

# Healthy Soil

## Your Garden's Foundation

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Community Gardens Leaders Day

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# What is Soil?

*Soil is ...*

***“a naturally occurring mixture of inorganic and organic ingredients with a definite form, structure, and composition that varies from one location to another.”***



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# Soil is ...

-  **Mineral**
-  **Water**
-  **Air**
-  **Organic Matter**

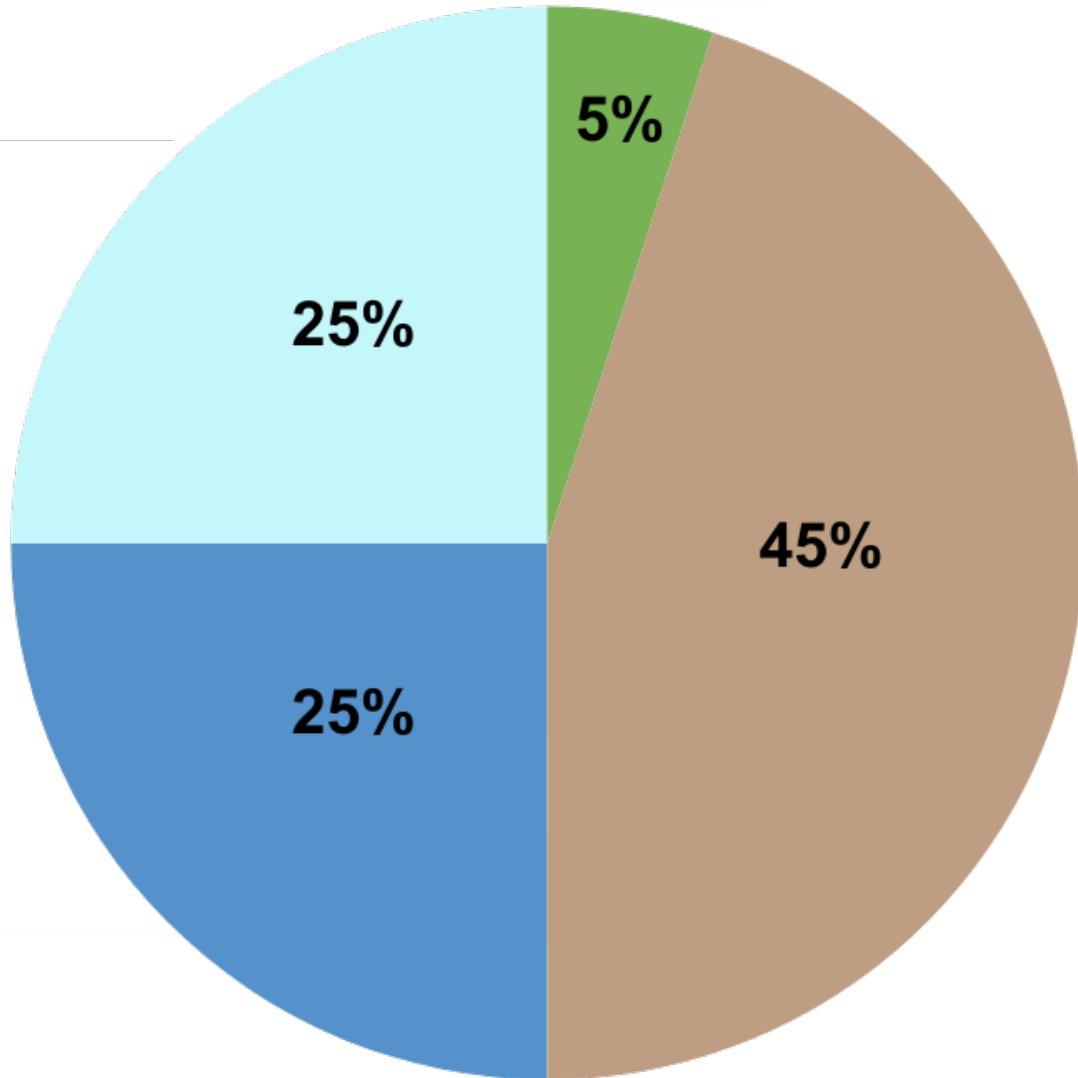


Image credit: N. Vollrath via Canva



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# Soil Minerals



**Sand**



**Silt**



**Clay**

Image credit:  
Sand: (File:BeachSand.jpg - Soil Ecology Wiki, n.d)  
Silt:(File:Silty.jpg - Soil Ecology Wiki, n.d.)  
Clay: Canva





# Soil Organic Matter

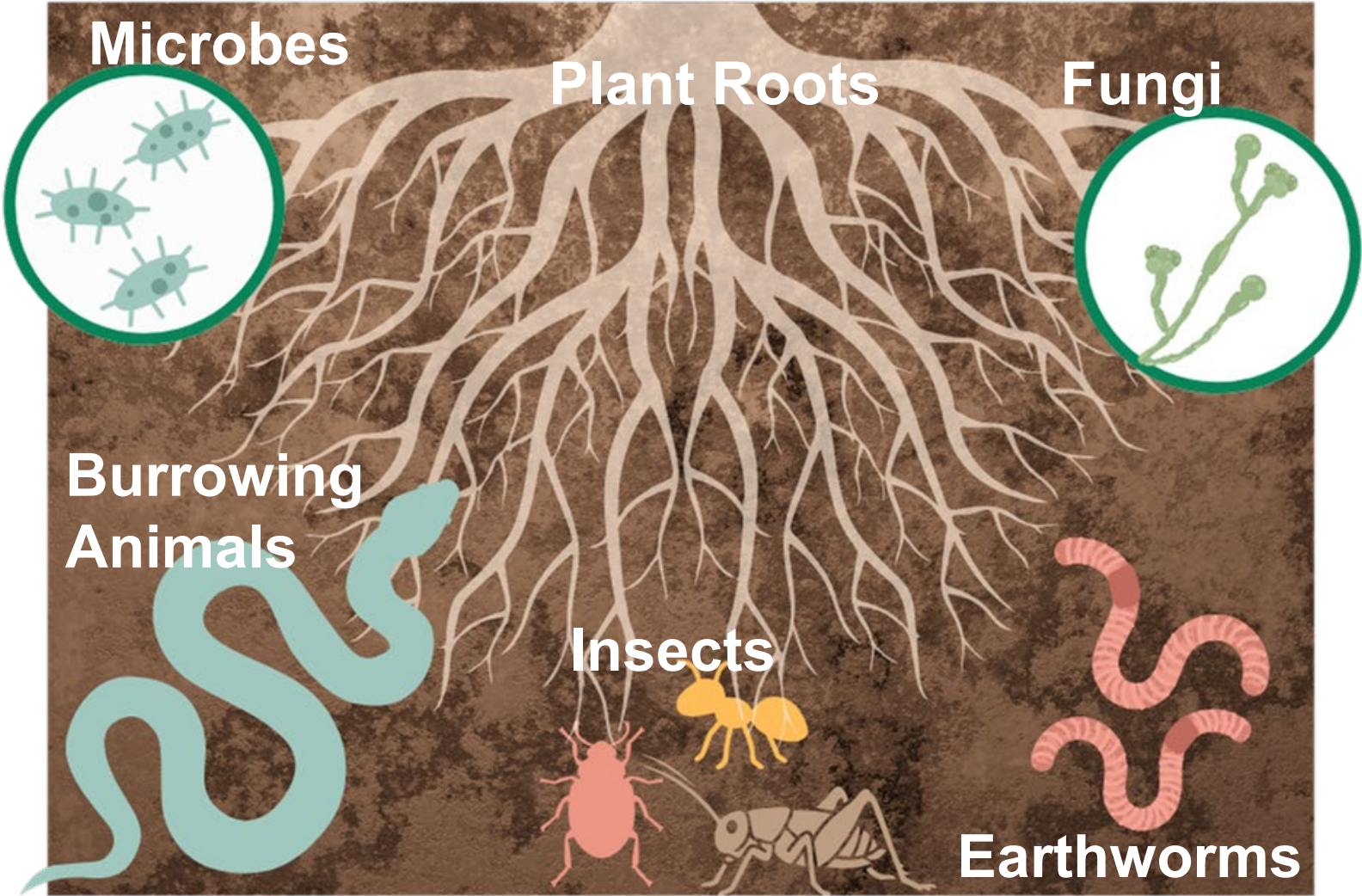


Image: N. Vollrath via Canva



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# Pore Space

Soil pores are ...

- spaces between soil particles (mineral & organic)
- regulate air and water movement
- hold air and water for plants & microorganisms
- site for nutrient exchange

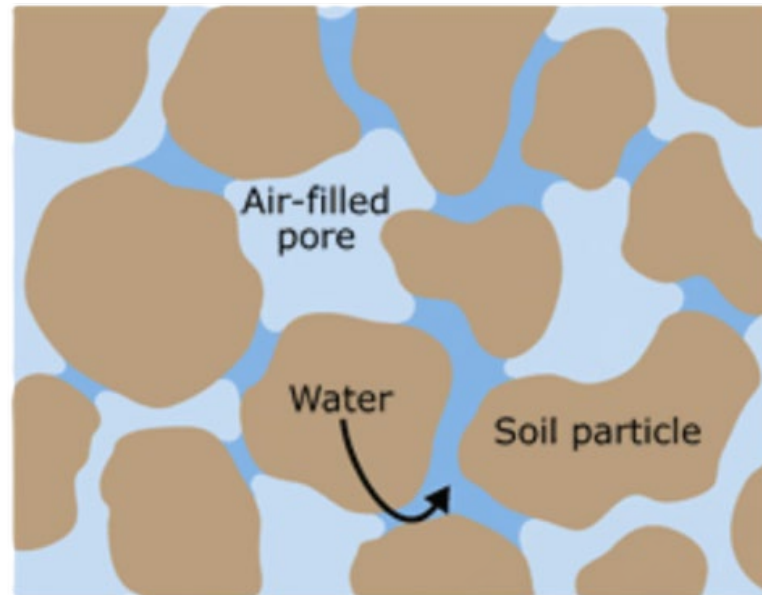


Image credit:  
Pore space: [WateReuse.org](http://WateReuse.org)  
Ladybug on soil aggregates: Arina Sukor:



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# What is Healthy Soil?

*Healthy soil has ...*

***“The continued capacity ... to function as a vital living ecosystem that sustains plants, animals, and humans.”***



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# Factors impacting soil health

- **Texture**
- **Structure**
- **Soil pH & Nutrient content**



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# Soil Texture

Soil texture determines tilth

**Texture:** “the relative proportions of sand, silt, and clay mineral particles”

**Tilth:** “fitness as a medium for growing plants”



Image: Sandie Clark, Unsplash



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# Soil Structure

“... a clump of soil particles held together in a unit so that it functions like a single large particle.”

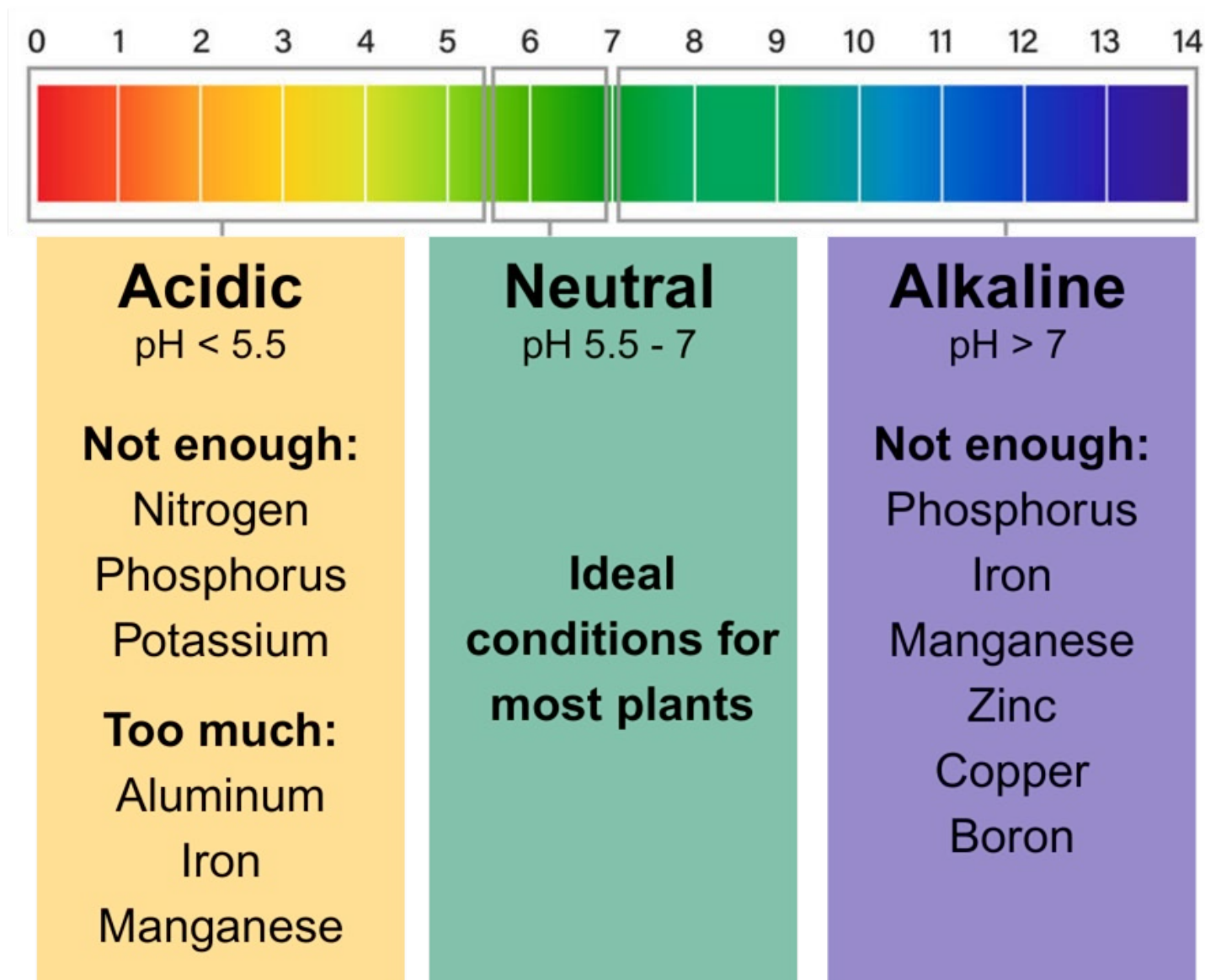


Crumbly soils (left) have more pores and channels than cloddy soils (right). Pores and channels allow air and water to move into the soil.

Structure affects:

- Movement of air and water
- Moisture retention
- Fertility
- Root penetration and growth

# Soil pH and Nutrient Content



# Managing Soil Health



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# Do you have healthy soil?

Productive plants



Plenty of earthworms



Soil is easy to work



Water easily soaks the surface



Images:  
vegetables: courtesy of Canva  
gardening hands: courtesy of Canva  
earthworms: Wikimedia Commons  
water: M Spiske, Unsplash



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# Best Soil for Raised Beds

- Loamy texture
- Loose, deep & crumbly
- Good water retention
- Allows water to move freely
- Soil pH 5.5 - 7



Image credit: Canva



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# Should I test my soil?



Ask yourself ...

- Do my plants look healthy?
- What am I growing?
- Why am I growing it?
- How much does testing cost?
- What will I do with the results?

Image credits:

pH test strips: USDA-NRCS

Soil Nutrient Test Kit: MSU Communications, Montana State University



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# Why amend mineral soil?



- To increase or decrease soil pH
- To maintain or improve physical structure
- To improve retention & movement of air, water and nutrients
- To increase the volume of organic matter

Image credit: Canva



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# What is an amendment?

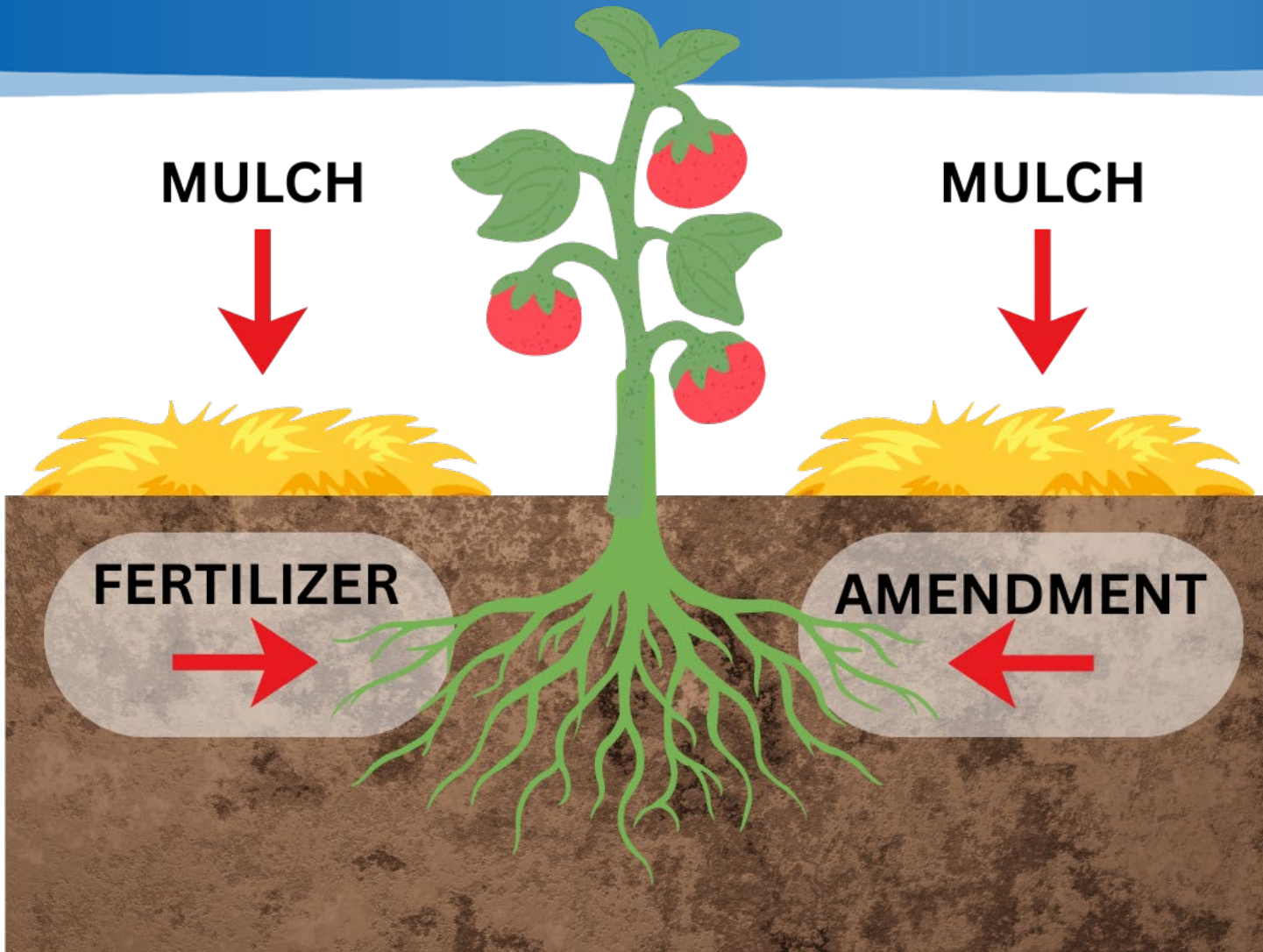


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# Mulches

## Benefits:

- Reduces weeds
- Conserves soil moisture
- Moderates soil temperatures
- Reduces compaction and erosion
- Can improve soil structure



straw mulch: Photo by [Nathan Blackaby](#) on [Unsplash](#)  
fallen leaves: Photo by [Susan Jones](#) on [Unsplash](#)



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# Organic Amendments

- Something that was once alive
- Increase soil organic matter
- Can act as fertilizer
- Energy source for soil organisms
- Improve soil structure



Image credit: N. Vollrath via Canva



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# Inorganic Amendments

- Are either mined or man-made
- They may:
  - Provide plant nutrients
  - Improve soil texture and structure
  - Adjust soil pH

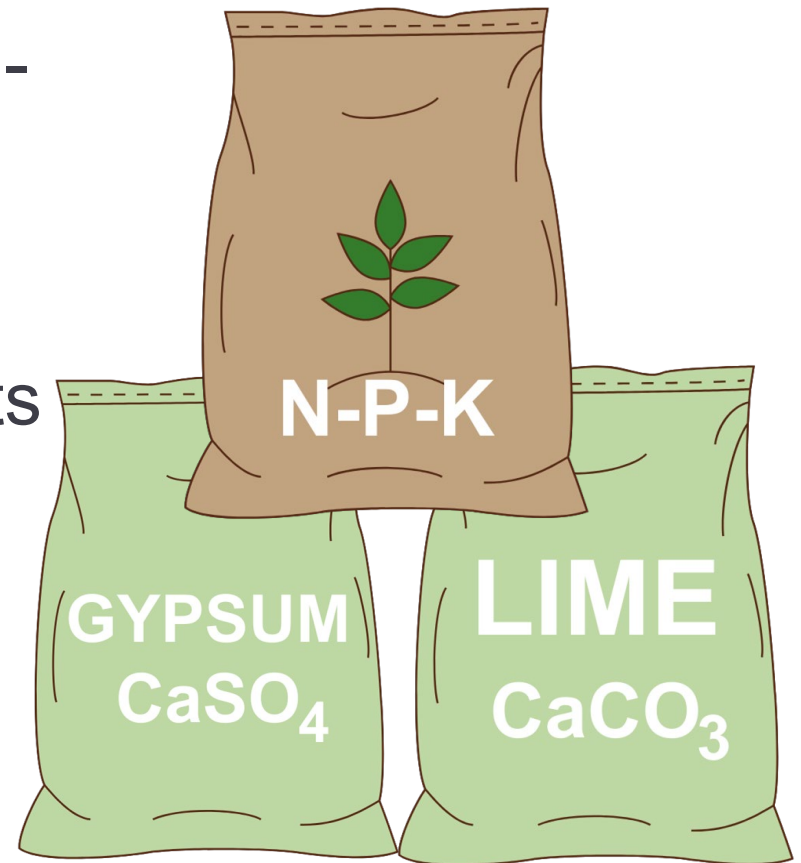


Image credit: N. Vollrath via Canva



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# Before you amend, consider ...

- Function
- Decomposition rate
- Permeability
- Water retention
- Any associated problems
- Practical aspects



Mulch  
Comparison  
Table  
(UCANR)



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# How to amend your soil

- Minimize soil disturbance
- Start w/compost
- Test pH and add other amendments as needed
- Consider cover crops during winter
- Add mulch in summer
- Add other organic matter seasonally



# How to keep your soil healthy



**Minimize disturbance**



**Maximize biodiversity**



**Maximize living roots**



**Maximize cover**



**Minimize chemicals**

Image credit: N. Vollrath via Canva



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# Soil - Your Garden's Foundation

*"... As a farmer, man himself became closely attached to the landscape, firmly rooted to the soil that supported him. At times the soil seemed bountiful and kindly and again stubborn and unfriendly, but it was always a challenge to man's cunning."*

*-- Charles E. Kellogg*

## Useful Resources

Soil



Healthy Soils  
for a Healthy  
California



What is  
healthy soil?



Preparing  
garden beds



Other Soil  
Amendments



Soil  
Amendments



Organic  
Amendments



Mulch  
comparison  
table



Mulches



Adjusting Soil  
pH in CA  
Gardens



Nutrients in  
Soil



Plant nutrient  
deficiency  
symptoms



Recognize &  
Correct Nutrient  
Deficiency



# Contact us with any questions

## Free Master Gardener Hotline

(858) 822-6910

[help@MasterGardenerSD.org](mailto:help@MasterGardenerSD.org)

