



**CREATING HEALTHY SOIL USING COMPOST AND  
LOW TILL METHODS**

# Brandon Merchant

- Owner of Southwest Victory Gardens
- Pima County Certified Master Gardener
- SmartScape Certified
- Former President of Tucson Organic Gardeners

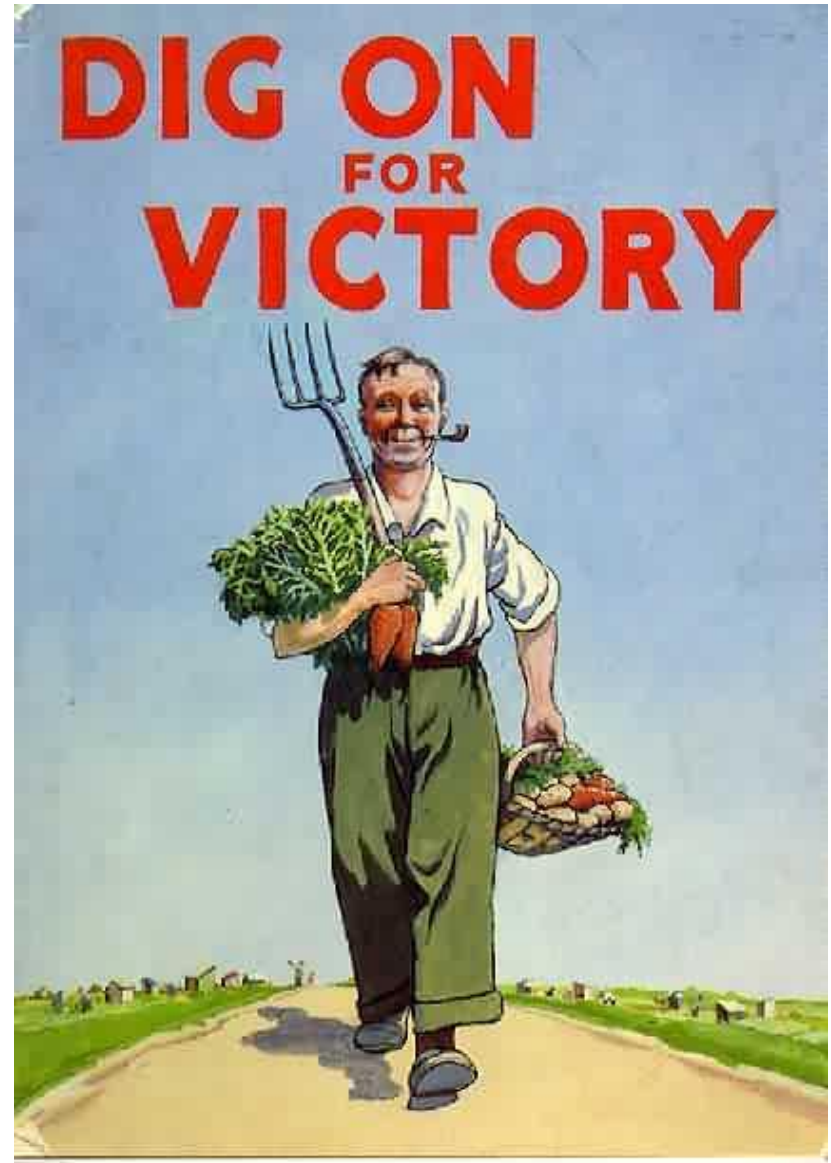




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# Our Philosophy

- Healthy soil encourages healthy plants
- Healthy plants require fewer pesticides and fertilizers (inputs)
- Garden with our climate not against it
- Reduce water usage
- Limit external inputs
- Encourage a natural ecosystem





# Why Healthy Soil?



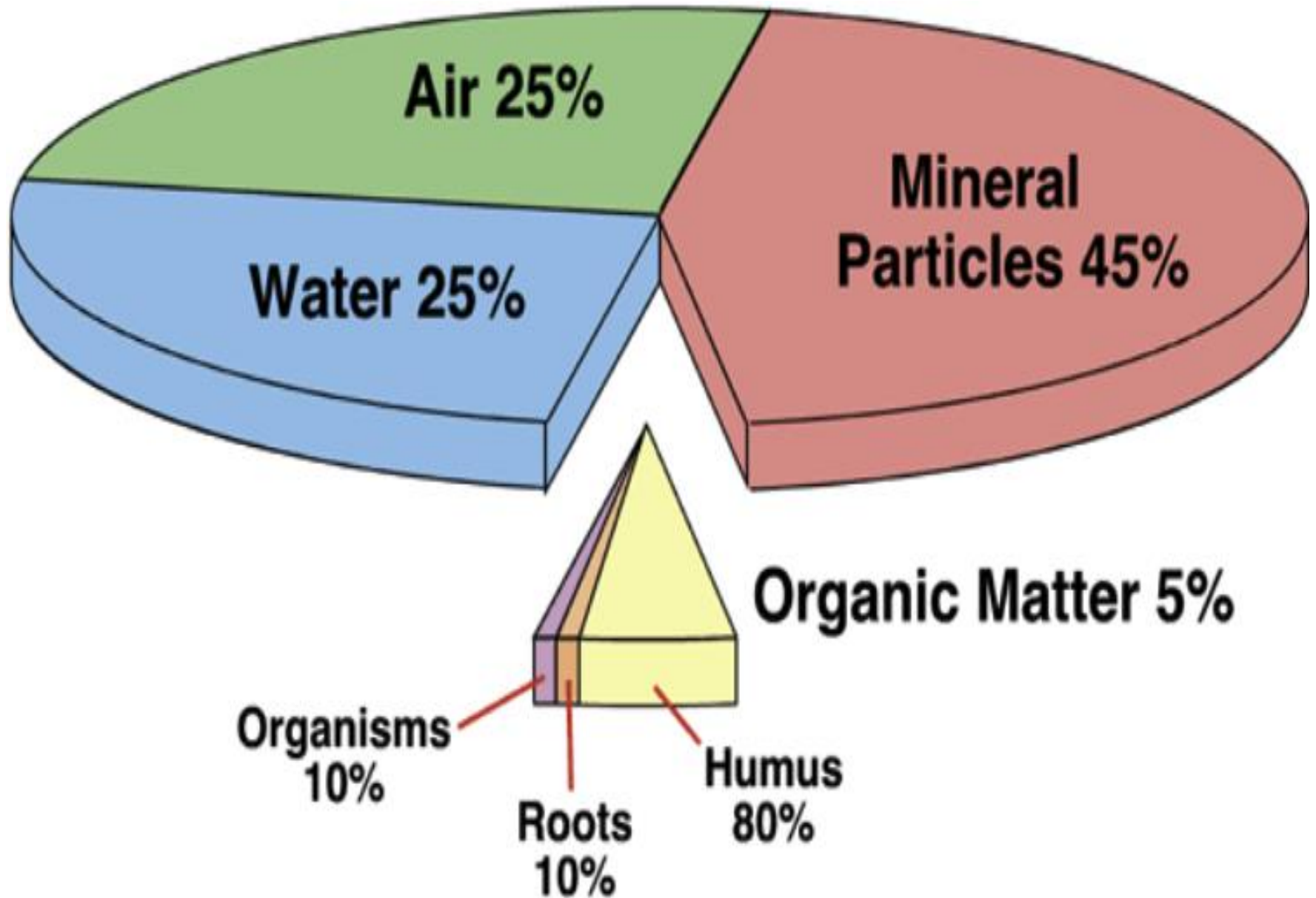
- 2<sup>nd</sup> Largest Carbon Reservoir on the Planet.
- Holds 4x More Carbon than Trees and Plants.
- In last 40 years, 1/3<sup>rd</sup> of World's Farm Land has been Destroyed
- 40% of World's Soils are Classed as "Degraded" or "Seriously Degraded"







# What is Soil?



# Soil Particle Sizes

GRAVEL



Relative soil particle sizes

SAND



SILT

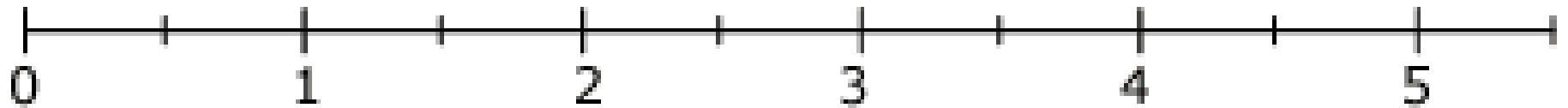


CLAY

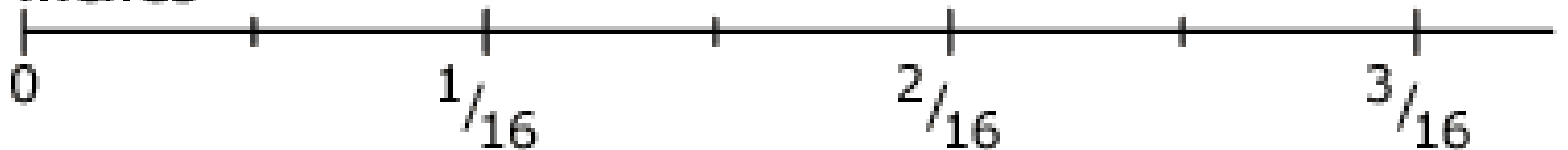


invisible at this scale

mm

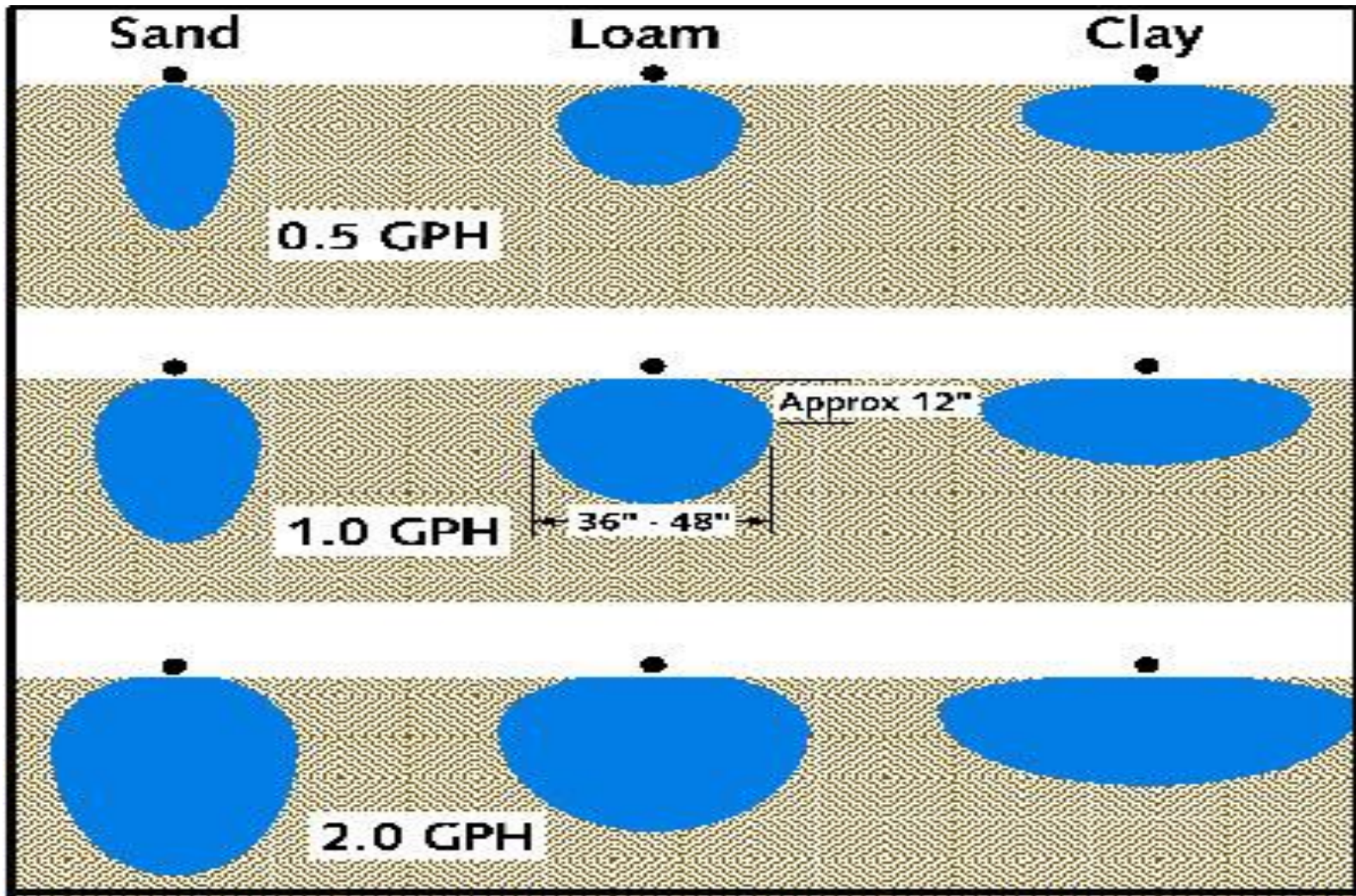


inches

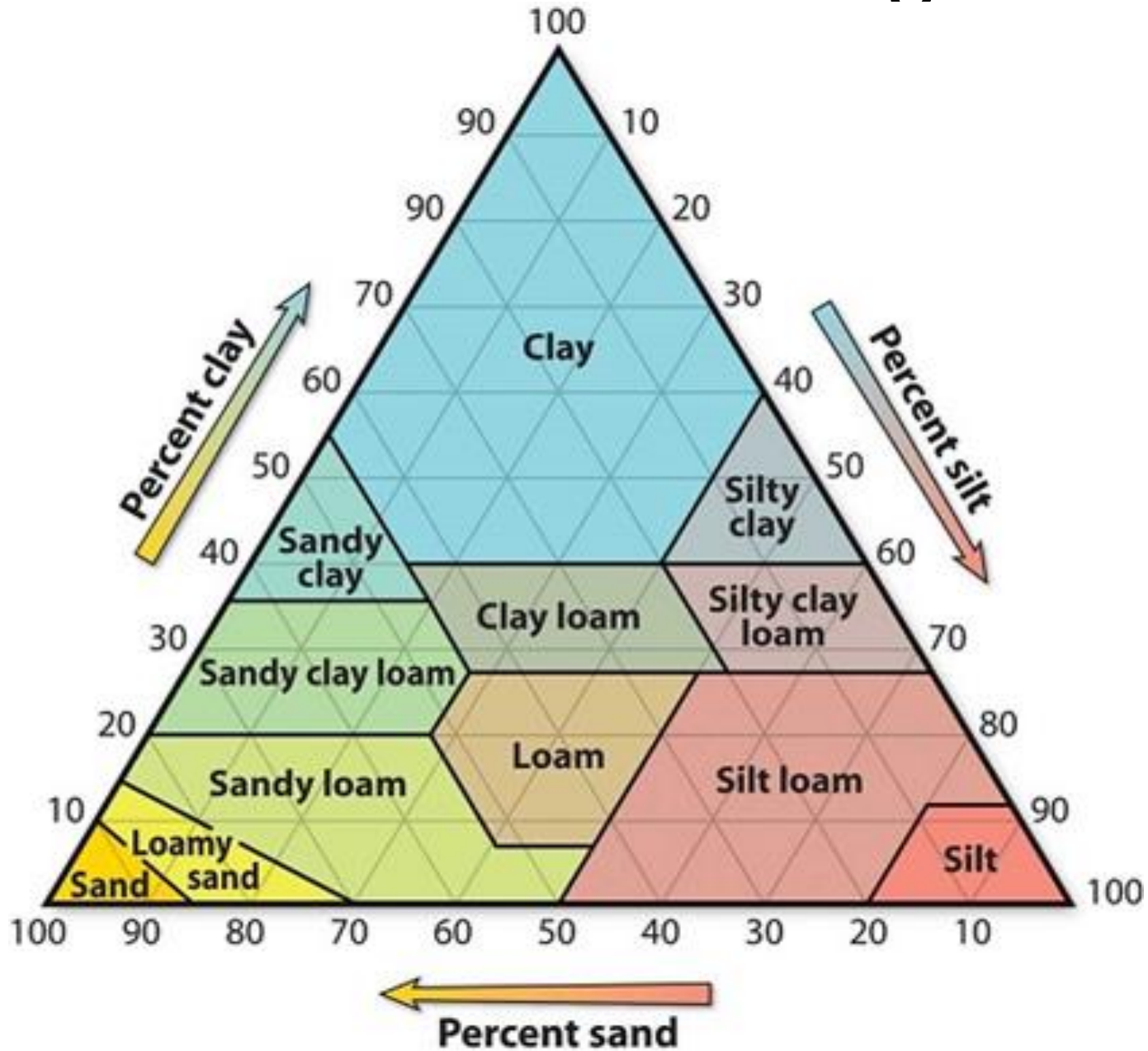




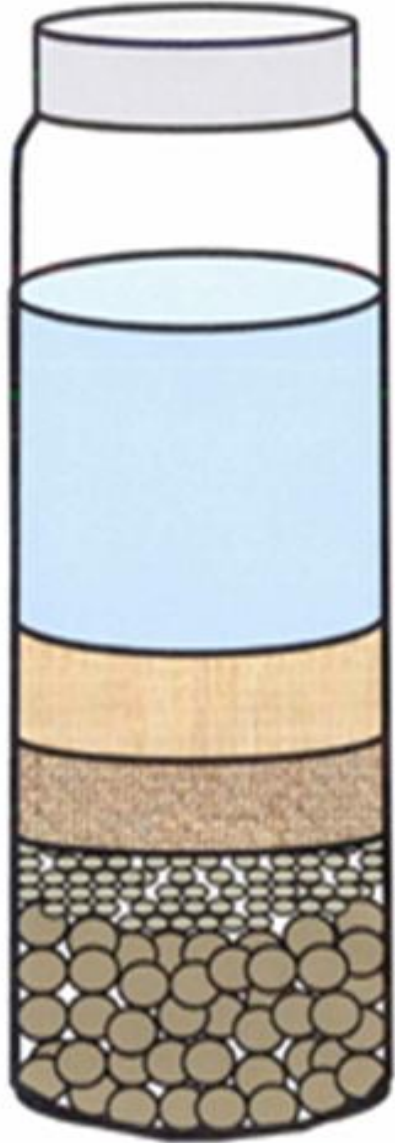
# Soil Wetting Patterns



# Soil Texture Triangle



# Soil Texture Jar Test



Clay layer – water clears

Silt layer – 2 hours

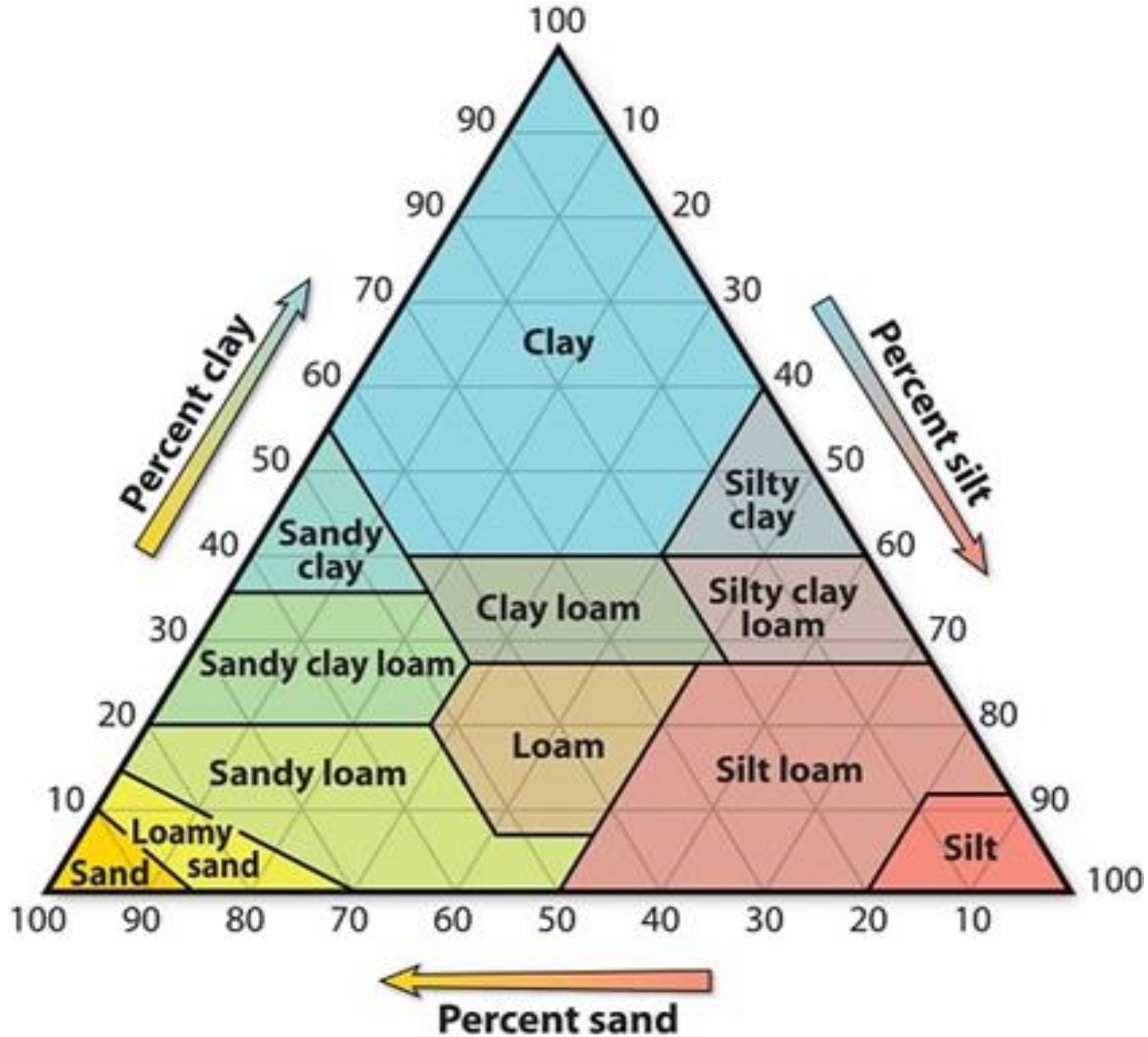
Sand layers – 1 minute

## How to Test Soil Texture

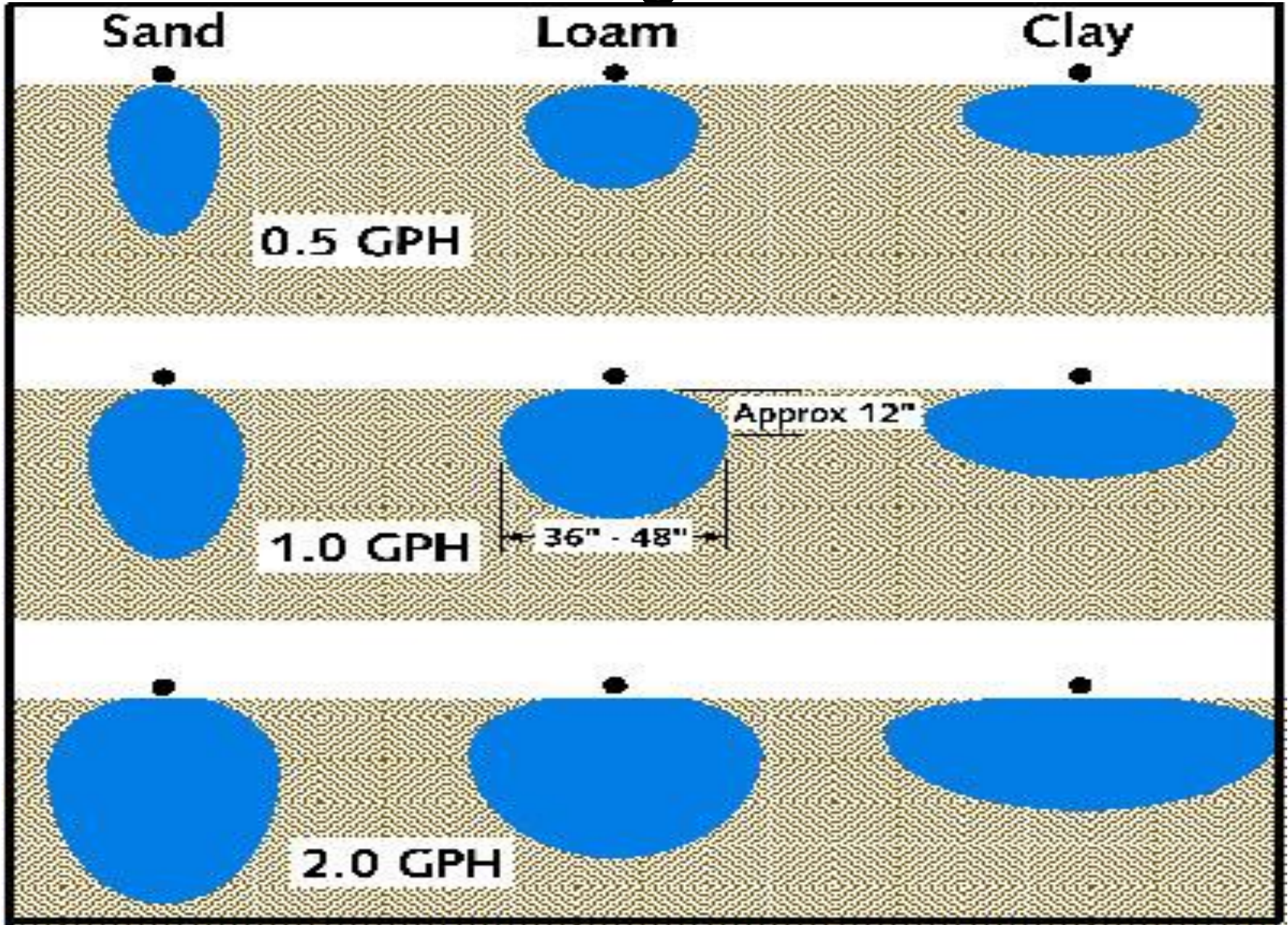
1. Fill Jar with 4 ¼" Soil
2. Add Water/Soap
3. Shake Vigorously 15 min.
4. Record Results



# Soil Texture Triangle

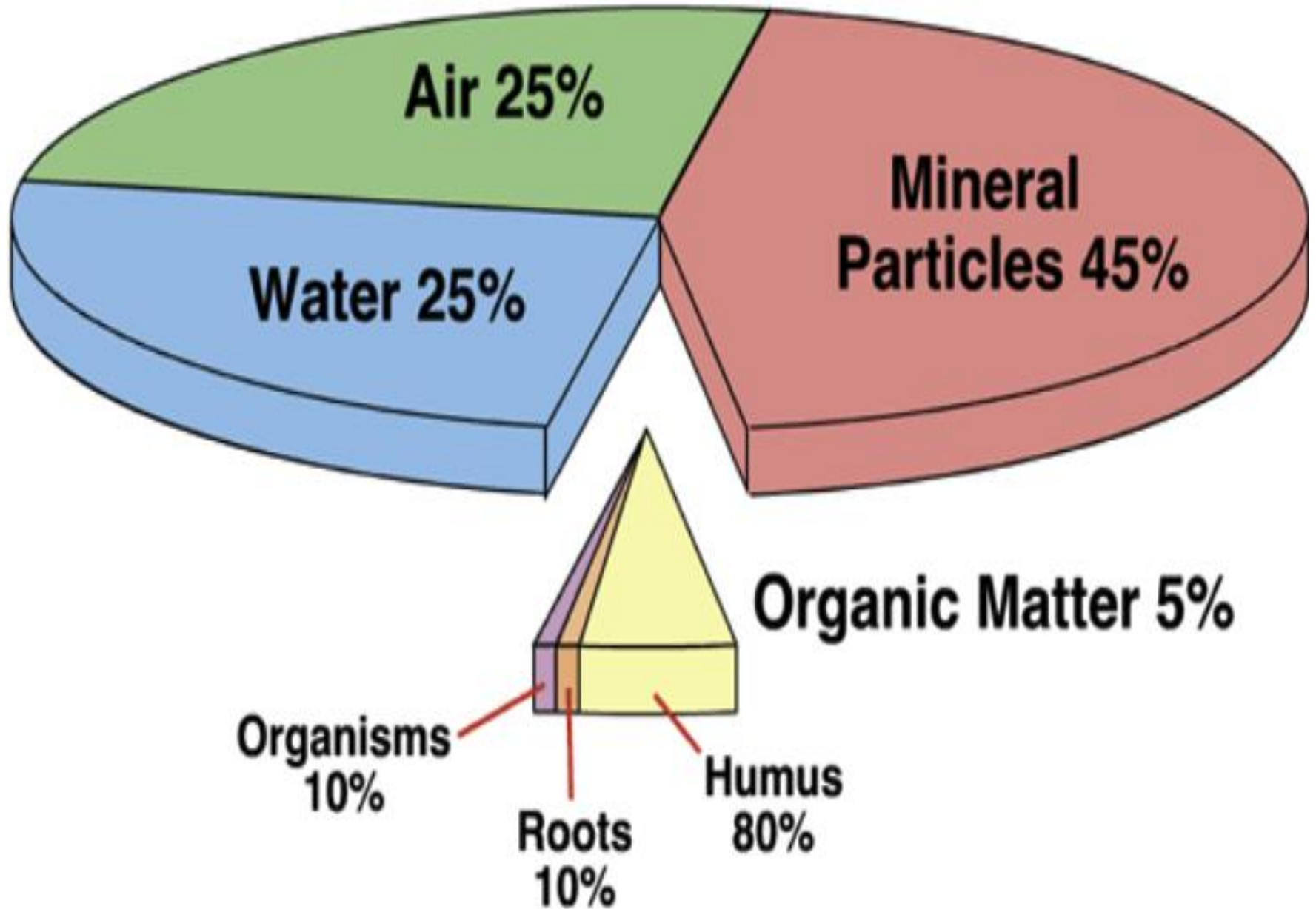


# Soil Wetting Patterns





# What is Soil?





# Characteristics of Soil

## Desert Soil

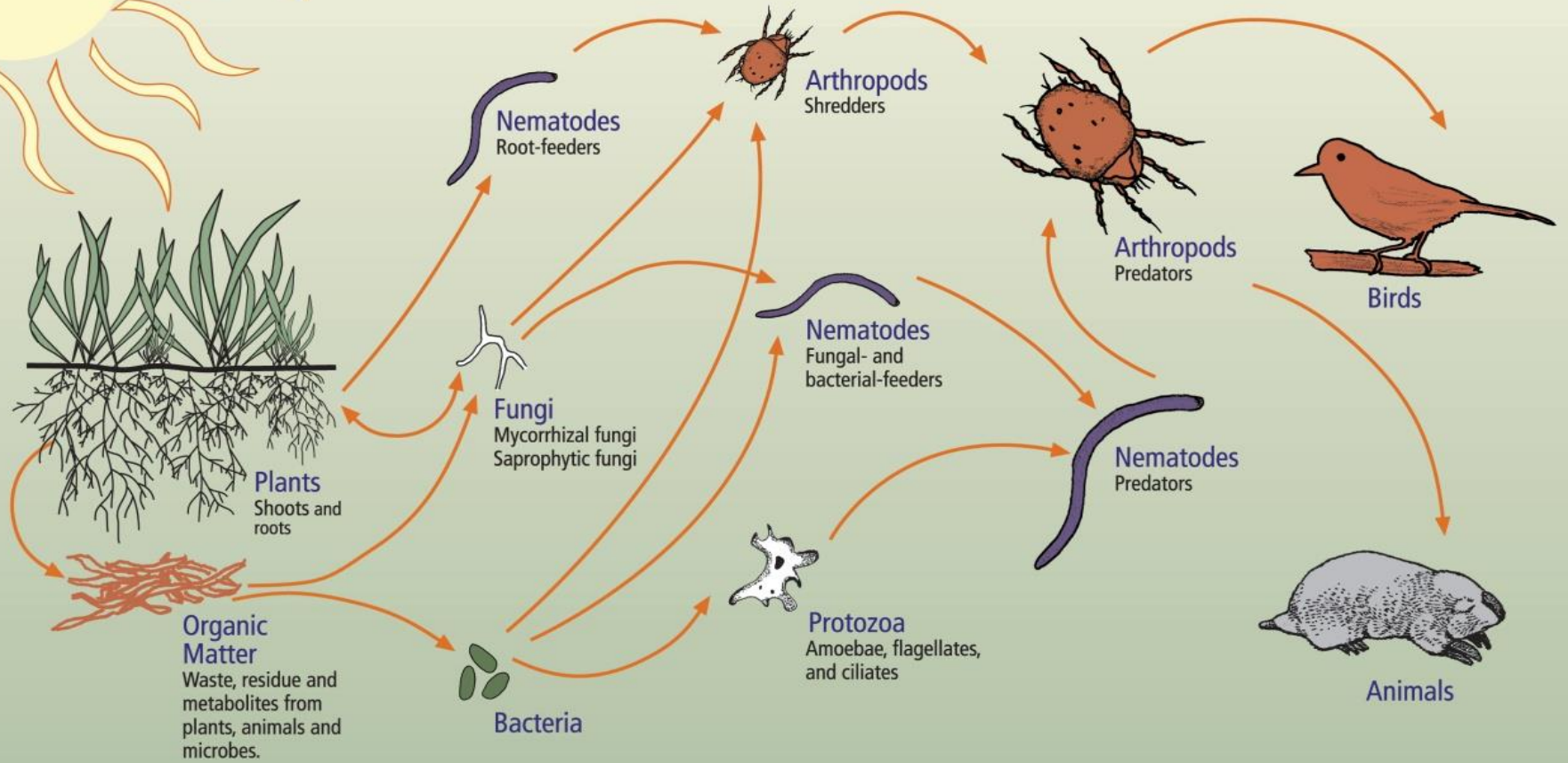
- Low Populations of Micro-Organisms
- Low in Organic Matter
- Lacks Nutrients
- Compacted
- High Ph

## Healthy Soil

- High Population of Micro-Organisms
- High in Organic Matter
- No Toxins/Pesticides
- Balanced Nutrients/Ph
- Porous
- Good Tilth/Structure



# The Soil Food Web



**First trophic level:**  
Photosynthesizers

**Second trophic level:**  
Decomposers  
Mutualists  
Pathogens, Parasites  
Root-feeders

**Third trophic level:**  
Shredders  
Predators  
Grazers

**Fourth trophic level:**  
Higher level predators

**Fifth and higher trophic levels:**  
Higher level predators

# Characteristics of Soil

## Desert Soils

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## Healthy Soils

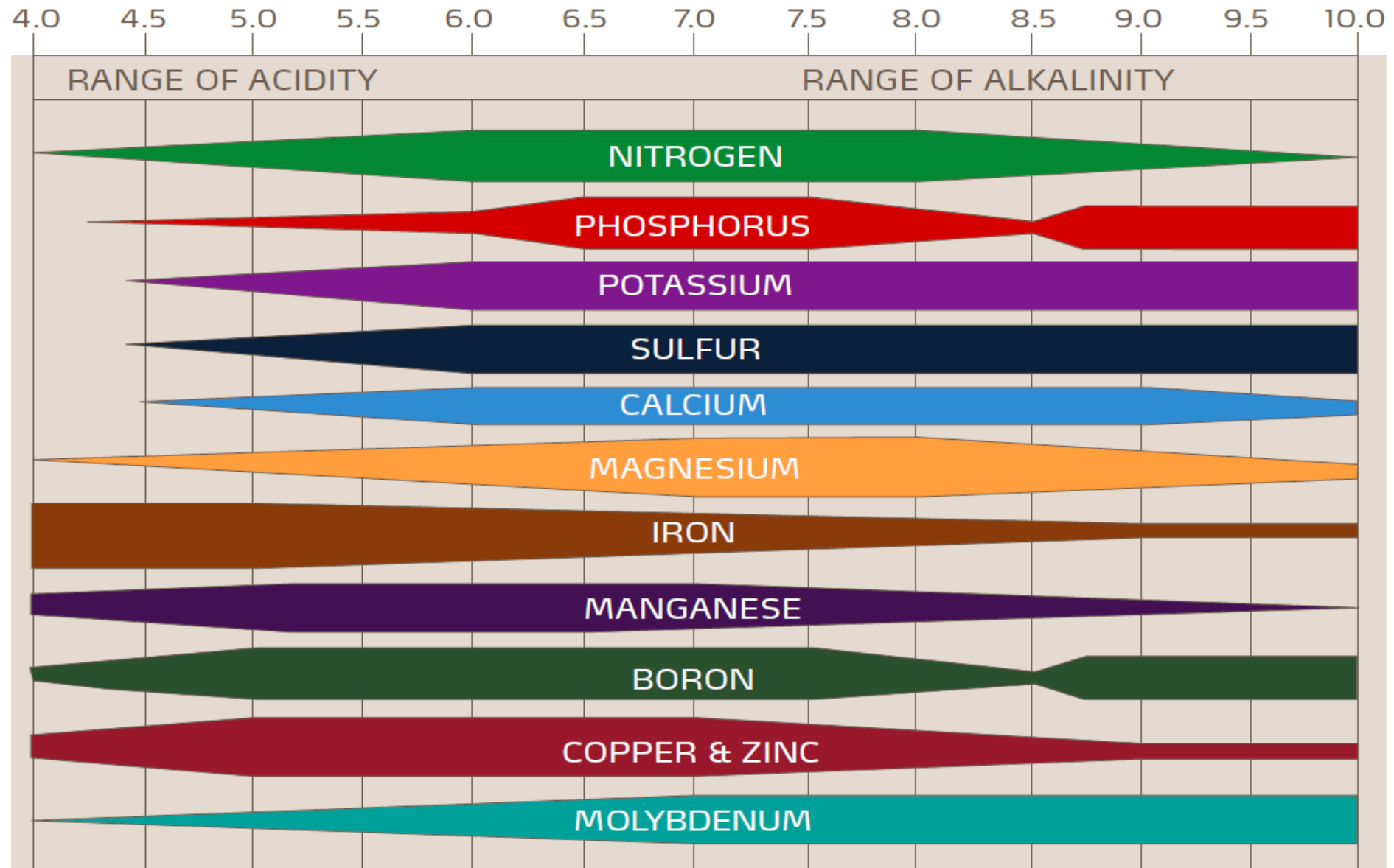
- High Population of Micro-Organisms
- High in Organic Matter
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- Porous/Permeable
- Good Tilth/Structure





# Soil PH and Nutrient Availability

## The Influence of Soil pH on Nutrient Availability



# Characteristics of Soil

## Desert Soils

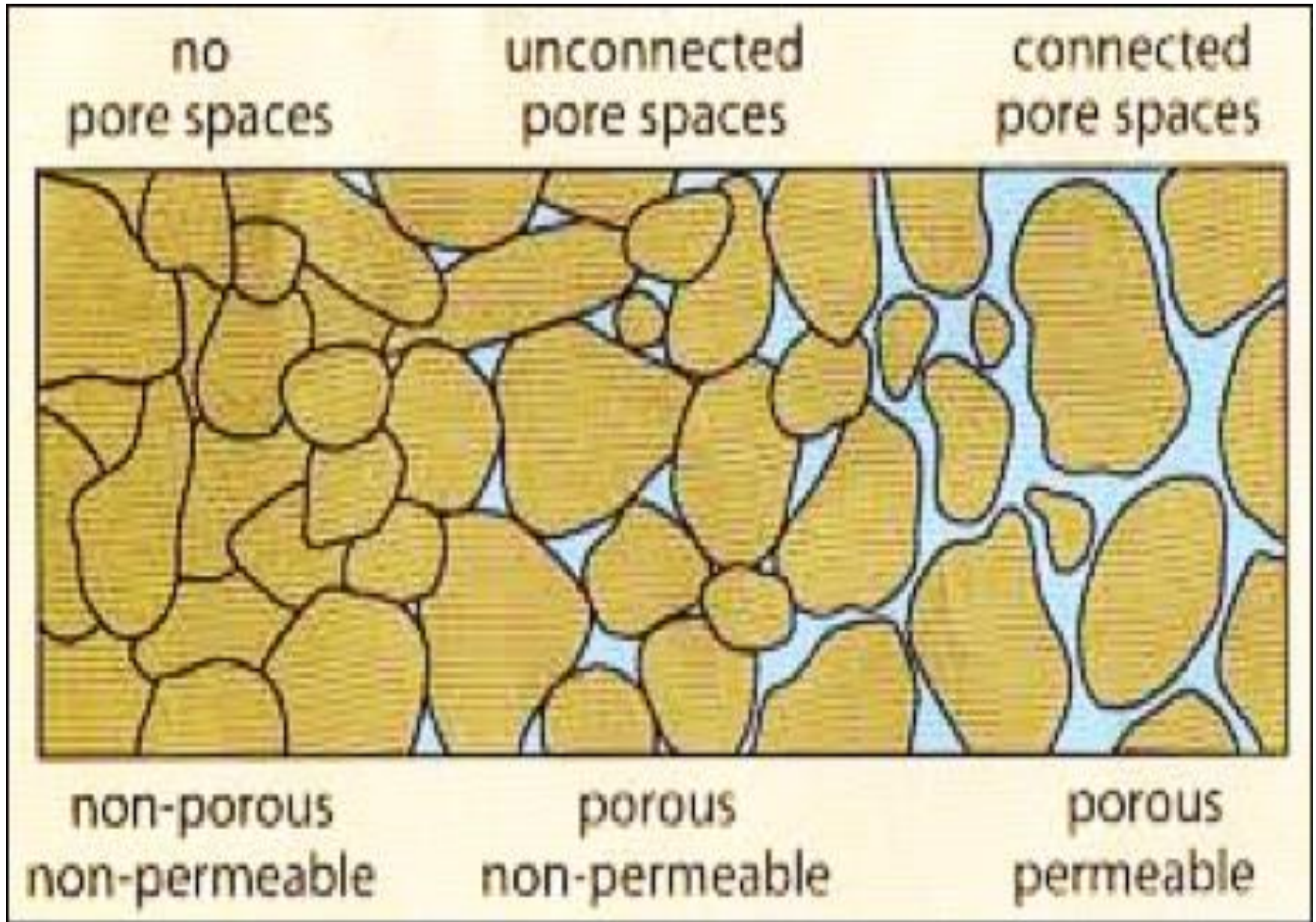
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# Tilling Destroys Soil Tilth





# How to Build Healthy Soils

- Eliminate Synthetic Pesticides/Fertilizers
- Encourage the Soil Food Web
- Use Compost and Compost Teas
- No Till or Low Till
- Use Supplements if Needed
- Grow Roots Not Plants





# Build the Soil – Mulch and Cover Crop



- Mulch, Mulch, Mulch
- Wood Chips for Trees and Shrubs
- Alfalfa Hay for Vegetable Gardens
- Avoid Straw
- Biologic not Geologic



# Build the Soil – Compost

- Adds Soil Life
- Improves Tilth and Water Holding Capacity
- Balances Ph
- Eliminates Food Waste
- For New Gardens, Replace 50% of Native Soil with Compost.





# Build the Soil – Compost



## Be A “Microbe” Manager

- Traditional Composting
- Worm Composting
- Fermentation Methods



# Build the Soil – Compost

## Traditional Composting

- Bins, Heaps, Piles
- Hot or Cold
- Mixed Ratio of “Greens and Browns”
- Must be turned, and sifted
- Keep moist for best results



# Build the Soil – Compost



## Worm Bin Composting

- Nutrient Dense Fertilizer
- Indoors or Outdoors
- Can be Very Efficient



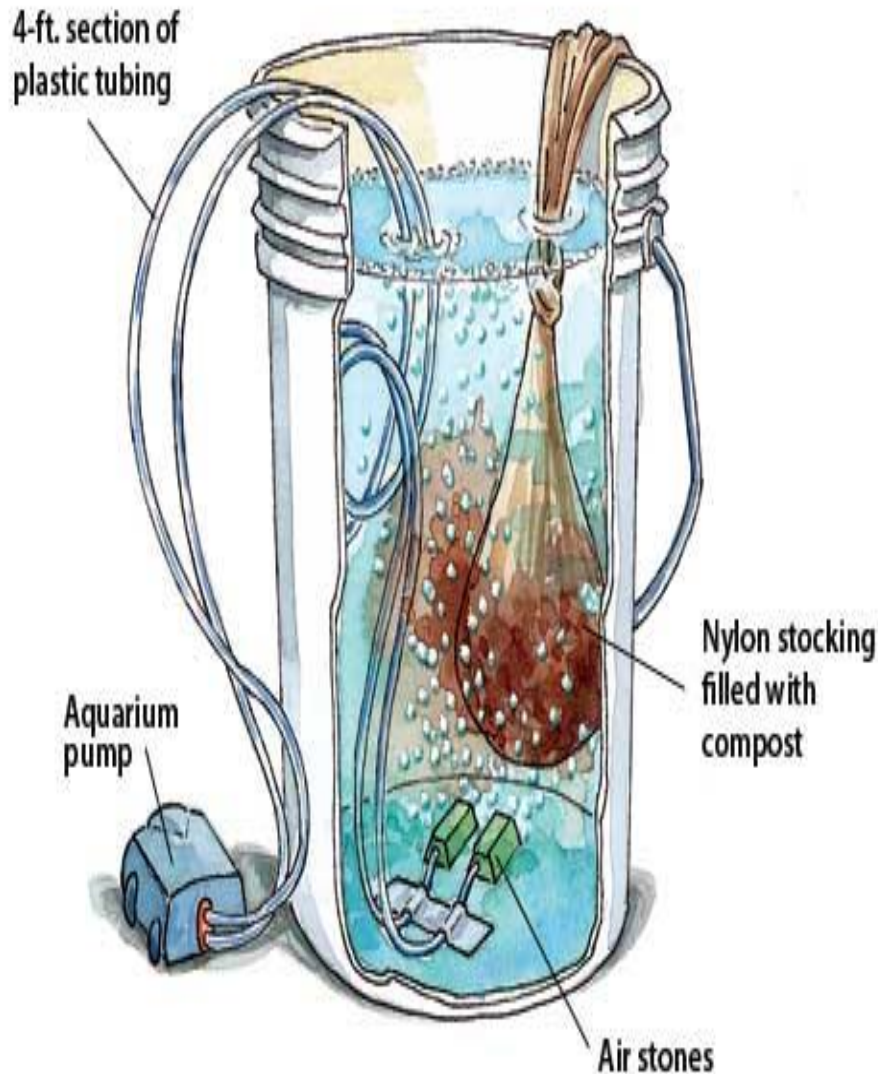
# Build the Soil – Compost

## Fermentation Composting

- Bokashi
- KNF
- Takakura



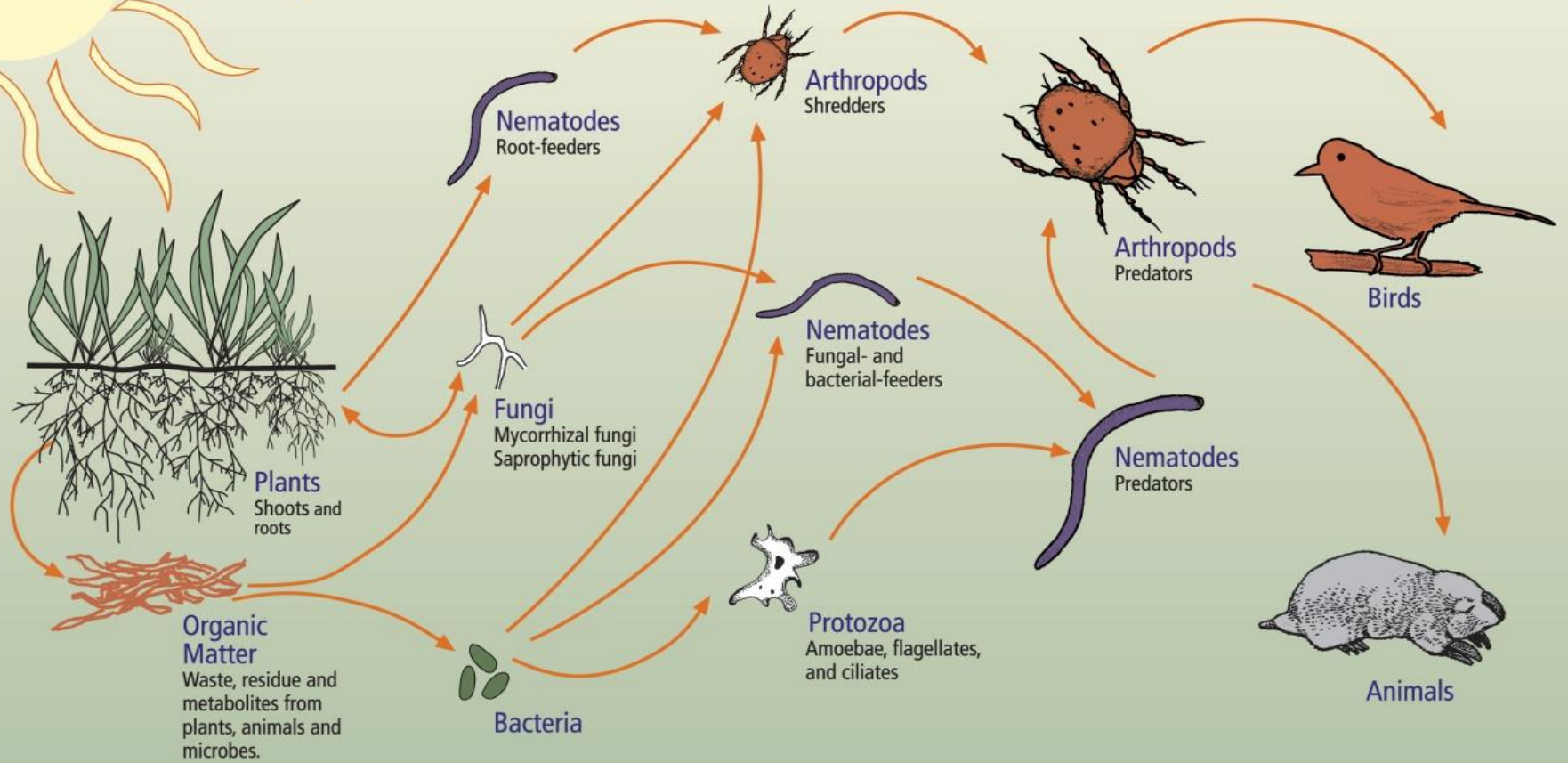
# Build the Soil – Compost Teas



## Active Aerated Compost Teas (AACT)

- Soak Compost in water and use as soil amendment
- Adding Aeration and Sugars Increases effectiveness
- Add Supplemental Ingredients to Boost Micro-Biology Diversity

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# RESOURCES

- Tanks Green Stuff
- EcoGro
- Reading List
- Gardening Clubs
- Local Businesses
- Friends and Family





**THANK YOU!**  
**(520) 576-7085**