



The University of Arizona  
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# PERMACULTURE AND ECO-FRIENDLY GARDENING

*Dianne Kadonaga, Sunny Glen Garden*

Yavapai Master Gardeners, 10/28/21



# NATIVE MILKWEEDS



An estimated **1.8 BILLION** milkweed plants are needed to enable the eastern monarch butterfly population to bounce back!



# NATIVE PERENNIAL PLANTS FOR NATIVE BEES

- ENHANCE BEAUTY
- POLLINATOR HABITAT
- SUPPORT BIRDS
- INCREASES BIODIVERSITY  
NATIVE TO THE AREA
- CAN BE EASILY  
INCORPORATED
- REQUIRES LITTLE CARE ONCE  
ESTABLISHED





# ORIGINS OF PERMACULTURE



<https://native-land.ca/>



# FIRST YEAR GARDEN 2015





# WHAT IS PERMACULTURE?



## Principles of Permaculture:

- Care of People
- Care of the Earth
- Fair Distribution of Surplus

“EarthCare, PeopleCare, FairShare, LimitsAware”

## Definitions of Permaculture:

- Designing synergistic assemblies of plants, animals, and structures that serve human needs but adhere to nature’s logic.
- A design system for sustainable living and land use.

# PERMACULTURE PRINCIPLES OR GUIDELINES



- Observe and interact with the land
- Connect and integrate the pieces
- Catch and store energy and materials
- Each component performs multiple functions
- Use small scale, intensive systems
- Apply self-regulation and accept feedback
- Obtain a yield
- Use and value renewable resources and services
- Produce no waste
- Design from patterns to details
- Integrate rather than segregate
- Use small and slow solutions
- Use and value diversity
- Use edges and value the marginal
- Creatively use and respond to change





Yoga & Meditation

# MORE GREENS PLEASE!





# WHY EAT ORGANIC FOOD?



## Organic Produce vs. Conventional Produce

Vegetable	Percentage of dry weight			Millequivalents per 100 grams dry weight			Trace amounts parts per million dry matter				
	Total Mineral Ash	Phosphorous	Calcium	Magnesium	Potassium	Sodium	Boron	Manganese	Iron	Copper	Cobalt
<b>Snap Beans</b>											
Organic	10.45	0.36	40.5	60.0	99.7	8.6	73.0	60.0	227.0	69.0	0.26
Commercial	4.04	0.22	15.5	14.8	29.1	0.9	10.0	2.0	10.0	3.0	0.00
<b>Cabbage</b>											
Organic	10.38	0.38	60.0	43.6	148.3	20.4	42.0	13.0	94.0	48.0	0.15
Commercial	6.12	0.18	17.5	13.6	33.7	0.8	7.0	2.0	20.0	0.4	0.00
<b>Lettuce</b>											
Organic	24.48	0.43	71.0	49.3	176.5	12.2	37.0	169.0	516.0	60.0	0.19
Commercial	7.01	0.22	16.0	13.1	53.7	0.0	6.0	1.0	9.0	3.0	0.00
<b>Tomatoes</b>											
Organic	14.20	0.35	23.0	59.2	148.3	6.5	36.0	68.0	1938.0	53.0	0.63
Commercial	6.07	0.16	4.5	4.5	58.8	0.0	3.0	1.0	1.0	0.0	0.00
<b>Spinach</b>											
Organic	28.56	0.52	96.0	203.9	237.0	69.5	88.0	117.0	1584.0	32.0	0.25
Commercial	12.38	0.27	47.5	46.9	84.6	0.0	12.0	1.0	49.0	0.3	0.20



# ORGANIC VS CONVENTIONAL FARMING



## ORGANIC

## CONVENTIONAL

Crop rotation

Synthetic fertilizers

Green manure

Pesticides

Compost

Hormones

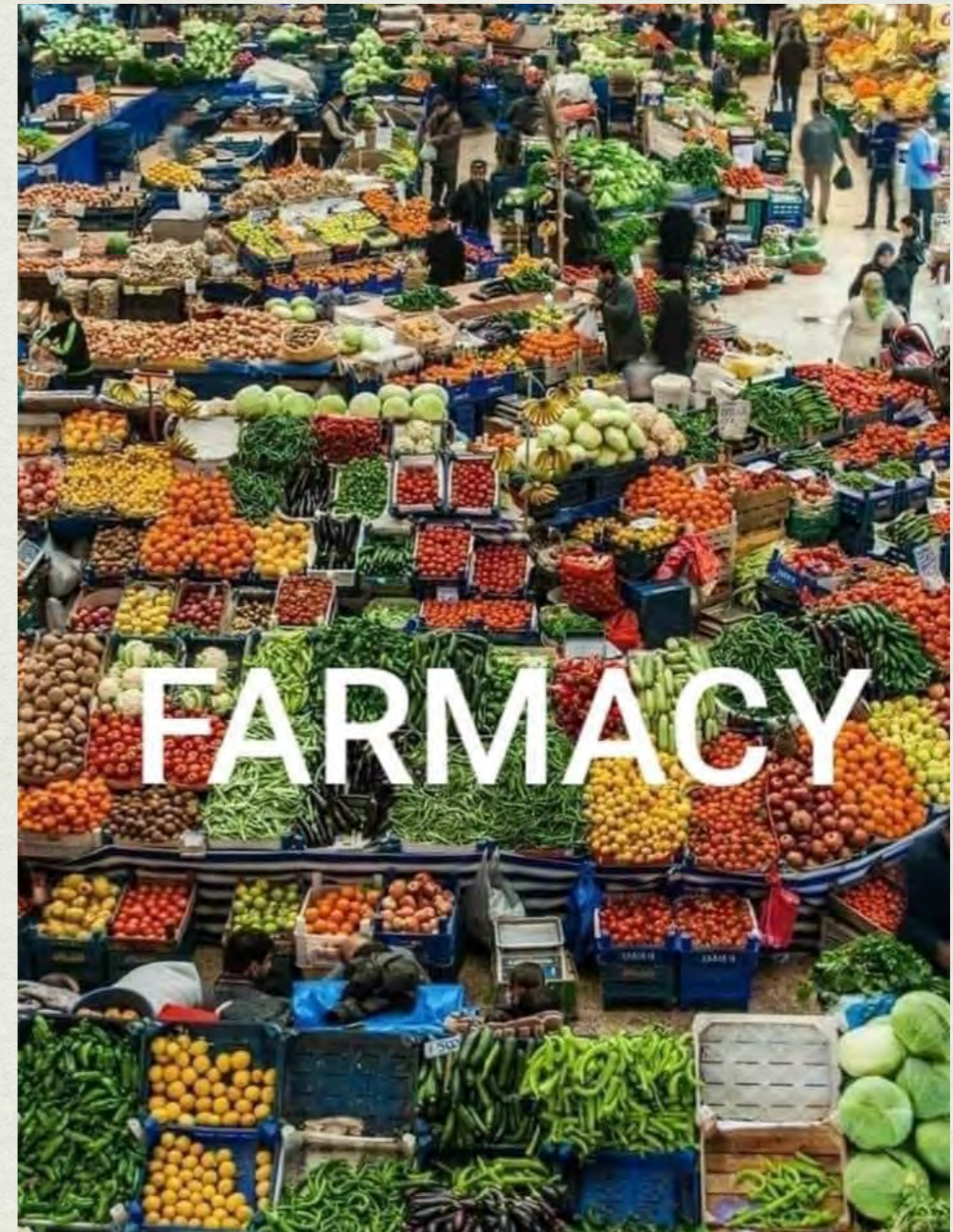
Biological pest control

Livestock antibiotics & food  
additives

# SUPPORT ORGANIC GROWERS



- Farmers Markets
- Support organic growers
- Buying local supports the local economy
- Get to know your farmers and how they grow the food



# FOODBABE.COM

# AND THE FOOD BABE ARMY



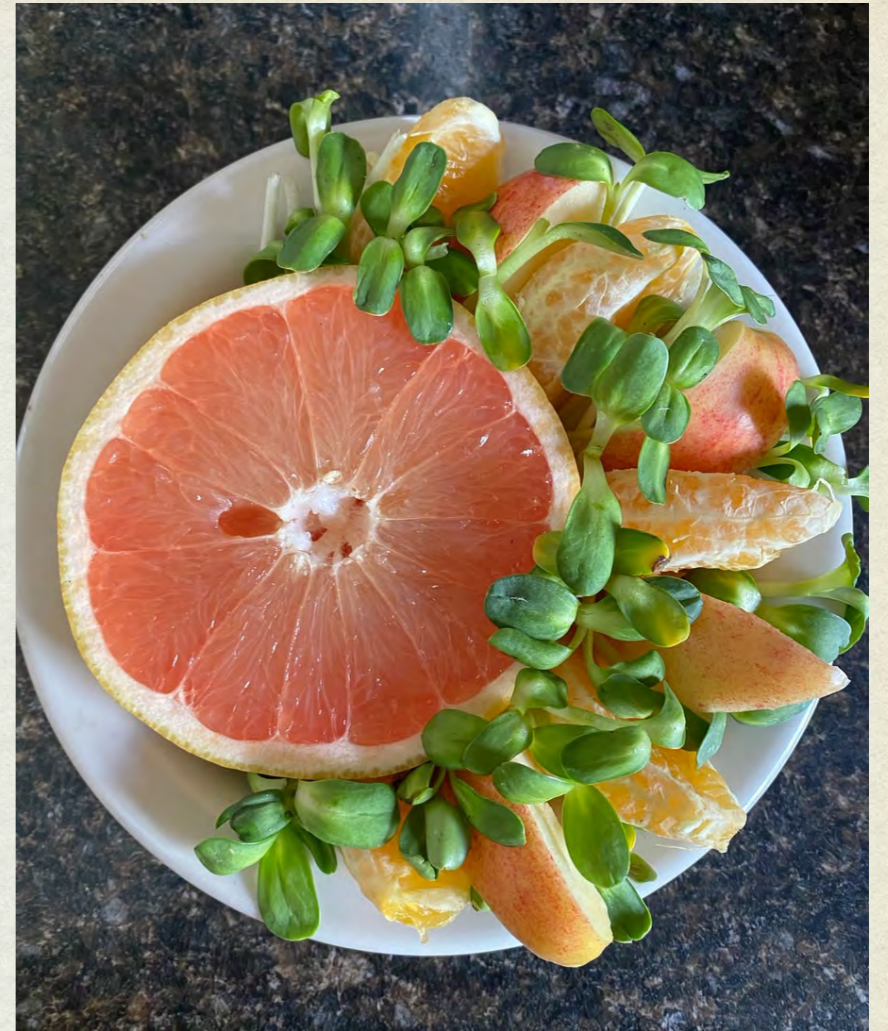
# SAFFRON



## GINGER



## TURMERIC





# PACKAGING & PLASTICS





# WASTE



The average American produces 1,600 pounds of trash every year!

What's in your garbage can?

Can you make one different choice that is more environmentally friendly?



# VIEW FROM SECOND HIGHEST POINT IN FRANKLIN COUNTY

From the mountain of our  
garbage at the  
Franklin County Landfill

We produce 1,100,000 TONS  
per year!!!

[tours@swaco.org](mailto:tours@swaco.org)

**To schedule a tour of Prescott  
transfer station, contact:  
[brady.higgs@prescott-az.gov](mailto:brady.higgs@prescott-az.gov)**





# THE TRUTH ABOUT RECYCLING





Plastic clamshells like these  
are NOT recyclable





# YAVAPAI COUNTY TRANSFER STATION

## RECYCLING



### RECYCLABLE

- Aluminum:** Aluminum cans, pie plates, frozen dinner pans, foil & food containers
- Metal:** Steel food cans, metal lids, EMP-TY aerosol cans, wire clothes hangers
- Newspaper, Paper, Junk Mail**  
Self-sealing & window envelopes
- Magazines:** Glue bound & stapled magazines. No paperback or hardbound books
- Chipboard:** Packaging or facial tissue boxes, dry food boxes such as cereal, cake mixes ( remove liners ), shoe and gift boxes
- Cardboard:** Flattened, corrugated and clean
- Plastics:** all number 1 through 7 plastics ( the number is on the bottom or side of the container). Remove and throw away all lids.

**No plastic grocery bags. No Styrofoam.**

### NON-RECYCLABLE

- Plastic bags**
- Styrofoam**
- Grass, yard &/or food waste**
- Glass**
- Unrecyclable caps & lids**
- Paper Napkins/Plates/Cups**
- Electronics**
- Concrete, Wood**
- Clothing**
- Textiles, Carpet**
- Hoses, Extension Cords**
- Paperback or Hardbound Books**
- Medical tubes**
- Diapers**
- Animal food bags**
- Rubber products**

**No garbage bags allowed in recycle bins.**

**Empty recyclables and throw garbage bags in the trash bins.**



# Know what can and what cannot go into recycling





Home made crackers  
from leftover  
almond pulp with  
garden herbs



Home m

es



Garden Popcorn with herbs



# MULTI-USE ITEMS









# LIFESTYLE CHOICES LIFE WITHOUT A CAR



Water wagon

Bale buggy



Honey hauler

Tulsi truck

Tomato Trolley





# LAWNS



- 63,000 square miles of turf grass in the USA
- Single largest irrigated agricultural “crop” in America
- Consumes 50-75% of a residence’s water
- Americans spend \$36 billion every year on lawn maintenance





# NOISE POLLUTION



Hazardous > 85 dB



Normal conversation ~ 60 dB

Lawn mower ~ 90 dB

Rock concert ~ 120 dB



# LAWN MOWERS & POLLUTION



- 800 million gallons of gas per year are used to mow lawns
- Every year 17 million gallons of gas is spilled while refueling lawn equipment
- Gas mowers represent 5% of U.S. air pollution
- One gasoline powered lawn mower emits about 106 pounds of greenhouse gas in one season



=



# ECO-FRIENDLY LAWNMOWERS ARE MORE FUN!



# GARDEN-BASED FITNESS



**TRICEPS**



**FOREARM**



**CHEST**



**BICEPS**



**LEGS**



**BACK**



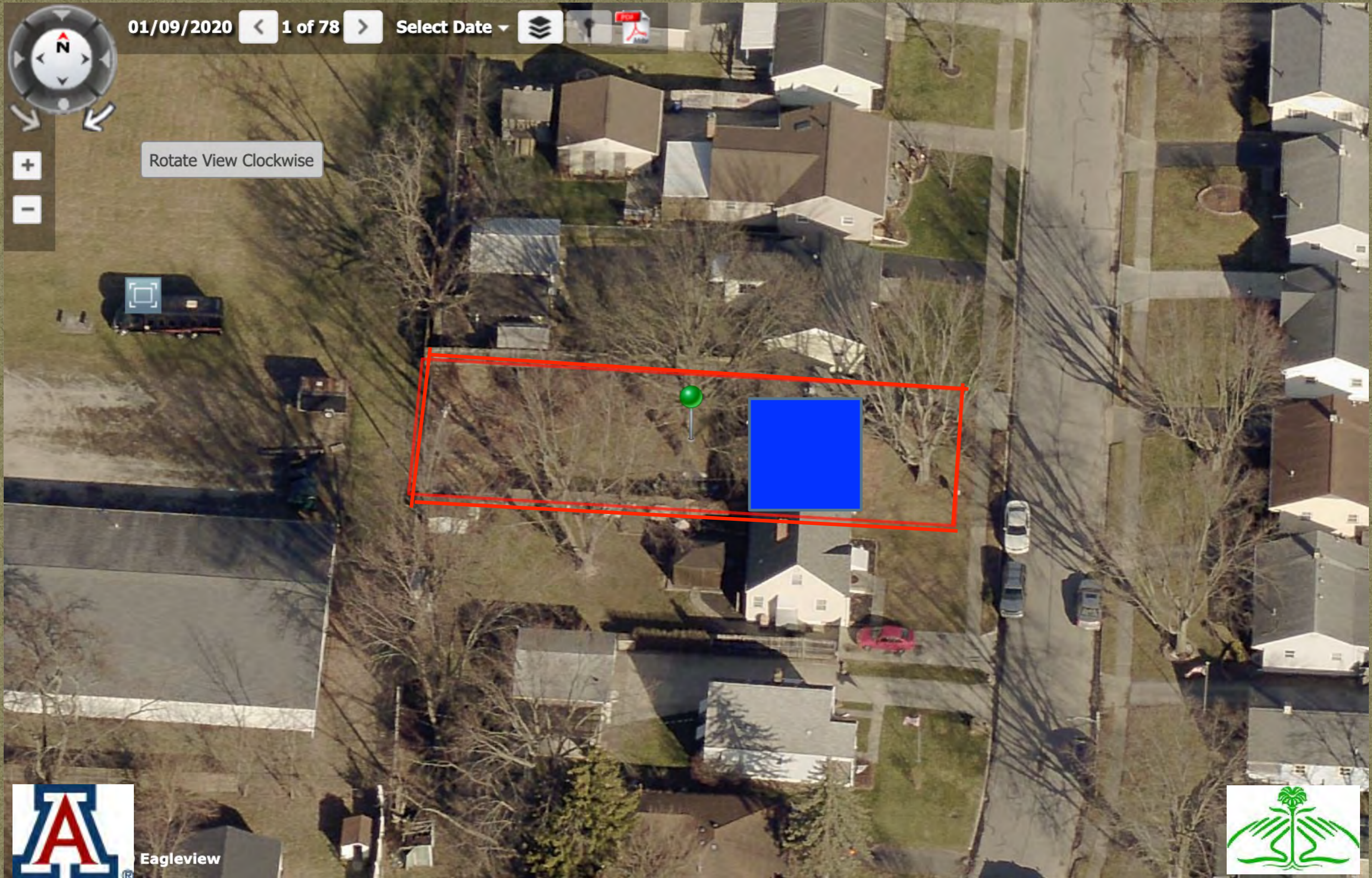
**SHOULDERS**







# WINTER TIME VIEW





# SUMMER TIME VIEW



Kingdom Power Baptist Church



# EDIBLE FOOD FOREST LAYERS

- 1 Canopy
- 2 Sub-Canopy
- 3 Shrub
- 4 Bush
- 5 Grass
- 6 Herbaceous
- 7 Ground Cover
- 8 Rhizosphere
- 9 Climbers & Vines
- 10 Water plants



# Three Sisters Guild





# SUNNY GLEN GARDEN EDIBLE FOOD FOREST PLANTS



FOREST LEVEL	EDIBLE PERENNIALS	PERENNIAL VEGETABLES	EDIBLE ANNUALS
<b>CANOPY</b>	Pin Oak		
<b>SUB-CANOPY</b>	Chinese Chestnut Green Apple		
<b>SHRUB</b>	Hazel Elderberry		
<b>BUSH</b>	Red & Black Raspberries Currants & Gooseberries Goji Berries Blueberries	Artichoke Rhubarb Asparagus	Sunflowers Corn (Cotton)
<b>GRASS</b>	Crocus (Saffron)		Lemongrass
<b>HERBACEOUS</b>	Sage, Rosemary, Thyme Oregano & Marjoram Lavender & Savory Virginia Mountain Mint & Bee Balm	(Comfrey)	Parsley Basil & Tulsi Cilantro Tomatoes
<b>GROUND COVER</b>	Strawberries - Everbearing Strawberries - June Bearing	Sea Kale	Nasturtium Sweet Potato
<b>CLIMBERS &amp; VINES</b>	Passion Fruit		Squash & Beans
<b>RHIZOSPHERE</b>	Red Wine Cap Mushrooms Shiitake Mushrooms		Taro, ginger, turmeric Beets & Carrots
<b>RAIN GARDEN</b>	Upland rice	Upland rice?	

# Hopi Reservation in Kykotsmovi, Arizona

Corn grown without irrigation



The importance of our own seed saving is vital!

# PRESCOTT AREA NATIVE FOOD FOREST PLANTS



## HIGH CANOPY

- Arizona walnut *Juglans major*
- Saguaro *Carnegielea gigantea*
- Juniper *Juneriperus*
- Oak *Quercus*



# PRESCOTT AREA NATIVE FOOD FOREST PLANTS

## SUB-CANOPY & SHRUBS

- Fruit trees - *apple, peaches, nectarines, plums, apricots, pear*
- Hackberry *Celtis*
- Manzanita  
*Arctostaphylos*





# PRESCOTT AREA NATIVE FOOD FOREST PLANTS



## BUSH & HERBACEOUS LAYER EDIBLE PLANTS

- Sunflowers, *Helianthus*
- Quamash, *Camassia quamash*
- Lambs Quarters *Chenopodium album*
- Figworts, *Schrophularisa*
- Agave
- Prickly Pear, *Opuntia*





# PIN OAK TREE

*QUERCUS PALUSTRIS*

Tall Canopy





Firewood

Wood Ash



# CREATING NESTING SITES





# SHIITAKE MUSHROOMS





# FLOWER TOP SHIITAKES





# Red Wine Cap Mushrooms In Maple Wood Chips



## Creating an Outdoor Mushroom Garden

Growing Red Wine Cap Mushrooms in Your Yard





# GAME OF THORNS!



**Who needs to watch Game of Thrones  
when I can play GAME OF THORNS  
in my own backyard?**

**Sunny Glen Garden version:  
The BlackRaspberryLands  
House Sunny Glen  
Queen of the Garden  
Preying Mantis Yielding a Trowel  
(banner)**





**Providing Nesting  
Habitat for Native  
Bees in Your Garden**





# BERRY HARVEST





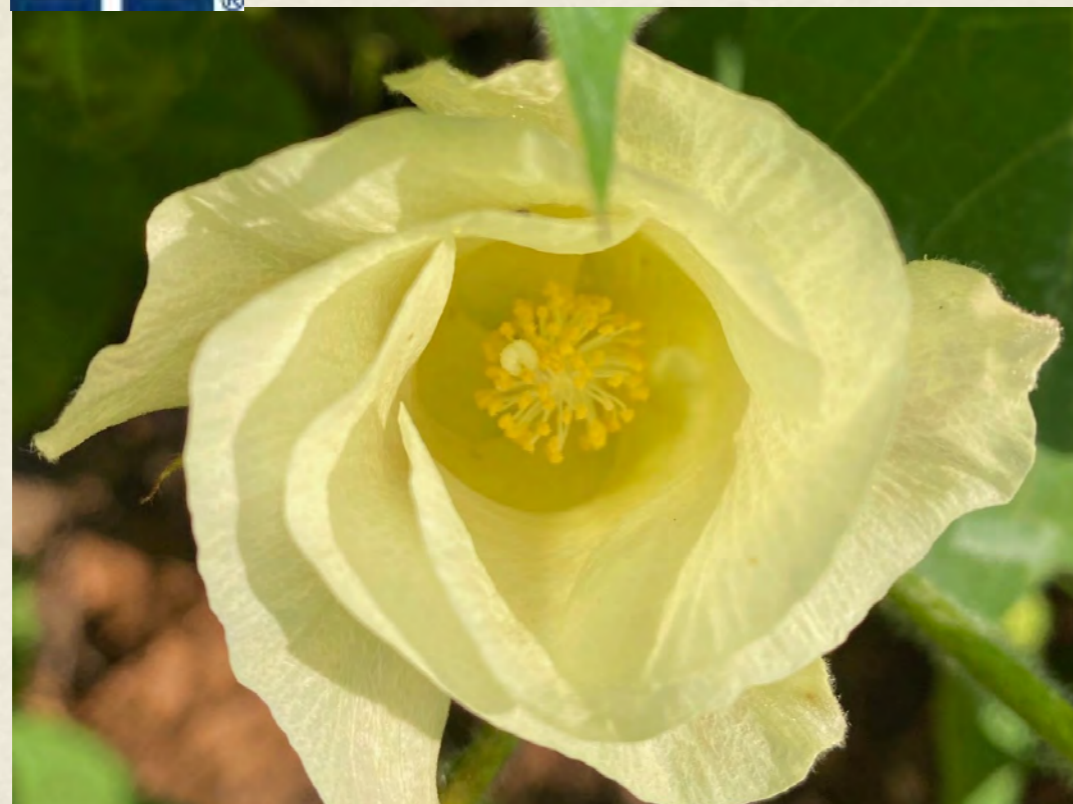
# SUNNY GLEN GARDEN

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<b>RAIN GARDEN</b>	Upland rice	Upland rice	



# FIBER - Growing Cotton





# REMOVE INVASIVE PLANTS



**Fuller's teasel plant, or *Dipsacus fullonum***

# Assassin Robber Fly



Bald Faced Hornet



# SITE OBSERVATION



- In the west, 60% of consumed water resources goes into lawns
- Water diversion harms the environment, kills fish, returns polluted water to our streams & rivers.
- The high cost of irrigation system installation & maintenance is reflected in what we pay in our water bills



Overflow water collection area turned rain garden



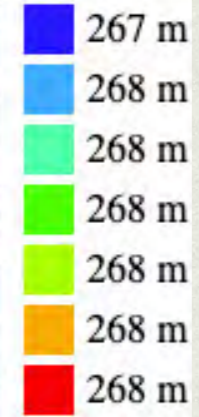


# Contour Map Creator

0.314

[improvement ideas](#)

3507 sunny glen pl, columbus oh



Sonshine Christian Academy

Google

Keyboard shortcuts | Map data ©2021 Imagery ©2021 | [Terms of Use](#) | [Report a map error](#)

Sampling	Plot Options	Save/Load Cookie	Other Options
<input type="button" value="get data"/>	<input checked="" type="radio"/> Number of levels: <input type="text" value="7"/>	<input type="button" value="save data in cookie"/>	<input type="button" value="clear map"/>
North West corner Latitude: <input type="text" value="40.0373"/> Longitude: <input type="text" value="-82.9879"/>	<input type="radio"/> Custom levels [m]: <input type="text" value="380,400,420"/>	<input type="button" value="load data from cookie"/>	<input type="button" value="change resolution"/>
South East corner Latitude: <input type="text" value="40.0371"/> Longitude: <input type="text" value="-82.9874"/>	<input type="radio"/> Level Interval [m]: <input type="text"/>	<input type="button" value="remove cookie"/>	
Sampling Point:	<input type="checkbox"/> Plot sampling points		



# IMPROVING SOIL HEALTH WITH RECYCLABLES: LASAGNE MULCHING/ LAYER MULCHING





# SWALES & MULCHES





# ENVIRONMENTALLY FRIENDLY



Reduce waste - 330,000 tons of trash are generated every year in Columbus from city residents!



# ROUND UP YOUR LEAVES IN THE OK LEAF CORRAL





# FREE MULCH



The following Yavapai County  
Transfer Stations have FREE  
mulch when available:

Black Canyon City  
Camp Verde  
Congress  
Mayer  
Paulden  
Seligman  
Skull Valley

For availability, please call 928-771-3183

(You will be required to sign a mulch waiver form.)





Composting  
kitchen scraps

Tresspassers  
will be  
composted!!!





# City of Columbus

## Rat Assessment Team




Know your local laws




THE CITY OF COLUMBUS COLUMBUS PUBLIC HEALTH  
ANDREW J. GINTHER, MAYOR

FIND  
FOLLOW  
WATCH




### Rat Control

Are you having trouble with rats on your property? Learn how to keep them away with a few simple steps. If you've tried everything on our list and still have rats, Columbus Public Health can help. Learn more below.




#### Rat Control Basics

Before filing a complaint about rats on your property, it's important to make sure you're doing all you can to prevent rats. [Learn more.](#)



#### Report a Complaint

If you've taken steps to prevent rats, but are still having problems, we are here to help. Call 614-645-3111 or [report online](#). [Learn more.](#)



#### Links & Resources

Find additional information and resources for rat control and prevention. [Learn more.](#)

AL & INSECTS

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Insect Complaints  
Vaccine Clinics  
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45-6134

# URBAN POLLINATOR POCKET PRAIRIE GARDEN





## CHECK WITH NEIGHBORS & LOCAL BUSINESSES:

Leaves from neighbor's trees - opportunities for sharing info, education

Free coffee grounds for compost -

Free cardboard - grocery stores, home improvement stores, girl scouts cookie boxes

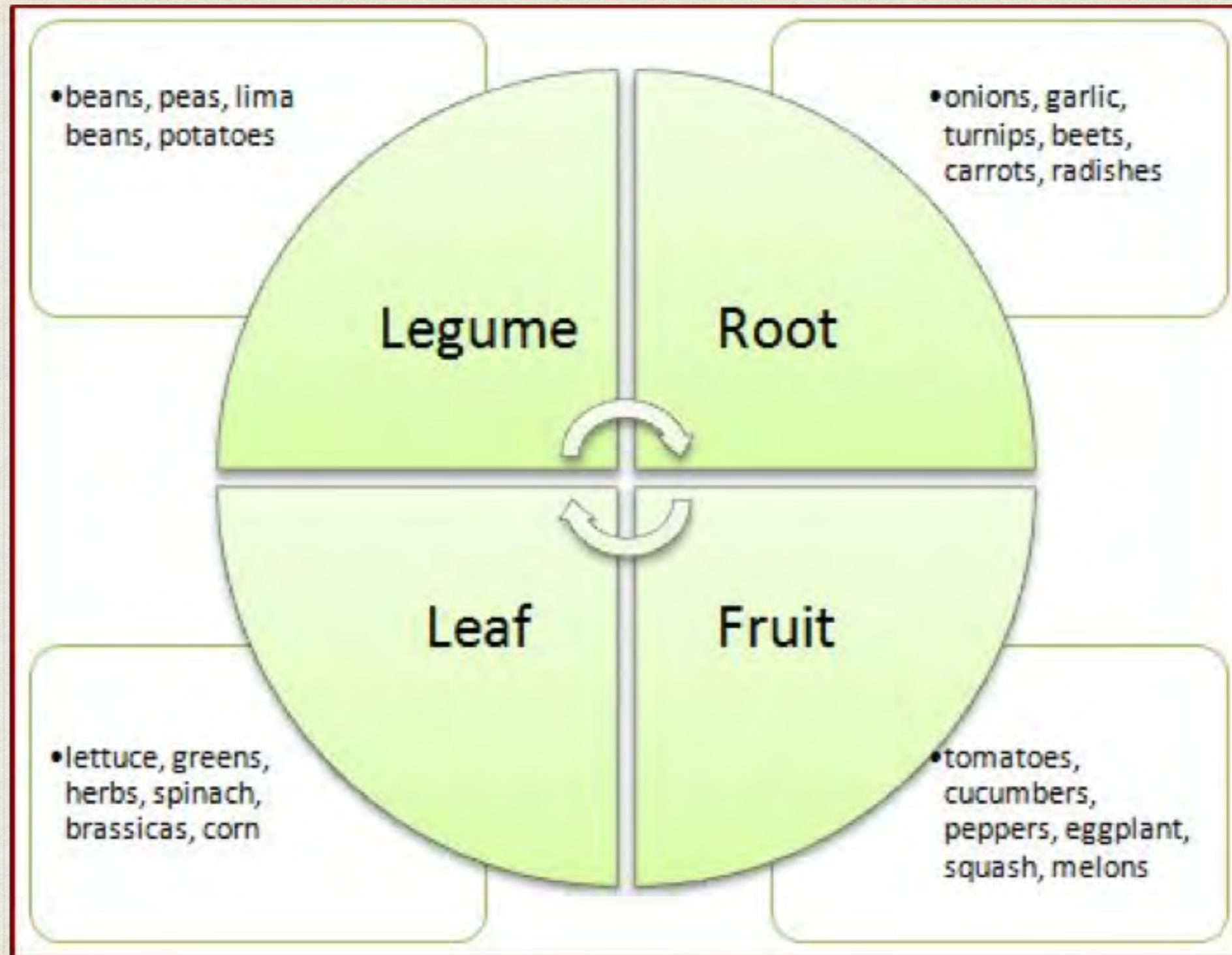
Free newspaper - weekly ads that come in the mailbox

# ORGANIC PEST CONTROL METHODS

- *Crop Rotation*
- *Companion Planting*
- *Beneficial Insects*
- *Row covers*
- *Cold frames*



# CROP ROTATION

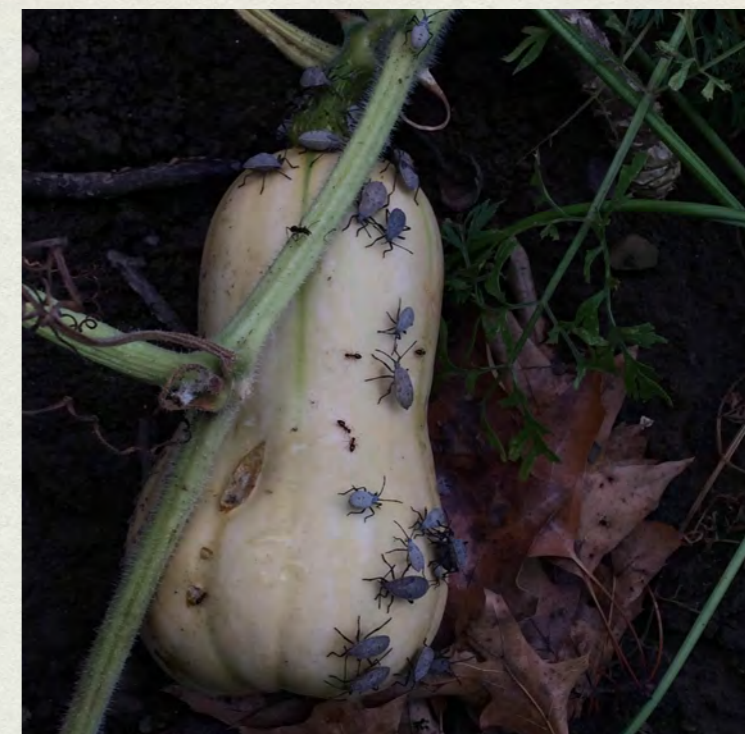








# ORGANIC PEST MANAGEMENT



- Japanese beetle, Squash bugs, aphids, chipmunks





# COMPANION PLANTING



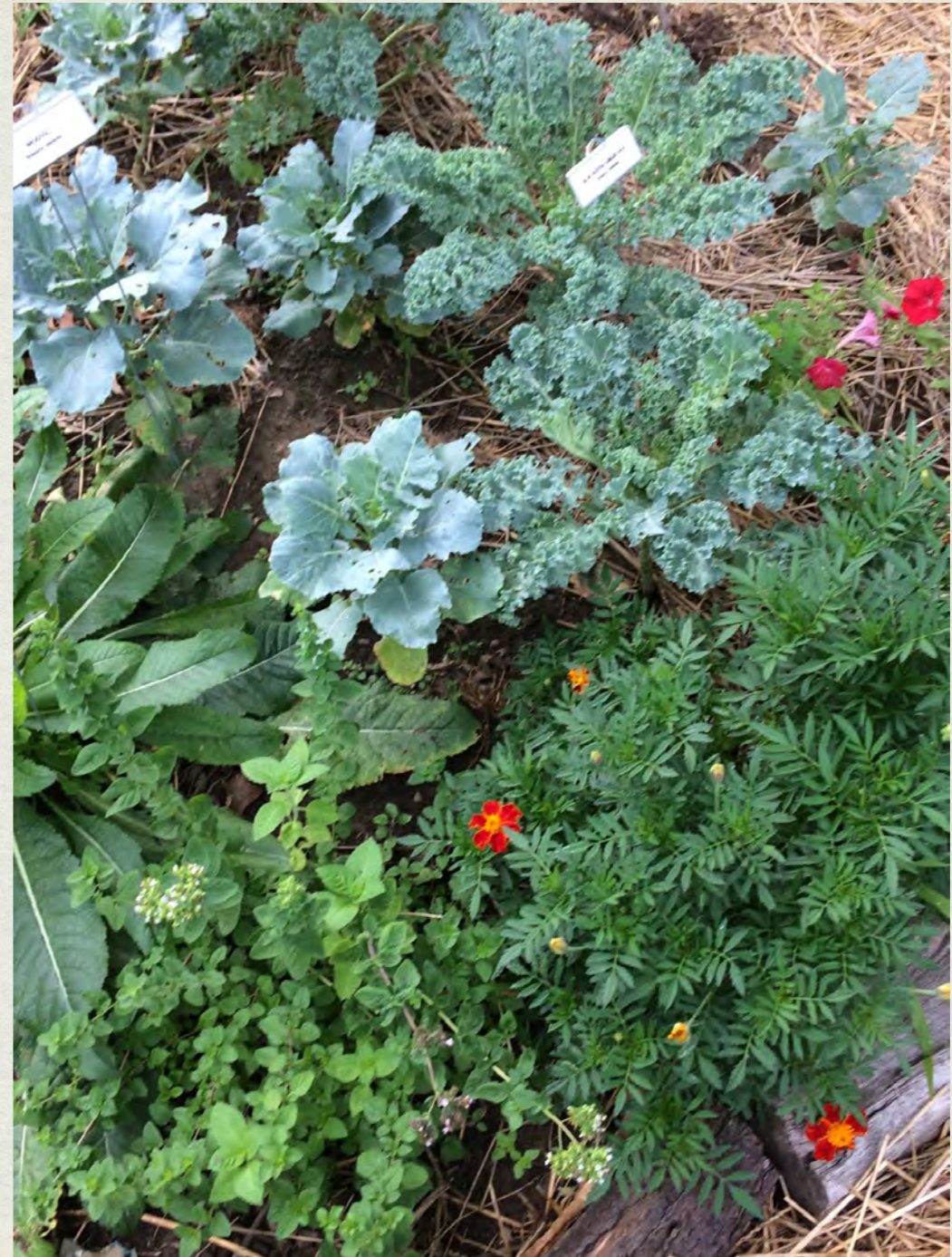
Creating plant communities which have mutual benefits to each other.

- An organic way to protect crops from pests
- Can improve pollination of fruit and vegetable crops
- Enhance plant performance
- Can avoid chemicals and pesticides which you don't want in your food and avoid killing off beneficial insects too





# WITH COMPANION PLANTS





# WITHOUT COMPANION PLANTS





# ORGANIC GARDENING METHODS



# FAST FOOD BACKYARD GARDEN STYLE



It is estimated that the average American meal travels about 1500 miles to get from farm to plate.

\* \* \*

We step outside the door for our dinner.





# DIVERSITY OF LIFE

Increases Stability and Resilience for Change





# Reconsidering "Weeds"





*Lights Out!*



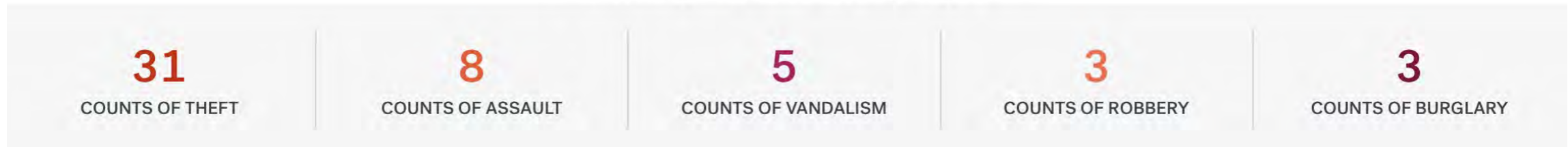


# Linden Community Challenges

	Linden	Franklin County
Infant Mortality (infant deaths / 1000 births)	25.7	8.5
Life Expectancy (age in yrs)	69.7	77.2
Education (% adults 25+ yrs without high school diploma or GED)	26.2	10.3
Unemployment (% 16 yr olds in labor force unemployed)	24.4	8.7
Vacancy (% of residents vacant)	17.3	3.8
Incarceration (Incarceration per 1000 adults)	16.9	3.0

# Clintonville

Most frequent crimes in the past year



Most frequent crimes in the past year



# North Linden



# COMMUNITY OUTREACH & EDUCATION



Little Free Library - take, share or bring free books, seeds and plants



Neighborhood Boys  
kale converts

# Seed Saving Workshop



# Recycled Plastic Plant Labels



# Pot Party!



# GARDEN SNACKS



**CERTIFICATE OF BIRTH**  
DIVISION OF VITAL STATISTICS      DEPARTMENT OF PUBLIC HEALTH  
*Official Cabbage Patch Doll*  
BIRTH DATE: February 20, 1998      REGISTRATION NO.: 91-02-025374  
PROVINCE OF NOVA SCOTIA, CANADA  
OWNER: Alison McDonald  
Note: This is an environmentally friendly product



The Columbus Dispatch



  
THE OHIO STATE UNIVERSITY  
COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES  
Urban Farm Tour



  
SIMPLY LIVING  
making life good together

Sustainable Living  
Home & Garden Tour



# SUNNY GLEN GARDEN CONNECTING COMMUNITY CORRIDOR FOR POLLINATORS AND BIRDS

Ohio sourced native  
plants

Straight species

35 families growing  
natives in their  
garden

Or organic vegetables

And providing safe  
habitat







# COLD FRAME / CROP COVER



# OUR SOLUTION TO PLASTIC POTS & THE PLANT NURSERY INDUSTRY



Paper Pots made from recycled newspaper!



# PERMACULTURE PRINCIPLES OR GUIDELINES



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Thank-You!

Questions?



**For more information about our programs,  
visit our website at  
[extension.arizona.edu/yavapai](https://extension.arizona.edu/yavapai)**

The University of Arizona  
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Learn more at:  
<https://extension.arizona.edu/legal-disclaimer>



**Cooperative Extension**

Yavapai County



THE UNIVERSITY  
OF ARIZONA