

# A Convenient Truth

Composting for home and  
community gardeners



Don Krafft  
Island County Master Gardeners



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# Why compost?



Bio-filter wattles filled with compost

- Waste diversion and greenhouse gases
  - Reduces landfill
  - Reduces methane and CO<sub>2</sub> emissions
- Improves soil fertility
  - Increases nutrient-holding capacity
  - Adds essential nutrients and microbiology
  - Reduces need for chemical fertilizer
- Improves soil tilth and texture
  - Improves soil structure and porosity
  - Loosens up clay soils so air and water can penetrate
  - Helps sandy soils retain water and nutrients
- Carbon sequestration
  - Creates stable forms of carbon
- Pathogen suppression
  - Binds toxins in the soil
  - Provides bio-filtration



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<http://whatcom.wsu.edu/ch/compostwhy.html>

# What is compost?

- Stable product of the decomposition of organic matter by microorganisms
- Feeds the soil micro-organisms which feed your plants
- Base soil consists of sand, silt, clay
  - Minerals
  - Soil structure
- Soil fertility from compost
  - Nutrients
  - Microorganisms
  - Organic matter
  - Humic substances



Compost is nature's  
way of recycling



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<https://en.wikipedia.org/wiki/Compost>

[https://www.soilwealth.com.au/imagesDB/news/Nov2010\\_ShafferCompost.pdf](https://www.soilwealth.com.au/imagesDB/news/Nov2010_ShafferCompost.pdf)

# Is compost a fertilizer?

- The big three plant nutrients N - P - K



Nitrogen



Phosphorous



Potassium % by weight

- N - P - K values for compost
  - 0.5 % to 1.0 %
  - Variable
- Fertilizer must have a guaranteed analysis
- Therefore, compost is an amendment



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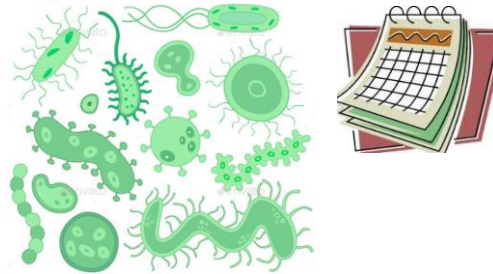


# How to make compost

Browns +  
Greens +  
Air +  
Moisture



Microbes + Time



Finished compost



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<http://clipartix.com/calendar-clipart-image-3592/>  
<https://www.pinterest.com/pin/490470215645748858/>

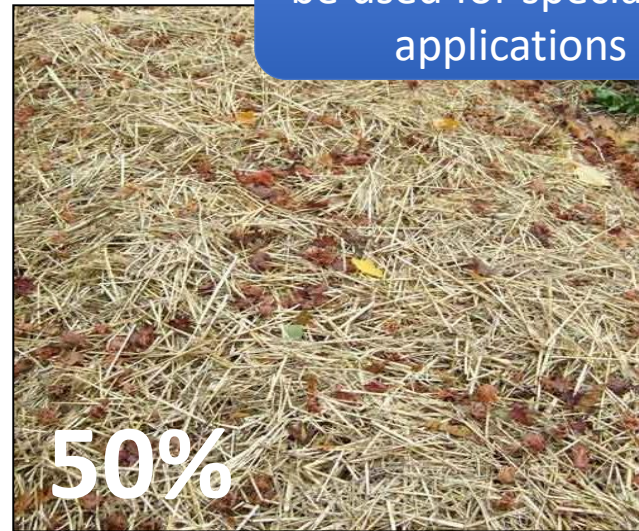
<http://whatcom.wsu.edu/ch/homecomposting.html>  
<https://www.grow-it-organically.com/build-a-compost-pile.html>

# Composting materials

- 50% Input “green” feedstock (nitrogen)
  - Manure
  - Grass clippings
  - Food scraps
  - Green plant cuttings
  - Coffee grounds
  - Eggshells
- 50% Input “brown” feedstock (carbon)
  - Dry leaves or leaf mold
  - Cardboard
  - Newspaper
  - Straw
  - Sawdust (not treated)
  - Woody cuttings
- Herbivore bedding contains a mixture of nitrogen and carbon



Other proportions can be used for specialized applications



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# Materials to avoid

- Meat and bones
- Poultry and fish
- Fatty food waste
- Whole eggs
- Dairy products
- Human and pet feces
- Pernicious weeds
- Treated wood



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<http://discountdogpoopbags.com/>

<https://ripenraworganics.com.au/>

<http://www.illinoiswildflowers.info/>



# Material preparation

- Chop materials
  - The smaller the pieces, the faster the process
- Layer equal amounts of browns and greens
  - Then mix the layers
- Adjust moisture content
  - Texture like a wrung-out sponge – 40% to 65% hydration



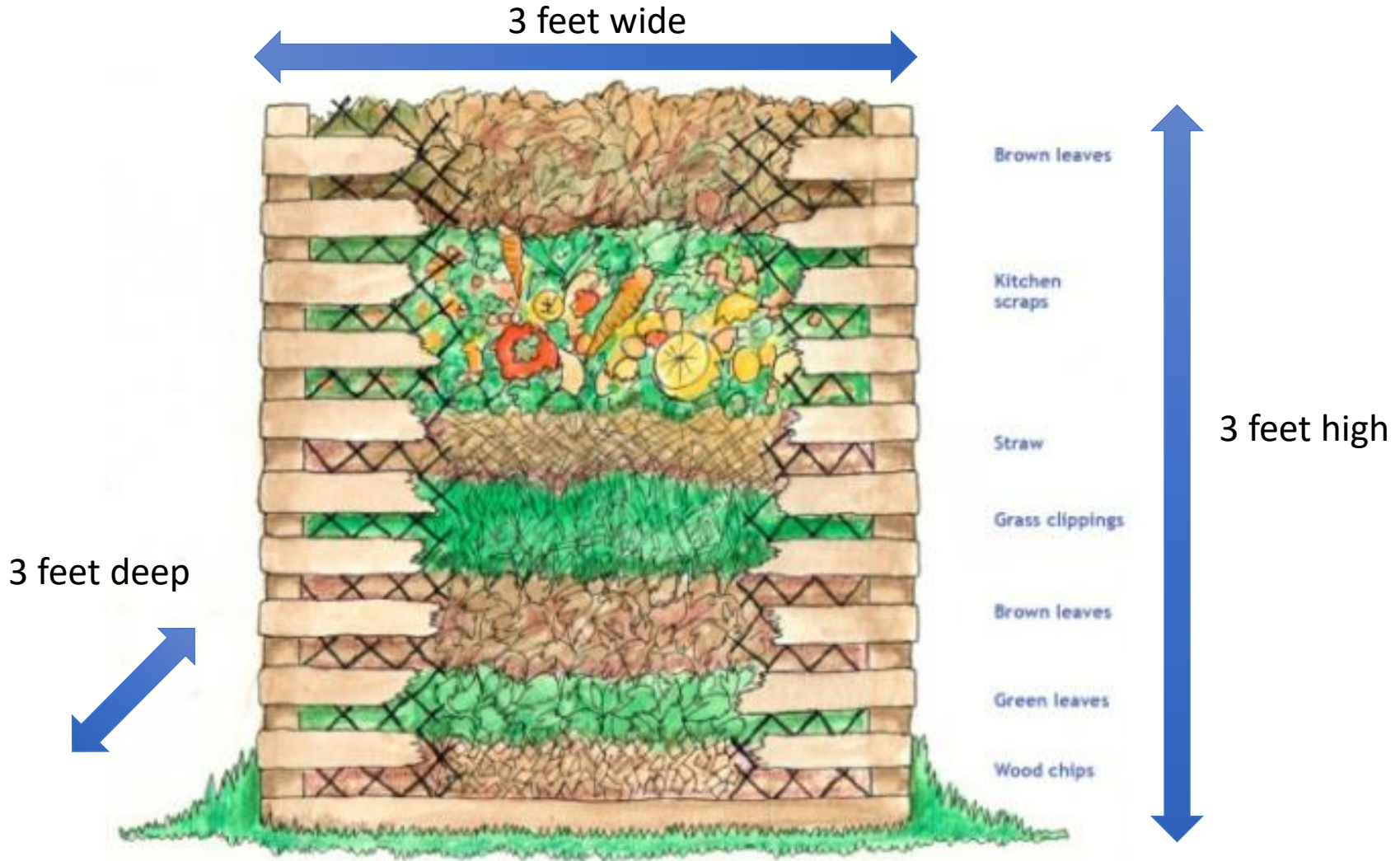
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<https://www.cheapmowers.com/acatalog/Mighty-Mac-SC800EX-Hammermill-Petrol-Chipper-Shredder.html>



# Building a compost pile



Island County <https://www.visokegrede.si/>

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# Compost pile maintenance

- Maintain air and moisture
  - Texture like a wrung-out sponge
- Turn the pile at intervals
  - More often for faster decomposition
  - Less often for lower maintenance
- Optionally, use instruments to
  - Monitor temperature
  - Monitor moisture
- Maintain until compost is “finished”
  - No recognizable materials
  - Pile is completely cold
  - Then wait a while!



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<http://biogas.ifas.ufl.edu/SCC/basics.asp>  
<https://www.oregonmetro.gov/tools-living/yard-and-garden/composting/tips-composting-success>



# Site assessment

- Convenient access
  - Adding material
  - Maintaining the pile
- Not too wet
- Not too sunny or dry
- Protected from rodents
- Near a water source
- Near a “banked” supply of browns



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<http://www.frisss.hu/hirek/szombathelyen-is-elkezdodik-a-komposztalo-ladak-kiosztasa>  
<http://www.clipartpanda.com/>



# Infrastructure



## Considerations

- Cost
- Size
- Ability to turn
- Pest resistance



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<https://extension.wsu.edu/whatcom/hg/many-types-of-compost/>  
<http://www.allotment-garden.org/store/equipment/wire-leaf-composter>



# A home composting operation

- Compost what you have!
- Stockpile leaves in the fall
- Chipped landscaping materials are pre-mixed
- Veggie garden stalks, stems, roots, and leaves work well



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A convenient truth

# Cold pile vs hot pile

- Mesophilic 70° - 110° F
- Medium temperatures
- Pros
  - Critters stay longer
  - Less labor intensive
  - More worm friendly
- Cons
  - Slower (months-year)
- Thermophilic 110° - 165° F
- Hot for a few weeks
- Pros
  - Faster (weeks-months)
  - Kills pathogens and weed seeds
- Cons
  - More labor intensive



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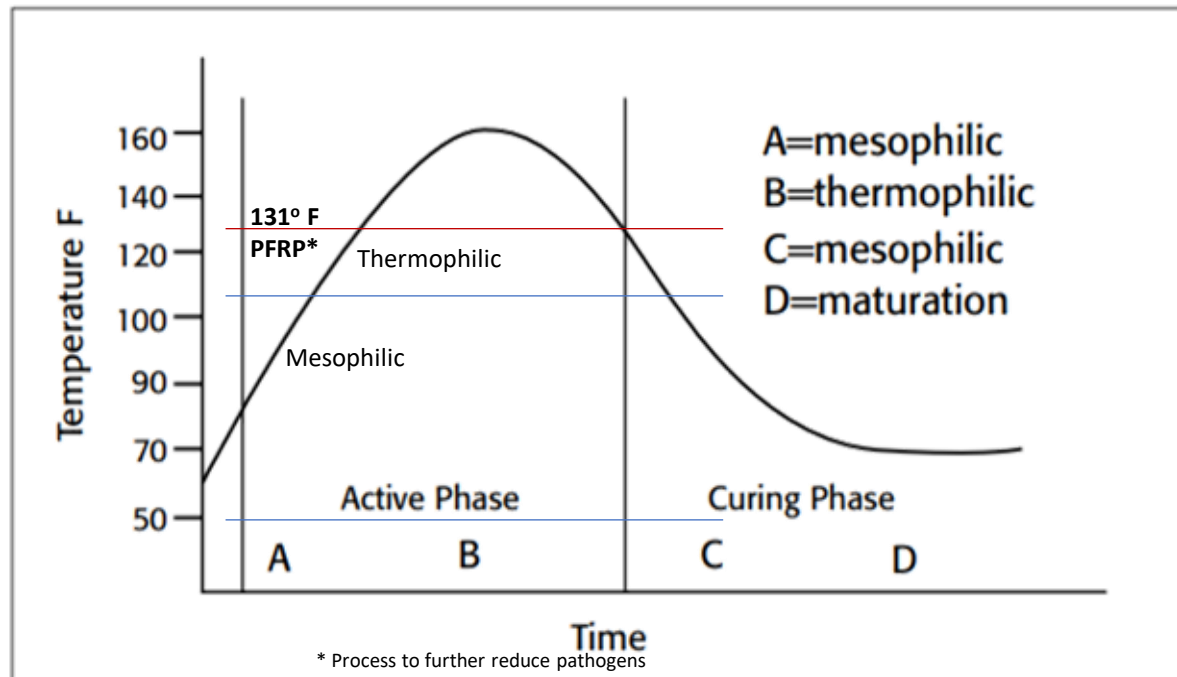
# The phases of composting

Phase dominance	Temperature	Consumption
Mesophilic bacteria	Up to 110° F	Soluble sugars, starches
Thermophilic bacteria	111° F to 165° F	Proteins, fats, cellulose
Fungi	130° F to ambient	Lignin, chitin, wax

Easiest



Toughest



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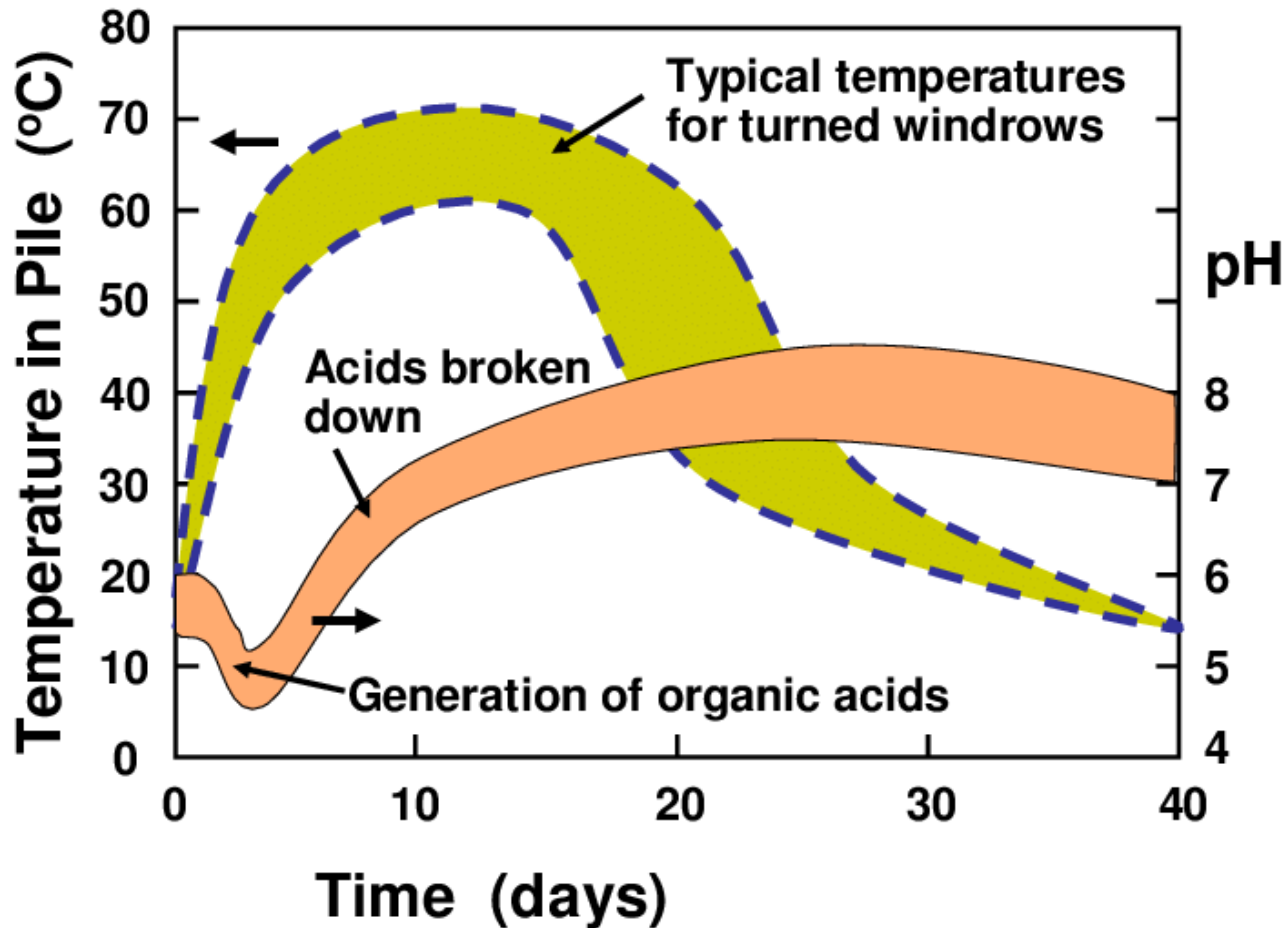
Four stages of composting

[https://www.webpal.org/SAFE/aaarecovery/1\\_farm\\_recovery/humanure/newchapter03\\_09.htm](https://www.webpal.org/SAFE/aaarecovery/1_farm_recovery/humanure/newchapter03_09.htm)

The phases of composting

<https://www.chelseagreen.com/2019/the-phases-of-composting/>  
<http://compost.css.cornell.edu/microorg.html>

# pH over the composting cycle



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[Changes in temperature and pH during a typical static composting operation](#) | [Download Scientific Diagram \(researchgate.net\)](#)

# The compost curing phase

- Low temperature process that activates as bacterial activity diminishes after the sugars, starches, and fats are consumed
- Fungal activity increases consuming the tougher lignin, chitin, waxes, and cellulose
- Phytotoxicity (plant toxicity) is reduced as pathogens continue to be broken down
- Completes the decomposition phase of the composting process
- Beneficial organisms and earthworms return



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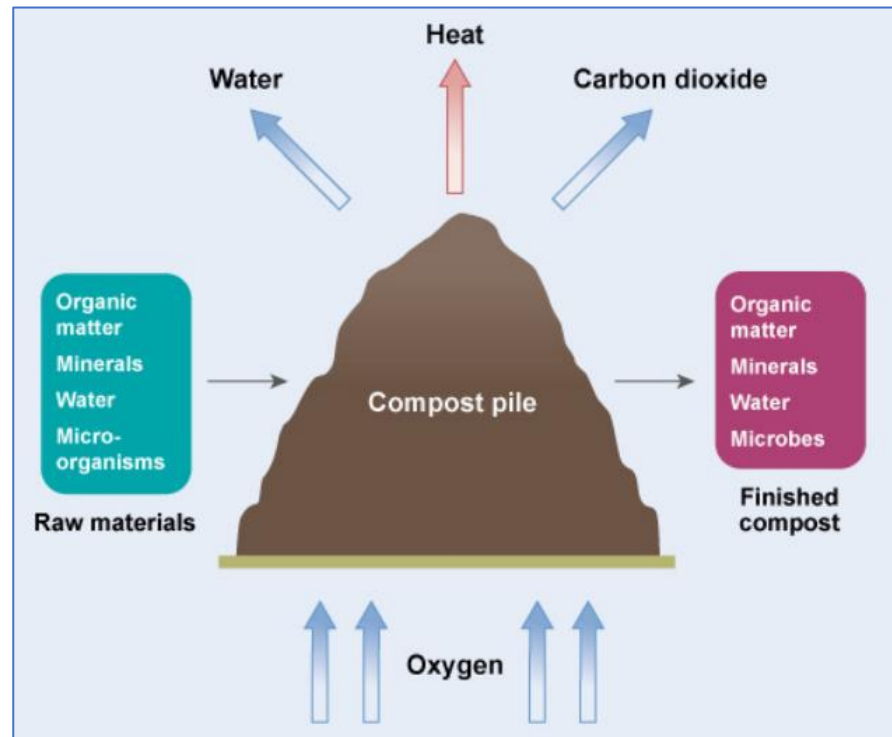
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The phases of composting <https://www.chelseagreen.com/2019/the-phases-of-composting/>  
[https://www.soilwealth.com.au/imagesDB/news/Nov2010\\_ShafferCompost.pdf](https://www.soilwealth.com.au/imagesDB/news/Nov2010_ShafferCompost.pdf)  
[https://www.soilwealth.com.au/imagesDB/news/Nov2010\\_ShafferCompost.pdf](https://www.soilwealth.com.au/imagesDB/news/Nov2010_ShafferCompost.pdf)



# The key factors that influence decomposition

- Carbon to nitrogen ratio of the feedstock material (C:N)
- Size of the particles and bulk density
- Aeration
- Moisture
- Volume of the pile



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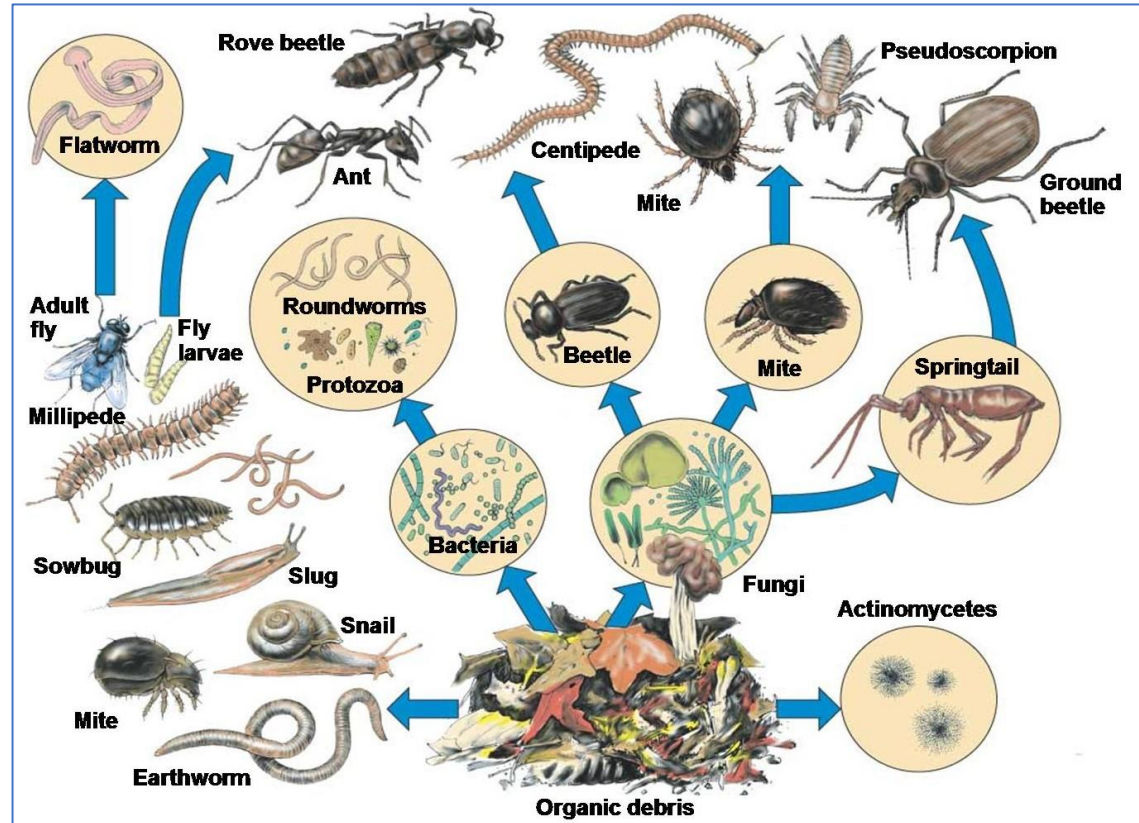
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<https://blog.growcalgary.ca/2015/01/12/large-scale-composting/>  
<https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=80574&section=7.2>

# Critters in the compost pile

Most critters  
are beneficial

- Many arthropods are attracted to the fresh feedstock
- They disappear as the pile heats up
- The microbiology and earthworms return during the later states
- Critters are rarely a problem in finished compost



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# Troubleshooting

## Rodents

- Meat
- Greasy or oily foods
- Cooked foods
- Physical access

## No action

- Too dry
- C:N imbalance
- Pile not turned

## Smelly pile

- Excess green (N)
- Too much water
- Not enough O<sub>2</sub>



<https://www.allotment-garden.org/>



[www.learn.eartheasy.com](http://www.learn.eartheasy.com)



<http://amodernmother.com/2010/02/how-to-compost.html>



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# Using compost as a soil amendment

Use	Thickness	Comment
Top dressing for lawns	¼"	Sift through ½" screen
Annuals and perennials	1" to 2"	Apply in the spring or any time
Vegetables	2"	Apply before planting
Around trees and shrubs	1" to 3"	Coarse compost works
Erosion control	2" to 4"	Coarse compost works



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&G

<http://whatcom.wsu.edu/ch/compostsoilamendment.html>



# Successful Composting Requirements

- Composting is getting on the right side of nature
- The realization that no matter what you do, no matter how many little mistakes [experiments] you make, you are still going to produce reasonably good, usable compost ... Stu Campbell, “Let it Rot”
- A basic understanding of the life forms and processes that operate within a compost pile
- A willingness to experiment
- A little effort
- A little artistry
- Composting and its results get better and easier with experience

Keep it simple!



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# Thank You!



Don Krafft  
Island County Master Gardeners  
[dfk@donkrafft.com](mailto:dfk@donkrafft.com)



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<http://archive.constantcontact.com/fs197/1101811920551/archive/1117199404572.html>

Insanecllopedia <http://insanecllopedia.com/1415/antidepressant-microbes-soil-dirt-makes-happy/>

# Washington State Composting Resources

- WSU Extension Whatcom County composting
  - <http://whatcom.wsu.edu/ch/compostingwhatcom.html>
- WSU Extension Puyallup composting
  - <https://puyallup.wsu.edu/soils/compost/>
- WSU Whatcom County Extension, Community Horticulture
  - <http://whatcom.wsu.edu/ch/compost.html>
- WSU Extension, Backyard Composting
  - <http://pubs.cahnrs.wsu.edu/publications/pubs/eb1784e/>
- Gardening in Washington State
  - <http://gardening.wsu.edu/>
- Search for all WSU extension composting resources “compost site:extension.wsu.edu”
  - <https://search.wsu.edu/default.aspx?cx=004677039204386950923:xvo7gapmrrg&cof=FORID%3A11&q=compost%20site:extension.wsu.edu>

