Similar to moisture content of freshly brewed coffee grounds. Moist but not dripping.
- Manage evaporation ! Cover the top.
- Wet dry stuff before adding.

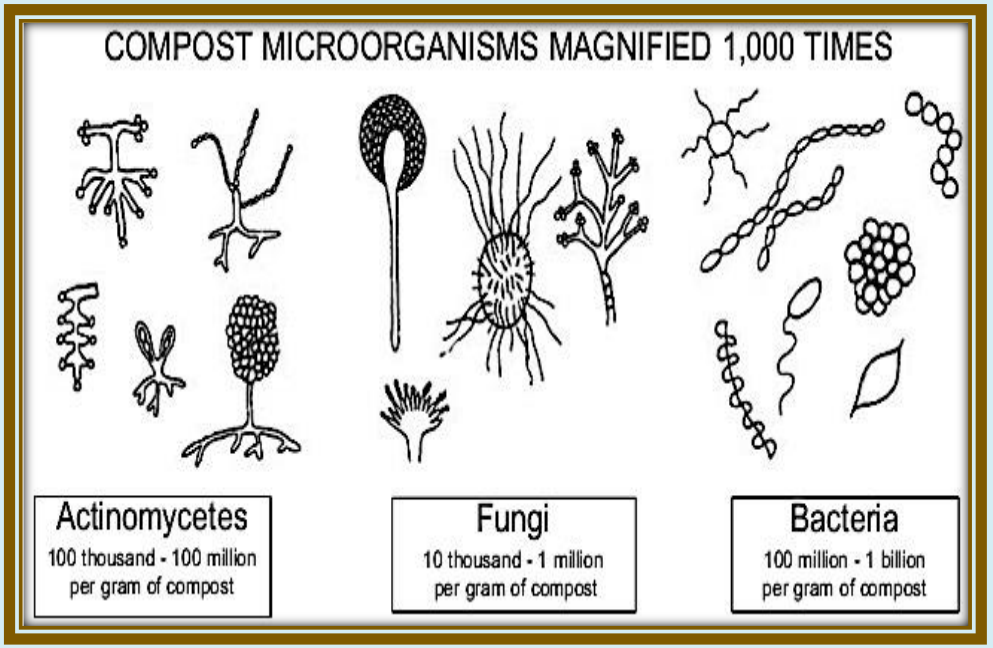
- Add moist materials then maintain moisture. Sprinkle with water as necessary.

Why Moisture

- Microorganisms can only function in a thin film of moisture on organic materials.

- Within that moisture film they secrete enzymes which transform organic material to Finished product.

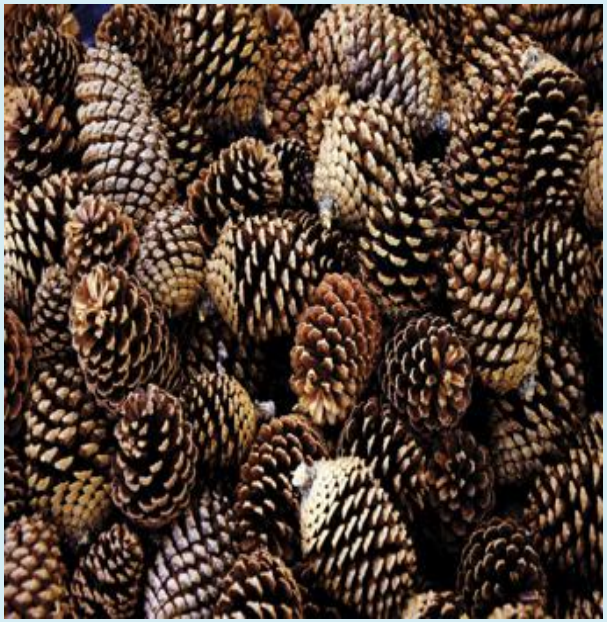
- No moisture = slow
  No decomposition



Surface Area of Feedstock

- Increasing surface area improves water absorption which fosters microbial activity.
- Smaller decomposes better (faster)
- Chop before you drop.

Coarse Bulking Material for Aeration



Coarse Bulking Material

- Decreases compaction of wet organics.
- Provides fluff.
- Helps convective air flow throughout pile.
- Woody, recalcitrant-
  slow to decompose.
- Useful in desert composting.
- Useful in static composting.
- Screen out of end product, then reuse.

Finger size sticks / twigs

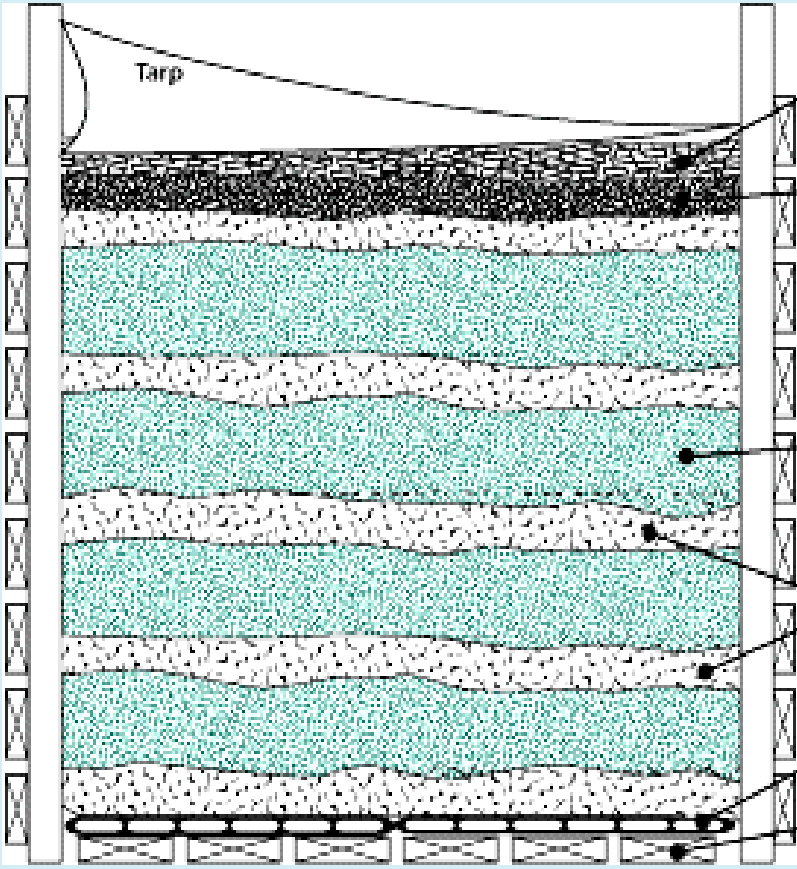
Chimney Effect From Bulking

Convective Aeration

Coarse material added
Bulk as you build.

Coarse Bulking: Why & How

- Decreases compaction, allows air flow
- Cover the top. ➔
- After every 6”, then add 4” bulking ➔
- 6” – 12” at bottom ➔

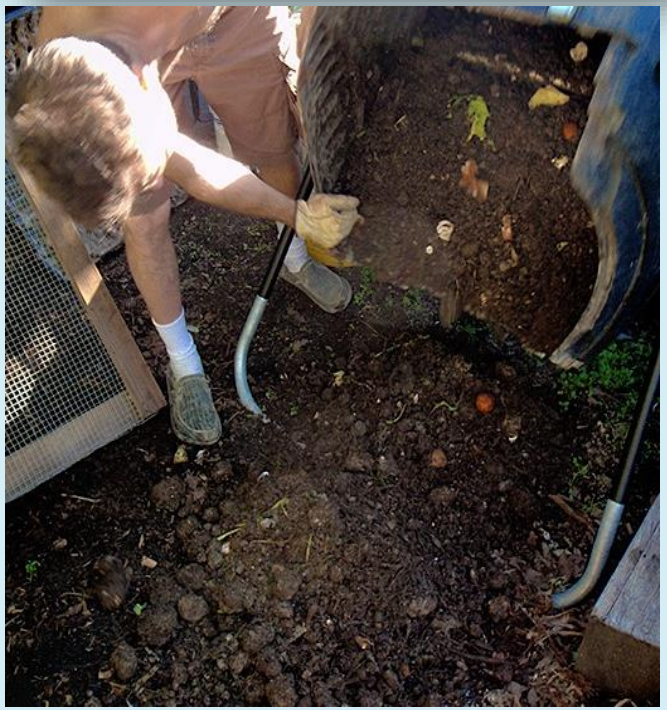


Bulk as you Build - Avoid Odors

Artist: Jenn Myers

- Decreases compaction Assists aerobic condition.
- Allows air flow
- Open bottom drains to soil

Sift-Out Coarse Bulking at Harvest



Purchased Compost – wood chips

- Use it as is.
- Sift it.
- Left over chips as a mulch

Sandoval County composting

Hardware cloth screen ¼ - ½”

Insect Helpers

- Dark, moist, food, undisturbed – stay where there's food.

- Detritivores
- Make organics smaller.

- Add to biology.
- Useful to the process.

Pill bugs

Accelerators / Microbial Inoculants

- Not required.
- Your choice.
- Finished compost is an inoculant.

Microbial load

Composting Divisions

- Cold / cool process

- Hot process

Composting Management

- **Static**: no turn / churn

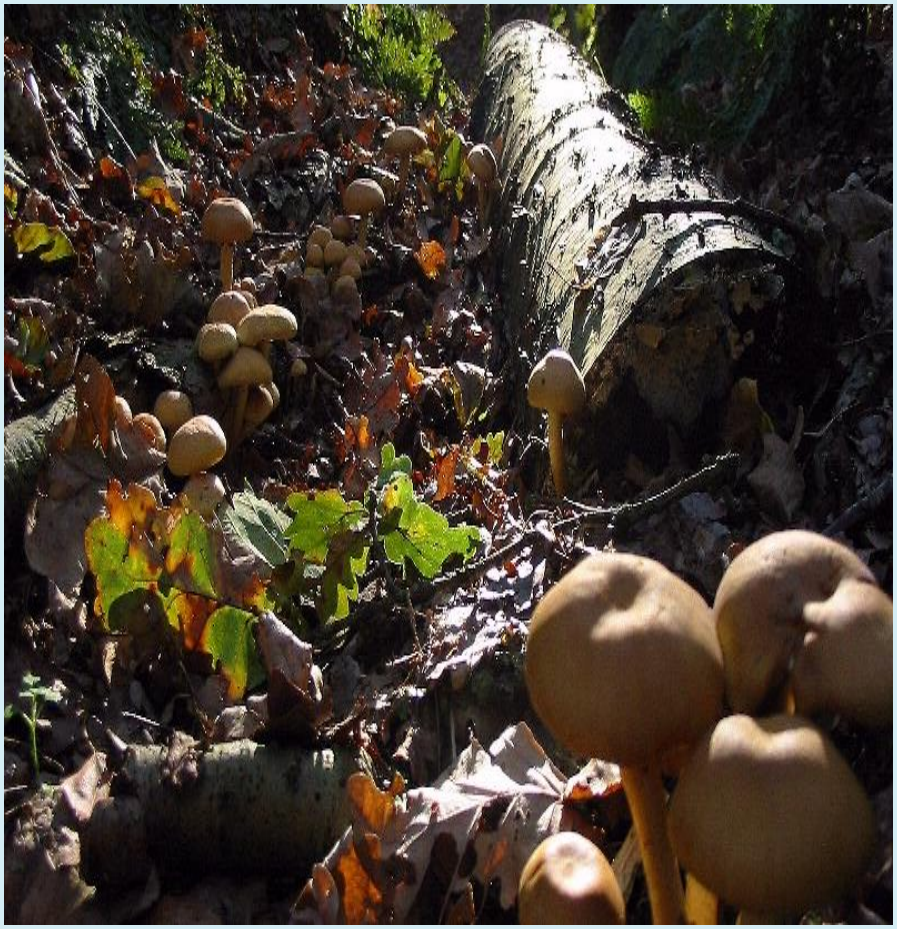
- Often cold process / easy >

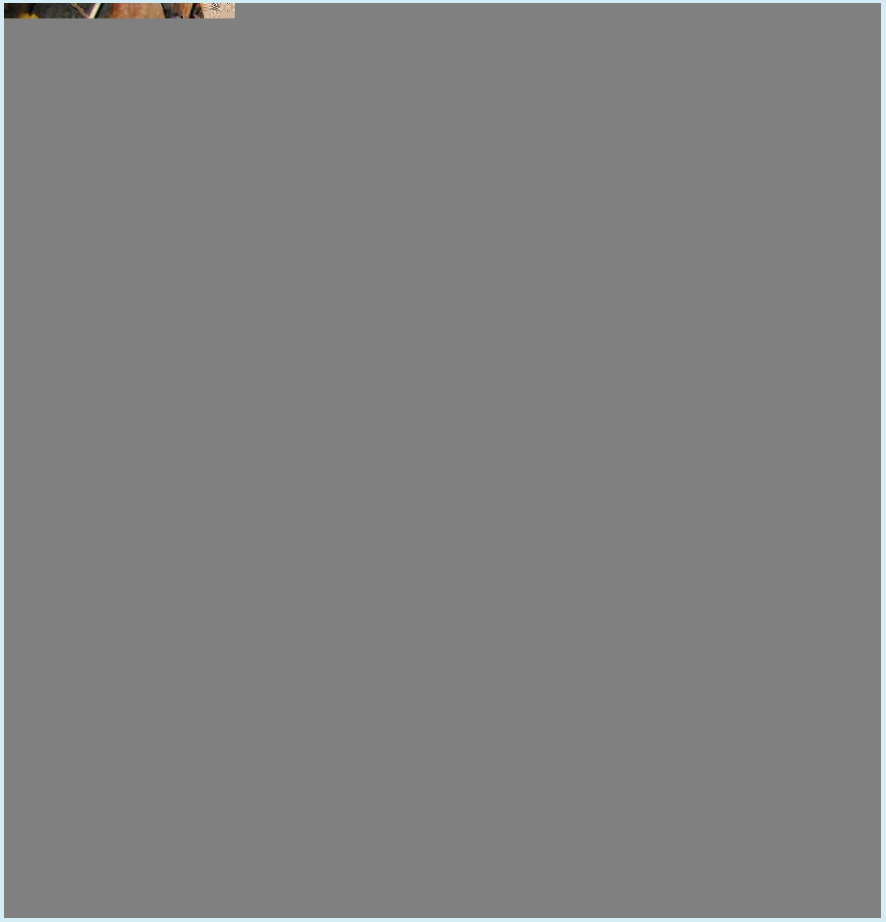
- Useful in urban yards

- **Active**: turning / churning

- Often hot process >

Static Decomposition in Nature





Fungal and microbial decomposition on forest floor.
Turning not required for decomposition to occur.

Cold Process Composting

- Any decomposition (composting) process which does not follow the specific guidelines for hot composting is cold process.
- Cold process mimics natures way, eg. forest floor
- May be static / passive, ie. no turning. Individual's choice
- Frequent choice for urban / senior homesteads.
- It is convenient, straightforward and reliably produces product.
- Temperature in a cold setup varies with ambient air.

Cold Process Composting

- Time to end product: 6 - 12 months in CNM
- Often occasional additions of whatever organics available. “ Dump and Run “
- Coarse bulking is added & moisture maintained at 50 % like moist coffee grounds
- **Avoid compaction of each addition.**

Easy Urban Composting: Cold Process

- Collect
- Container quite useful
- Chop, then drop
- Bulk as you build
- Static : dump & run dump & done
- Active: turn / tumble
- Maintain uniform moisture, always
- Shade in summer
- Harvest regularly, every 3 months

Easy Cold Static Composting

- Chop before you drop.

- Dump, add water, course bulking, then cover.

What's happening in the Setup

- What goes in today…..
- Decomposes – particles become smaller & smaller…. Sinks down
- Ends up at the bottom as humus 6 - 12 months later.
- Harvest – drop down

Composting is Organizing OM

- Let's organize, contain and manage organic material so that it decomposes.

- Let's consider some choices.

Dump and Run

Containment Options in the Desert

- **On top of soil** – bins, sheet, pile, bag

- **In the soil** – pit, trench, container in the soil

Containers - Plastic Bins

- Easy to add to; easy to harvest from - usually
- Neat / tidy
- Facilitate air & moisture management
- Movable – many styles / choices
- One time expense – as many as you need.
- Reduce flying insects, critters, predators

Containers - Manufactured - Towers

Open bottom drainage

Too Porous – Customize for Desert Use

- Shade in Summer
- Cover Holes
- Cover top of pile
- Sprinkle
- Avoid compaction
- **Bottom drainage**

Pallet lifter / riser

- Under a bin
- **Avoid tree roots**
- Drainage & air upflow

Underline to prevent drop down:

- ¼’ hardware cloth
- Weed barrier porous fabric
- Slat the gaps

Containers - Plastic Tumblers

Elevated

May be elevated

Help avoid tree roots

Compare Bins – Both Produce Product

Stationary tower

Product at bottom

Tumbler turns

Product is mixed in

Tumbler Bins

- A rotating container.
- **The same science applies.**

- "*Tips for Tumblers*" at nmcomposters.org
- In the shade in summer.

- Add coarse bulking material.
- Avoid overstuffing bin.

- Maintain moisture in all seasons.
- Harvest 3-6 mos. after first addition.

D I Y Containers - Desert

Too many Holes

Homemade Bins: nmcomposters.org

Containers

Too porous

Cover the top

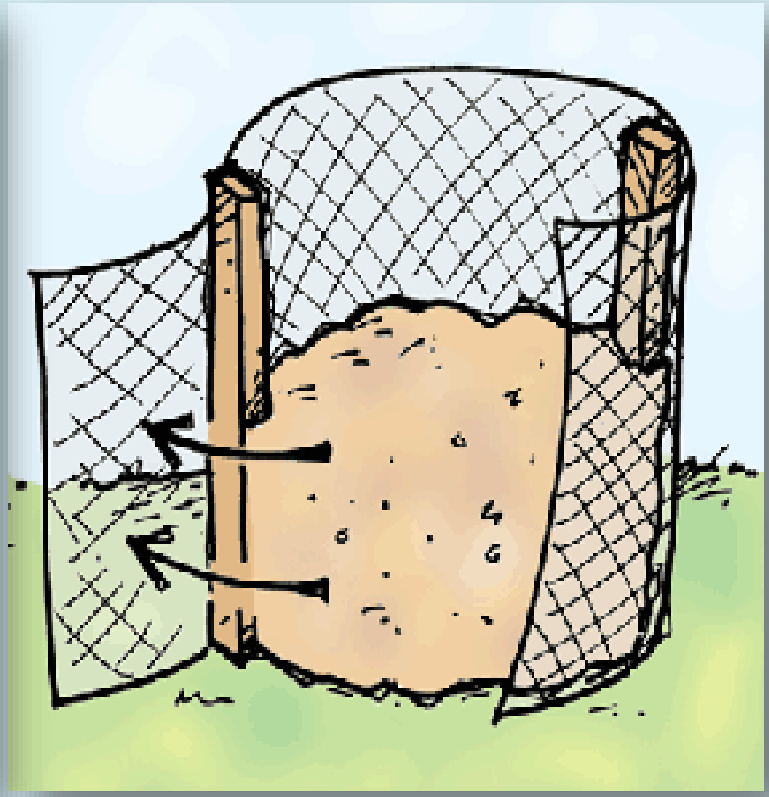
Better →

Snug Bins Appropriate for the Desert

Stacked Block Bins

Cover the top

D I Y - Wire Bins



Too porous for Desert

Lined Fence Wire Bin = Better

Finished compost is at the bottom

Bale Bins

← Cover the Top ↑

Uncontained Piles - Cold / Hot

← **Water vapor escapes from uncovered pile.**

Layered Composting on top of Soil

- All at once or little by little
- Maintain moisture in layers

Containment in the Soil

- Moisture, mulch, cover
- Cold / static
- Cover or bury

Container in a Hole Composting

- Any size with a lid➔ Keeps moisture in container.
- Soil moderates temp. inside container
- Less frequent digging ➔ Dump and Run.
- Composting worms may be added.

Bag and Wait Composting

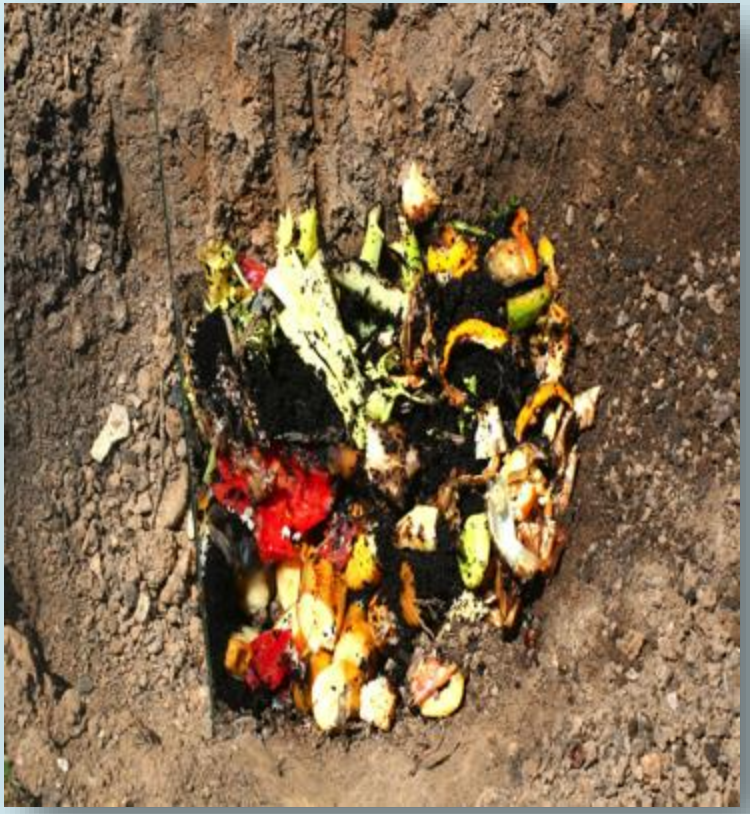
- Shred
- Moisturize
- Bag – sunny location
- Wait ➜ Leaf mold

Bokashi Closed Bucket Method

First stage

Entomophobes

Second stage



Cold / static

Vermicomposting

Mary Appelhof, 1936 – 2005
Michigan, USA

Cold / Static

ABQ Urban Composting Enthusiast

Your Choices

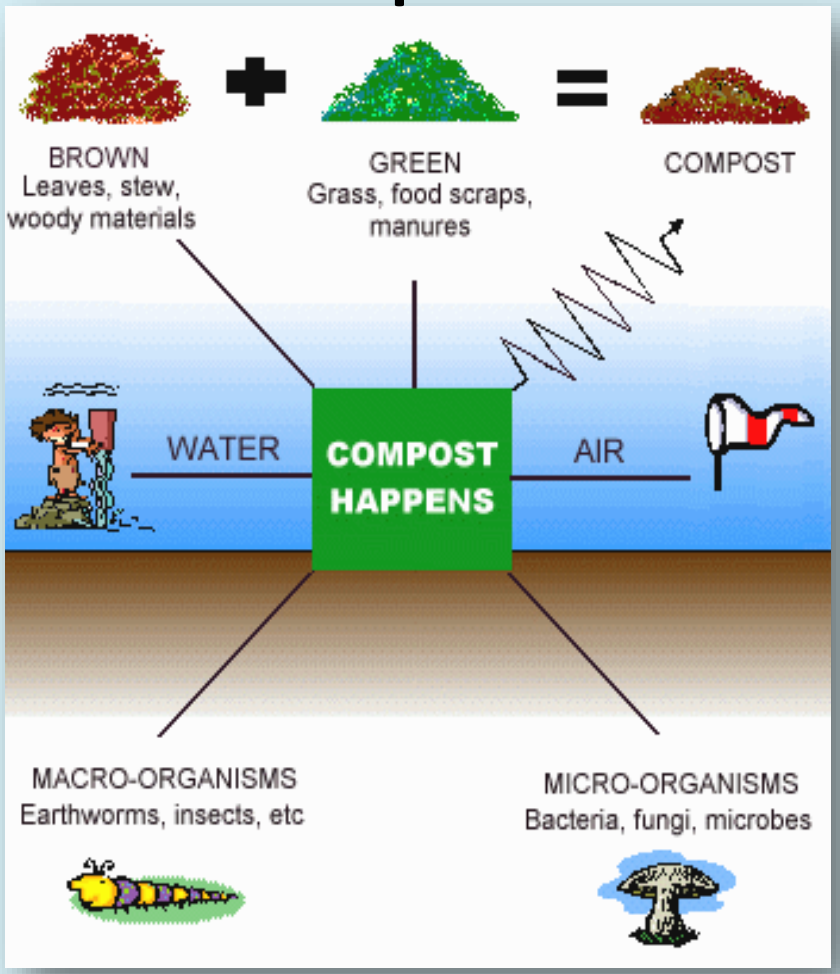
- Choose organizing method – bin, pit, sheet, bag,
- Then a process – eg. cold for this discussion
- Then a management style – active or passive:

- **Active** - turning & churning with coarse bulking.
  Usually hot process.
- **Passive** - static with coarse bulking. Often cold process.

Tweaking the Variables - Review

- Time cycle – depends on

Required



- **Moisture – 50%**
- **Temperature - variable**
- **Air - bulking**

- Browns + Greens = 2:1
- Surface area of feedstock
- Insects, worms

Additions

- What is added; What is left out……
- **Is your choice.**
- Not sure / concerned, then research the item.
- Compost-questions@nmcomposters.org
- Call your local extension office for advice.

Avoid Unpleasant Odors

- **Compaction** of moist feedstock will enhance an *anaerobic* process.
- Putrefaction / putrescence
- Anaerobes ➔ unpleasant gases.
- Blend Greens with Browns.
- **Bulk as you build to decrease compaction. ↗**
- Avoid standing liquid in setup – open bottom drainage

Predators ? Then Consider:

- Indoor worm bins
- Bokashi bucket method
- Pits – deep, blend & bury
- **Avoid** scented food scraps- meat, dairy in out door piles / containers.

Decrease Insects ? Possibilities:

- Deep soil burial
- Bokashi Bucket method - closed
- Indoor worm bins – somewhat closed
- Raised tumbler bins- somewhat closed
- Cover holes w. screen fabric - barrier
- Underline bin w. hardware cloth - barrier

Composting in Small Spaces

- Worm bin
- Bokashi bucket method.
- Pit composting
- Bag & wait

Composting Processes - Choices

- Cold process - done

- **Hot process**
- Same science, the formula is the same
- Unique management guidelines for hot process
- Let’s discuss thermophilic process

Hot Process Composting - Dynamic

Microbial decomposition of CHO's generates heat.

Hot Process Composting Guide

- **Batch mixed all at once. Intention – heat**
- **Minimum batch size** - 1 cu. yard: 3’x3’x3’
- **Attention to the brown /green blend** 
- **2 parts brown : 1 part green**
- **Turn & churn** when pile reaches 130 -150 F – active management, every 7 -14 days

Hot Process

- Moist heat softens the organics. Destroys pathogens & seeds.

- Sprinkle pile before tuning & churning.

- Turn & add more green as necessary

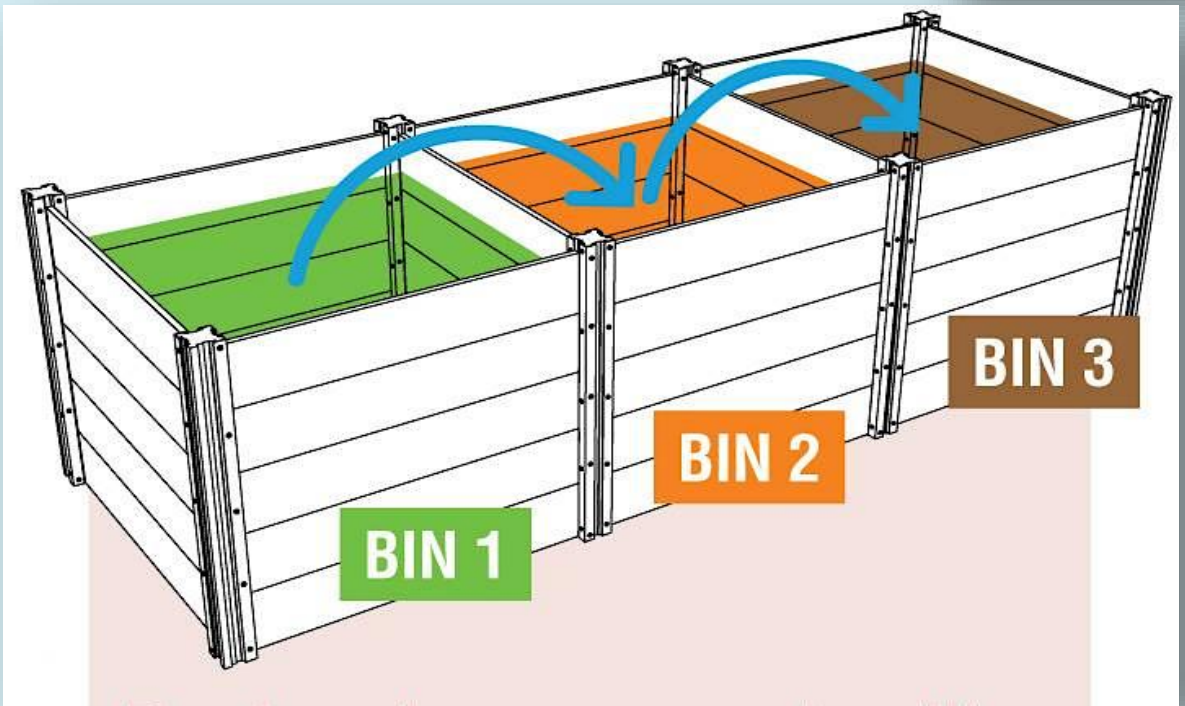
- Cure end product for 6 weeks. (cold phase)

Hot Process

New Zealand Box

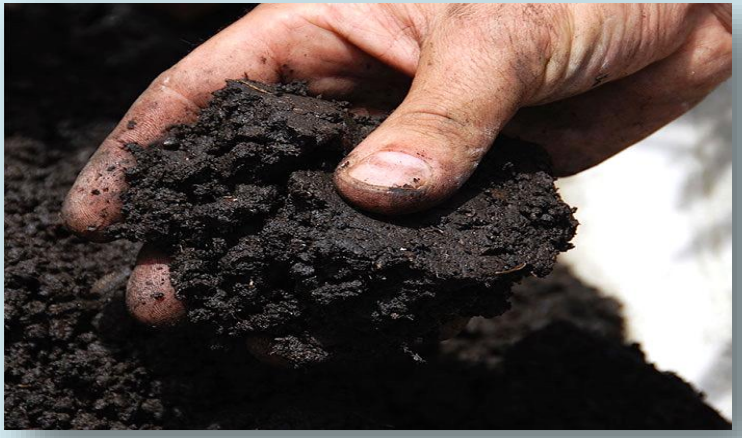
Cover the Top !

Bin to Bin Transfer



Finished compost: humus in the making

- Stable mixture of compounds containing carbon, nitrogen and plant nutrients.
- Particle can absorb 80% of its mass in water.
- Involved with nutrient exchange in plant root zone.
- Buffers soil pH.



Finished Compost Contains

- The end product of microbial decomposition of organic material.
- Dormant, living and dead microorganisms
- Undecomposed organic material.
- Plant nutrients

Finished Product

- Looks like chocolate cake crumbs after bulking removed.

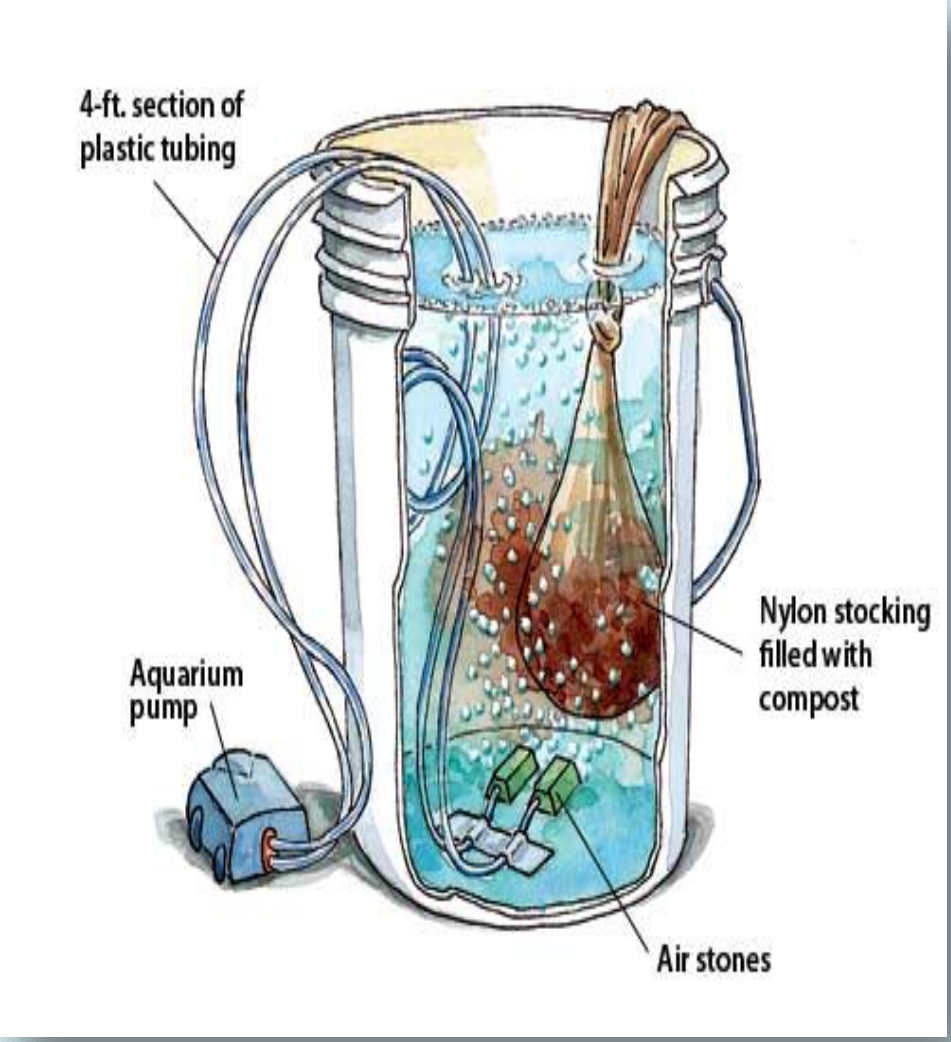
- Unable to identify original ingredients.
- Earthy pleasant fragrance

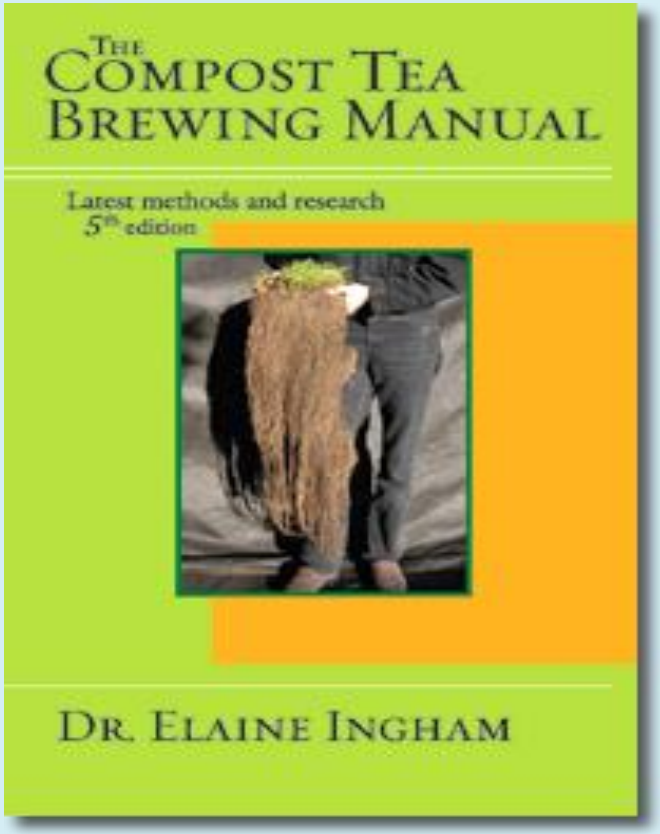
- Does not generate heat
- NPK - 1: 1: 1

Finished Compost - Uses

- Unsifted: mulch on top soil
- Sifted: on top of or incorporated into soil
- Remove grubs

Actively Aerated Compost Tea





Compost – Soil Amendment

- Spread
- Scratch
- Water
- Mulch

Finished Compost a Soil Amendment

Broad fork

- Poke Holes
- Spread & Scratch
  1” – 3”
- Water in
- Plant / mulch
- Spring & Fall

Amend Potted Plants' Soil Too

Sensible Suggestions - Safety

- Wear gloves. Cover wounds.
- Avoid touching face / mucous membrane.
- Sprinkle before turning / churning.
- Consider tetanus booster.
- Scrub hands & vegetables.
- Common sense

Practice Summary

- Follow the science – recipe – tweak variables
- Organize organic material
- Chop before you drop
- Bulk as you build
- Maintain moisture, in all seasons
- Drape the top
- Adjust expectation - patience

Choices

- What might work for you / family ?
- Pick a method. Get started. Practice !
- Keep notes. Ask questions.
- Be patient and compost on…….
- Read & research. Attend another class.
- Contact us with questions:
  compost-questions@nmcomposters.org

Useful Practices in the Desert

Moderate & manage evaporation: page 7

- Use low porosity bins/containers.
- Block holes in manufactured bins.

- Always cover the top of pile then the top of bin.
- Wet dry material before adding.

- Sprinkle to maintain 50% moisture throughout.
- Place operation on soil in shade in summer months.

Useful Practices in the Desert

- Chop, shred, cut before you drop.
- Add what you have on hand – all will decompose.
- Mixing browns with greens is helpful – 2 : 1
- Avoid compaction of additions.
- Add coarse bulking material as you build.

Home Composting

- Undecided, while waiting ….

- Then donate organics to a community, school or church garden with composting facility.

Putting it Together

- Composting is a science-based art form
- Management is tweaking the variables
- **Follow the science**, then
- Do whatever suits you. - Your composting art.

Benefits of Home Composting

- You help nature recycle plant nutrients to produce
- Product – soil amendment.
  Sequesters carbon in soil
- Thereby avoiding landfilling
- What a sense of accomplishment.

Contact

- nmcomposters.org
- Send composting questions to:
- compost-questions@nmcomposters.org

New Information

Did you learn something new today ?

Compost Happens. We can help !

nmcomposters.org