

# THE STEWARDSHIP TEAM

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# GIBBS HOUSE AND THE COMMUNITY GARDEN

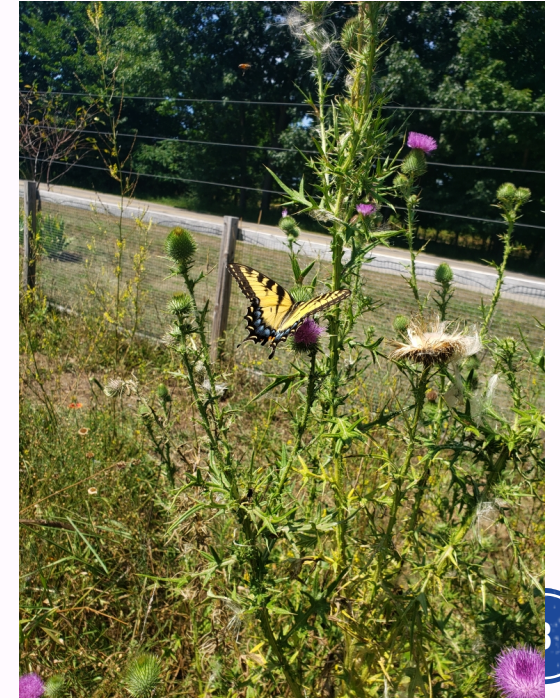
How we grow our own organic food and why we love it....





# THE GIBBS HOUSE

- Almost all of you have been to the Gibbs house
- Here we grow organic food
- We produce in season food
- We give excess food to students through the food pantry





# COMMUNITY GARDEN

- Anyone can rent a plot, students get a discount
- Our plot we grow:
  - Corn
  - Tomatoes
  - Ground Cherries
  - Green Onions
  - Red Onions
  - Carrots
  - Lettuce
  - Sweet Onions
- Volunteers work with us to learn about gardening and how fun it is!





# HARVESTING



Today's harvest



# TOMATOES!

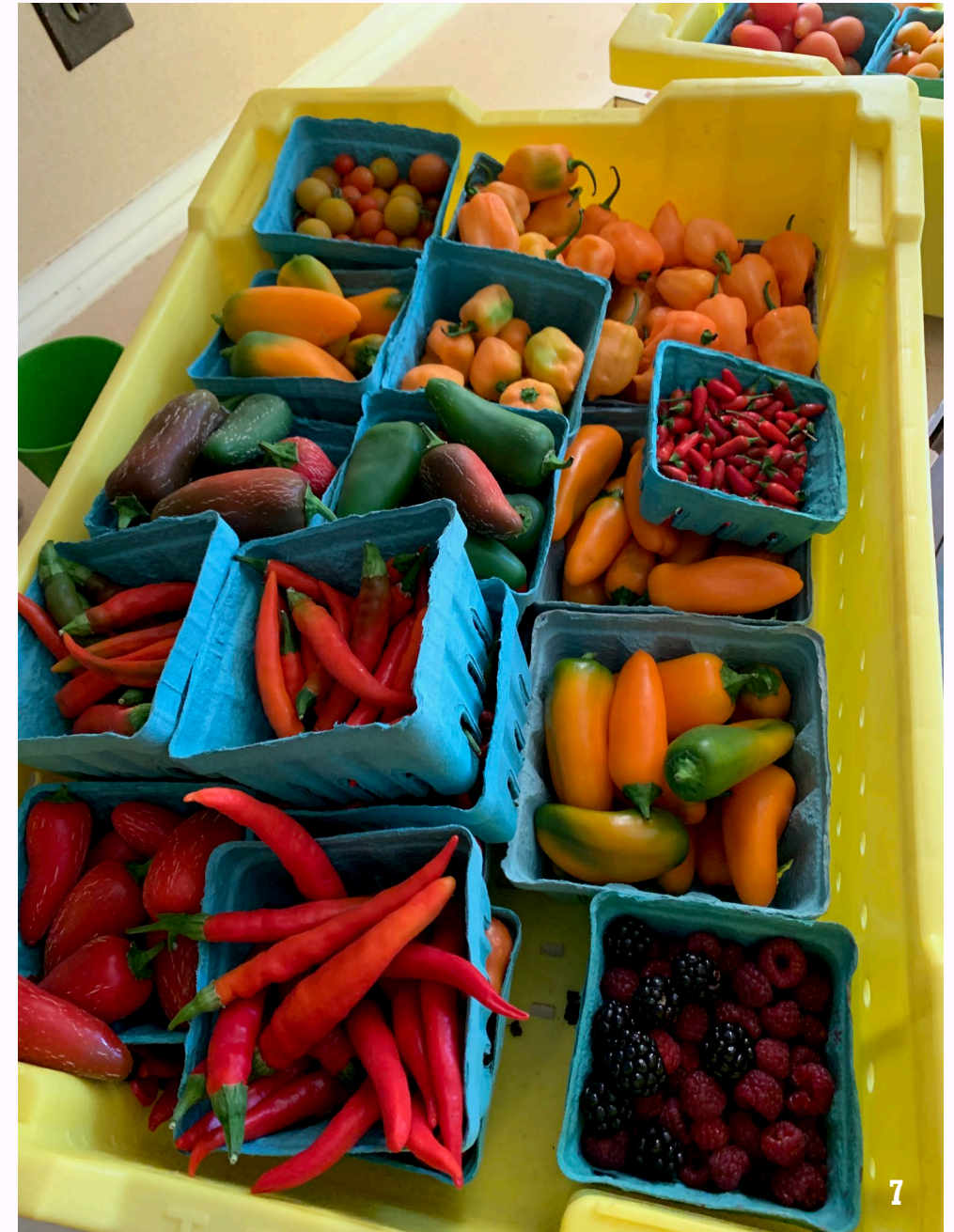
- Kinds:
  - Red pear tomatoes
  - Yellow pear tomatoes
  - Red cherry tomatoes
  - Orange cherry tomatoes
  - Heirlooms
- Grown in hoop house 2 and community garden
- Picked at least once a week
- This was from one harvest
- Students said they enjoyed them





# SPICY PEPPERS

- Kinds:
  - Chili peppers
  - Habaneros
  - Jalapeños
  - Bell peppers (not spicy)
  - Thai hot peppers
- Grown at Gibbs and Community garden
- This was from one harvest
- This was a popular item from the food pantry because a lot of international students requested hot peppers for cooking
- Peppers grew all season long





# GARLIC PROCESSING

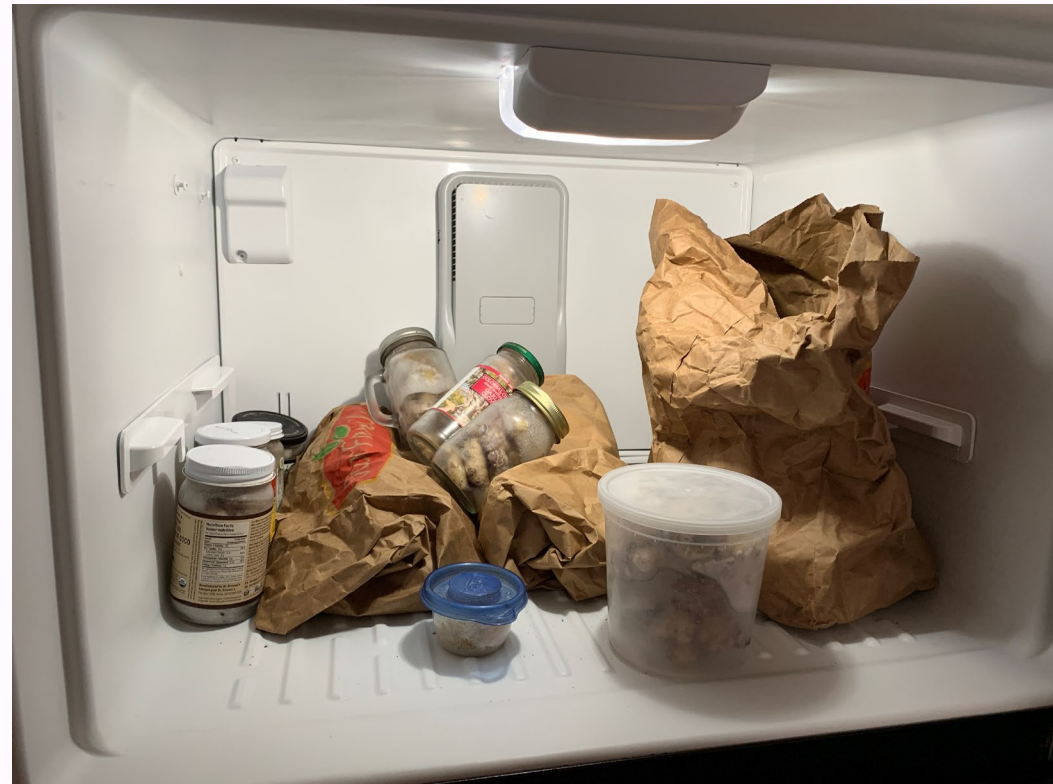
- Soft neck and hard neck
- Planting
  - Replanted by using one clove
  - Before the first frost
  - Put in a new bed in food forest
  - Planted in worm castings, dairy dew, sand, etc.
  - Covered with hay for some protection from cold
- Lots given out to volunteers and food pantry
- Grown under ground so it comes out covered in dirt and each bulb must be cleaned and the outer layers peeled off





# SPICE PROCESSING

- Ginger and turmeric
- Both can be added in fresh or dried and used
- We used the food dehydrator to remove water from the turmeric and then ground it up into a fine powder (much like you would buy from the store)

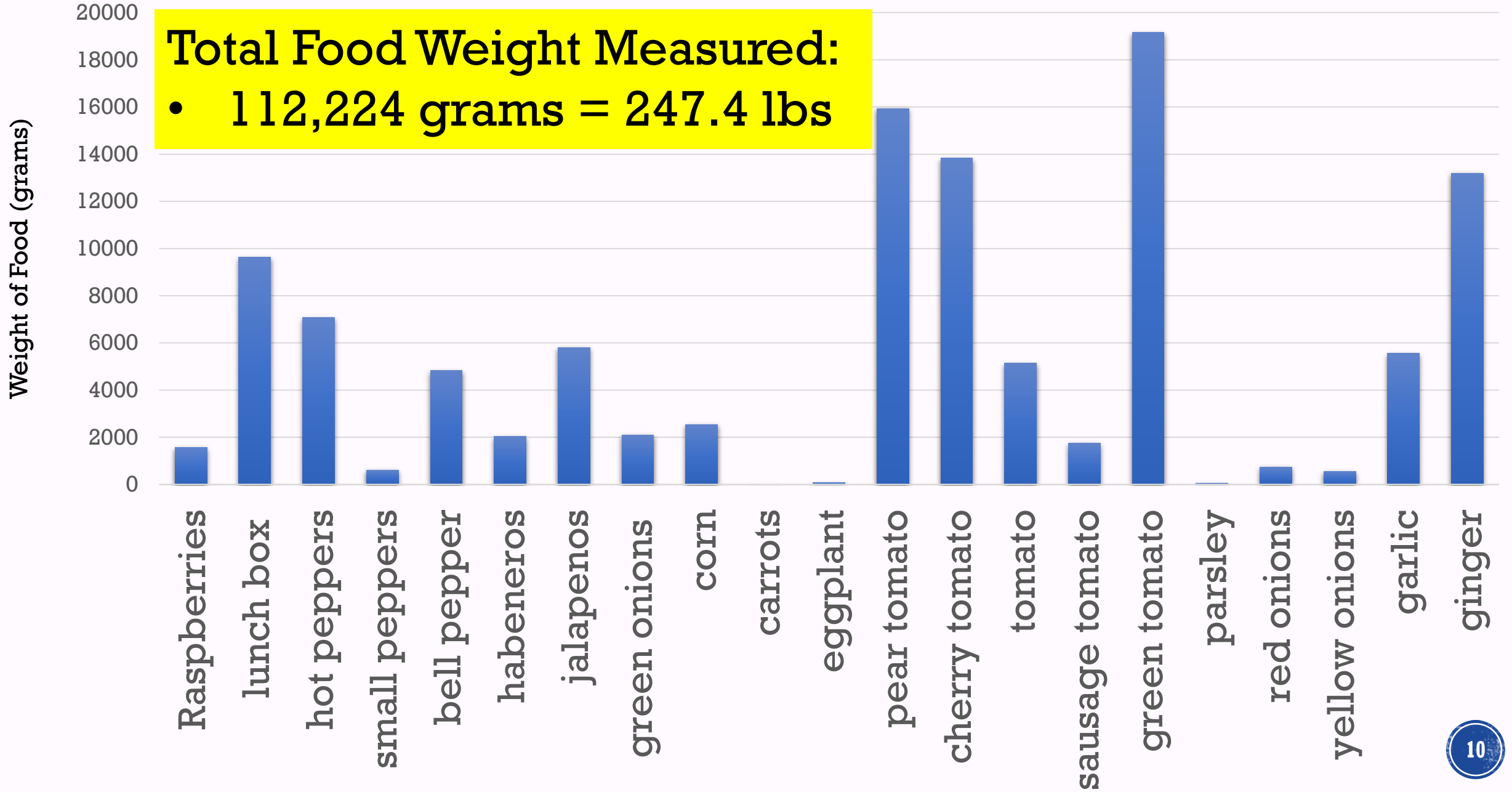




# Total Weight Measured of Each Plant

**Total Food Weight Measured:**

- 112,224 grams = 247.4 lbs

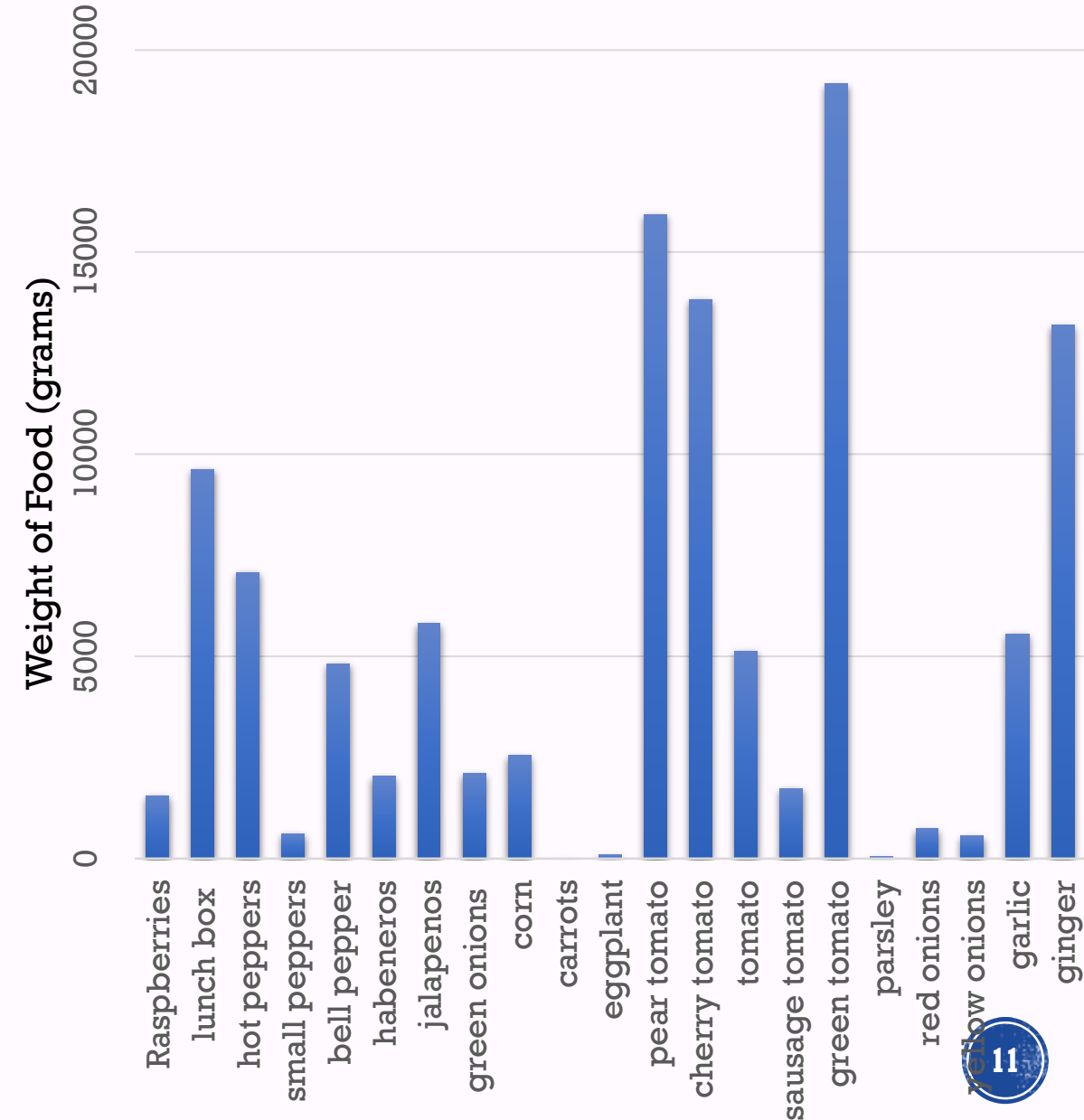




# IMPORTANT NOTES

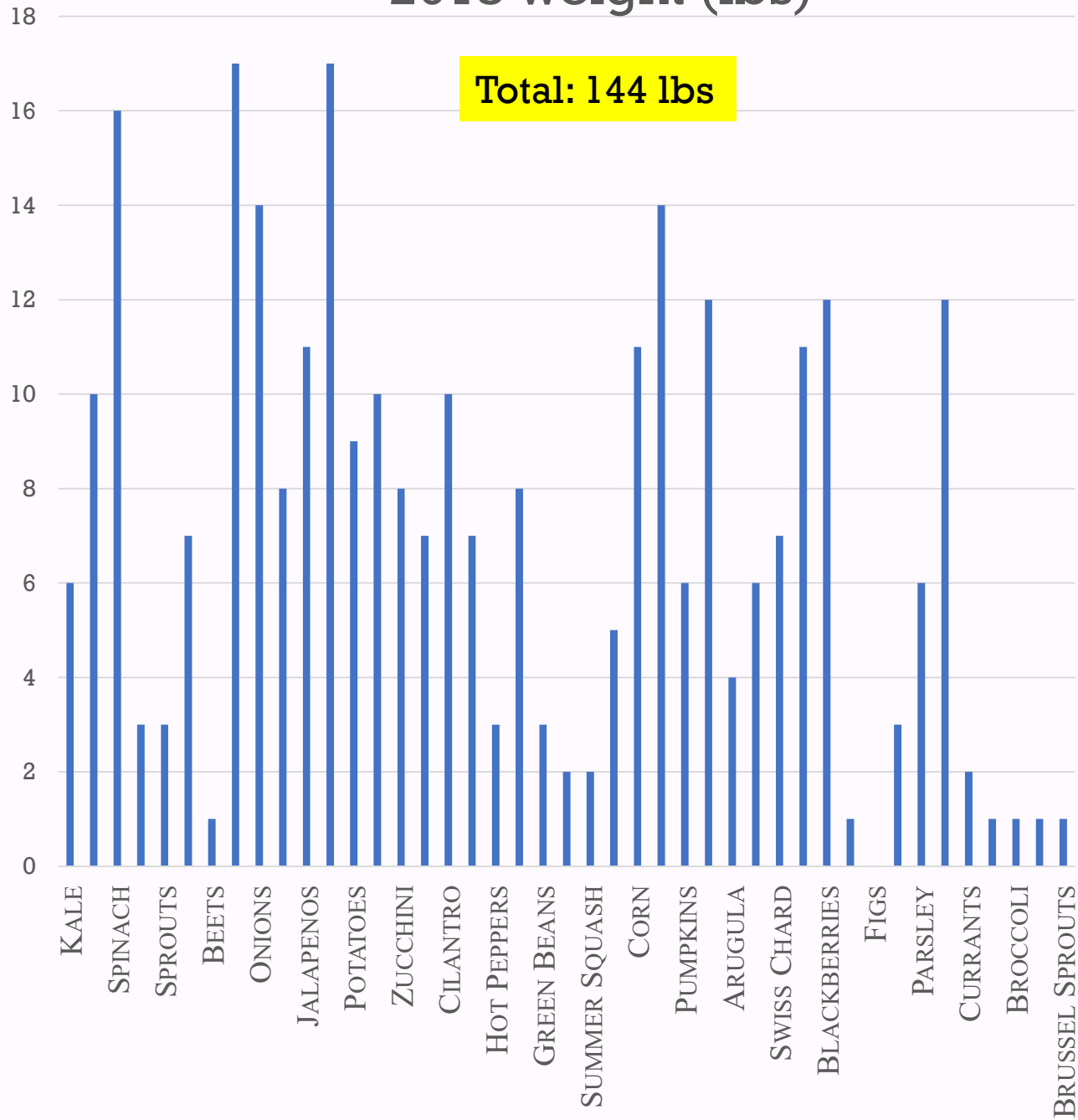
- Started weighing July 17<sup>th</sup>
- Raspberries: Many eaten right off the bush
- Green tomatoes
  - Picked green because would get eaten by pests if turned red
  - Invisible needs said they weren't popular
- Sometimes we forgot to weigh food
  - Carrots
  - Garlic
  - Turmeric
- Greatest successes
  - All peppers
  - Onions
  - Cherry and Pear tomatoes

## Total Weight Measured of Each Plant

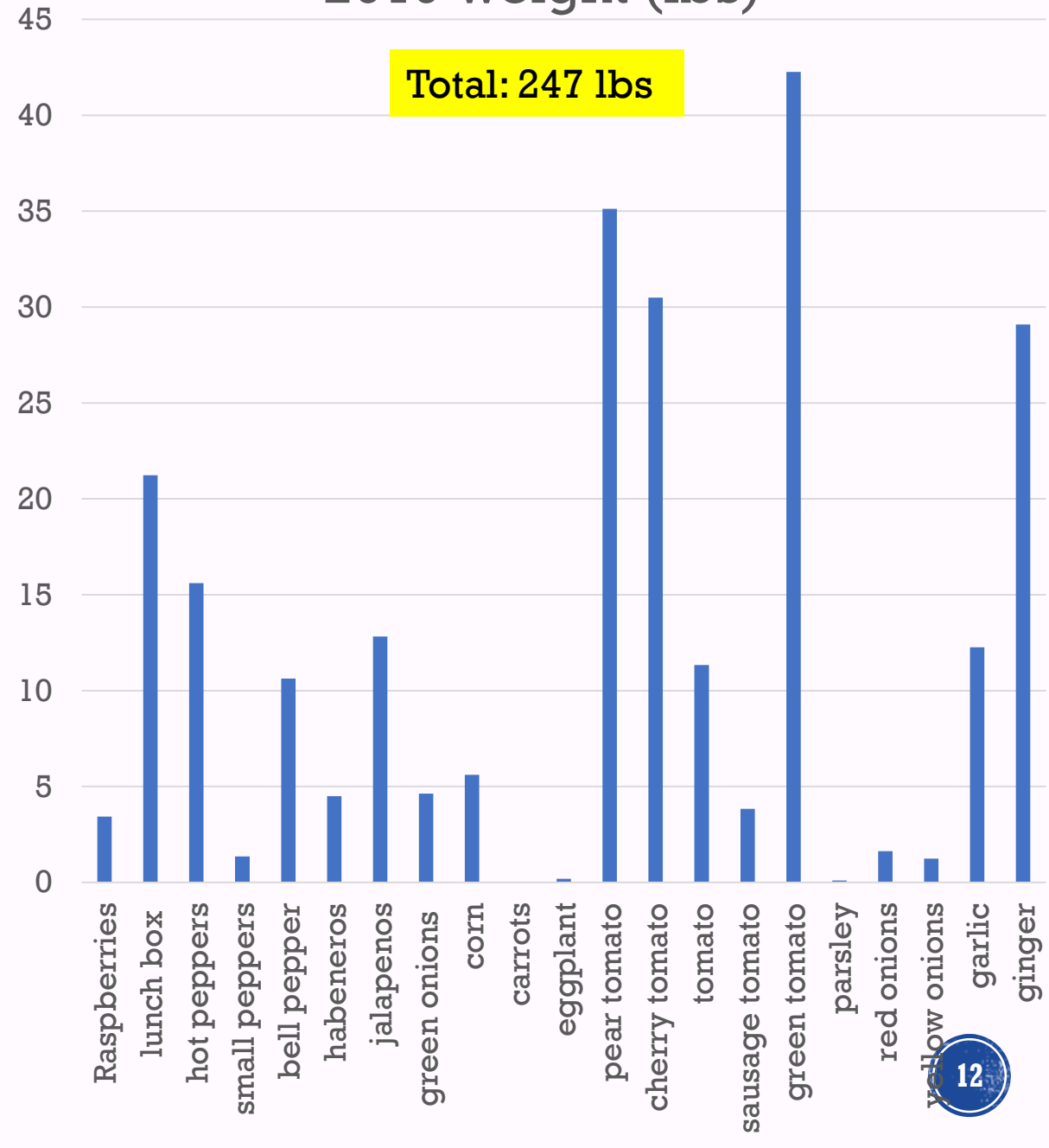




# 2018 weight (lbs)



# 2019 weight (lbs)

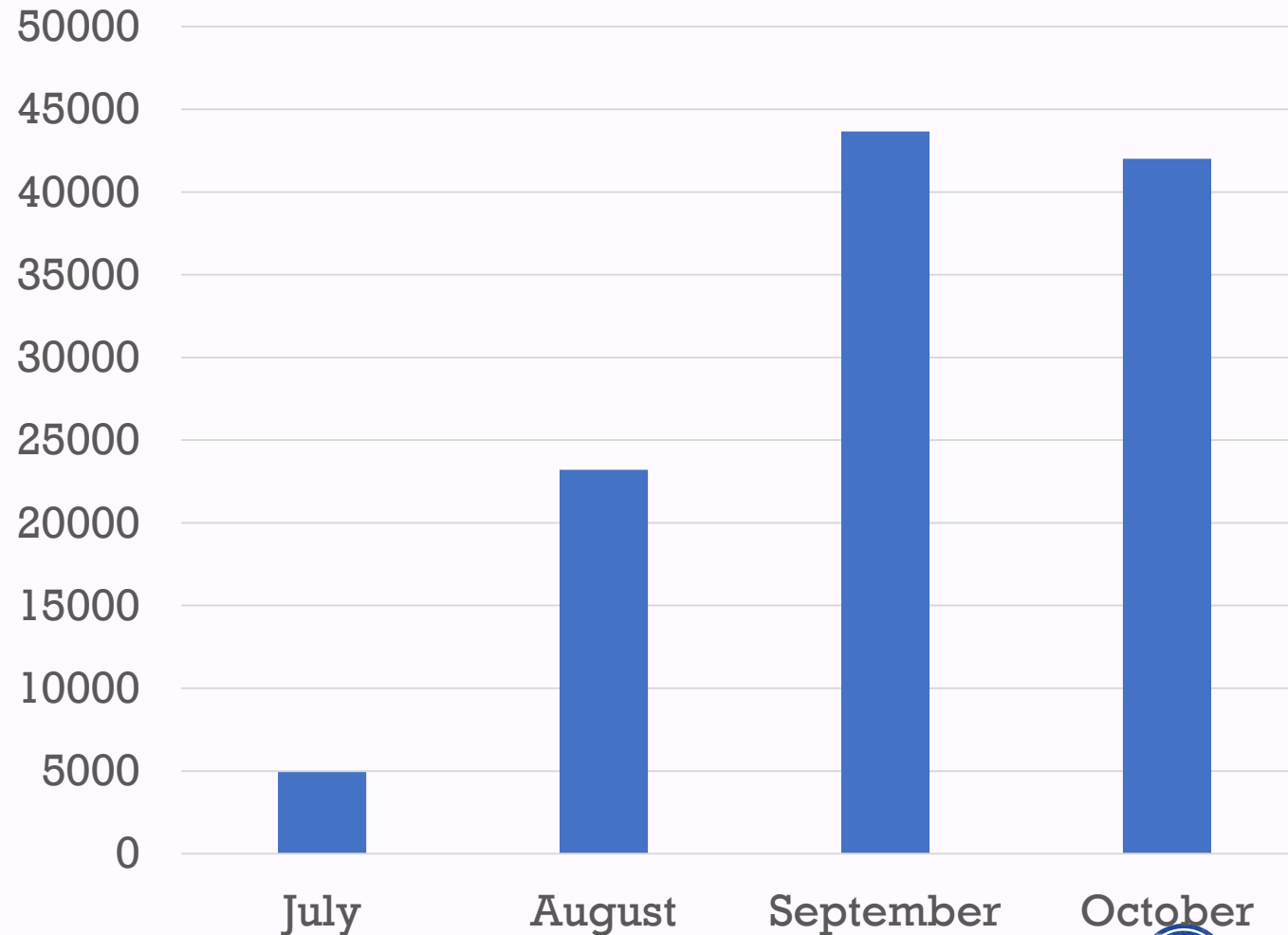




# FOOD WEIGHT BY MONTH

- Started weighing July 17<sup>th</sup>
- Ended October 14<sup>th</sup>
- If carrots were weighed, they would have been in October
- If more garlic was weighed, it would have been in August
- If turmeric was weighed, it would have been in October
- October had all ginger of the ginger (13197 grams)

Food Weight (g) Measured by Month





# VOLUNTEERS

- Volunteering for:
  - Gibbs House
  - Community Garden
  - Composting
- 48 total volunteering forms filled out







The beginning of a new project ....







# **FIRST VERMICOMPOSTING BIN**

- **Blue Roller 1 V1**
- **Vermicomposting**
- **Goals:**
  - **Using what we have**
  - **Easily movable**
  - **Produce worm castings and worm tea for the Gibbs house and the community**
  - **To begin the composting program**



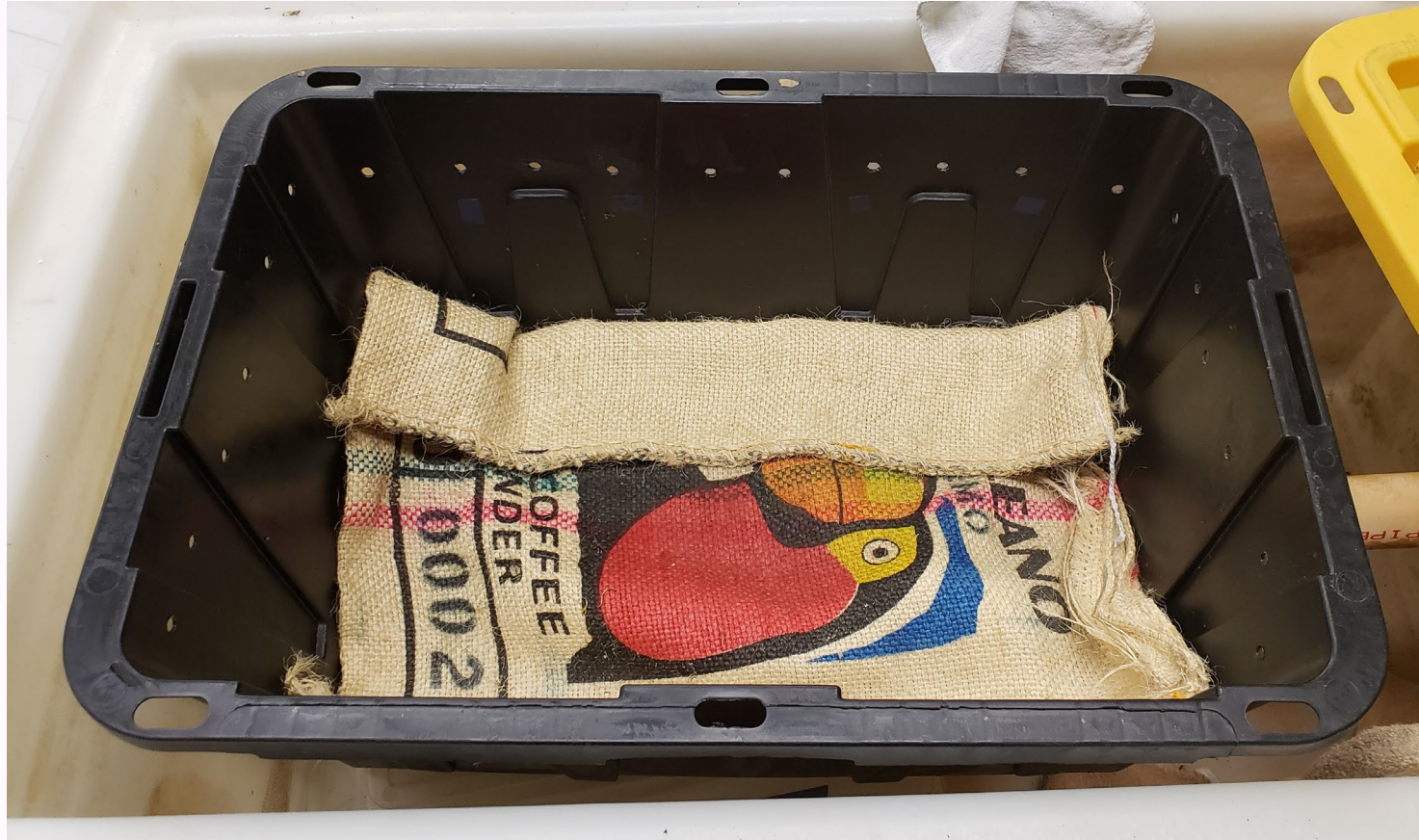
- **Blue Roller 2**
- **Vermicomposting**
- **Goals:**
  - **Using what we have**
  - **Easily movable**
  - **Produce worm castings and worm tea for the Gibbs house and the community**
  - **Comparing Blue Roller 1 and 2**

## **SECOND VERMICOMPOSTING BIN**





# **THIRD VERMICOMPOSTING BIN**



- **Yellow and Black Bin 3**
- **Vermicomposting**
- **Goals:**
  - **Using what we have**
  - **Teaching interns**
  - **Produce worm castings and worm tea for the Gibbs house and the community**
  - **Comparing this to Blue Roller 1 & Blue Roller 2**
  - **Longer cycle**



# RESULTS FOR THE FIRST THREE BINS





	Bin 1	Bin 2	Bin 3
Food Weight (grams/lbs)	5837 / 12.9	6597 / 14.5	12039 / 26.54
Number of Days	96 + 15 days harvesting	104 + 28 days harvesting	237 + 14 days harvesting
Average Weight per Day	60.8	63.4	50.8
Water after start (cups)	14	13.5	30.75
Carbon after start (g)	377	358	2743
Initial Worm Weight (g/lbs)	181 / 0.4	181 / 0.4	209 / 0.46
Final Worm Weight (g/lbs)	291 / 0.64	236 / 0.52	447 / 0.98
Worms came from	Aquaponics system	Gibbs vermicomposting	Gibbs vermicomposting
Fruit fly analysis	Much more than bin 2	Barely any	The most, but only the first couple months
Differences	Aerated more	Aerated less	Fed more at start, longer time span
<b>Final Compost Weight (g/lbs)</b>	<b>6005 / 13.2</b>	<b>4596 / 10.1</b>	<b>5320 / 11.73</b>





**Total Compost Weight: 15921 grams = 35 pounds**





# SOIL TESTING RESULTS

		<u>Below Optimum</u>	<u>Optimum</u>	<u>Above Optimum</u>
<u>Phosphorus (P)</u>	29 ppm			
<u>Potassium (K)</u>	10832.4 ppm			
<u>Magnesium (Mg)</u>	743.4 ppm			
<u>Calcium (Ca)</u>	5020 ppm			
<u>Soil Type</u>	Organic	<i>*For more information on each individual nutrient, or the bar graph, click on the underlined word.</i>		
<u>Soil pH</u>	8.4			
<u>Lime Index</u>	0			
<u>Organic Matter</u>	49.7 %			

		<u>Below Optimum</u>	<u>Optimum</u>	<u>Above Optimum</u>
<u>Phosphorus (P)</u>	94 ppm			
<u>Potassium (K)</u>	155 ppm			
<u>Magnesium (Mg)</u>	266 ppm			
<u>Calcium (Ca)</u>	1876 ppm			
<u>CEC</u>	12 meq/100 g	<i>*For more information on each individual nutrient, or the bar graph, click on the underlined word.</i>		
<u>Soil Type</u>	Mineral (Loam)			
<u>Soil pH</u>	7.4			
<u>Lime Index</u>	0			
<u>Organic Matter</u>	3.1 %			



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## Phosphorus:

Important for root development and flowering; too much can negatively impact our lakes and streams. Beginning January 1, 2012, Michigan Law restricts the use of phosphorus-containing lawn fertilizers.

## Potassium:

Promotes natural plant resistance to disease, drought, cold and heat damage

## Magnesium:

Essential part of chlorophyll used in photosynthesis (how plants make their own food)

## Calcium:

Important for plant vigor; aids in uptake of nutrients

## Soil pH:

Measure of soil acidity; influences nutrient availability in the soil

## CEC:

CEC (Cation Exchange Capacity) gives an indication of the soils ability to hold cations (potassium, calcium and magnesium). The higher the number the greater the ability of the soil to hold cations.



# SOIL TESTING RESULTS

		<u>Below Optimum</u>	<u>Optimum</u>	<u>Above Optimum</u>
Phosphorus (P)	189 ppm			
Potassium (K)	217 ppm			
Magnesium (Mg)	572 ppm			
Calcium (Ca)	2691 ppm			
CEC	18.8 meq/100 g			
Soil Type	Mineral (Loam)	*For more information on each individual nutrient, or the bar graph, click on the underlined word.		
Soil pH	7.6			
Lime Index	0			
Organic Matter	4.6 %			

		<u>Below Optimum</u>	<u>Optimum</u>	<u>Above Optimum</u>
Phosphorus (P)	189 ppm			
Potassium (K)	357 ppm			
Magnesium (Mg)	633 ppm			
Calcium (Ca)	2822 ppm			
CEC	20.3 meq/100 g			
Soil Type	Mineral (Loam)	*For more information on each individual nutrient, or the bar graph, click on the underlined word.		
Soil pH	7.6			
Lime Index	0			
Organic Matter	7.3 %			



- **The Brown Bin**
- **Vermicomposting**
- **Goals:**
  - Using what we have
  - To raise our own worms to expand this program and give them to others who want to compost
  - Produce worm castings for the Gibbs house and the community



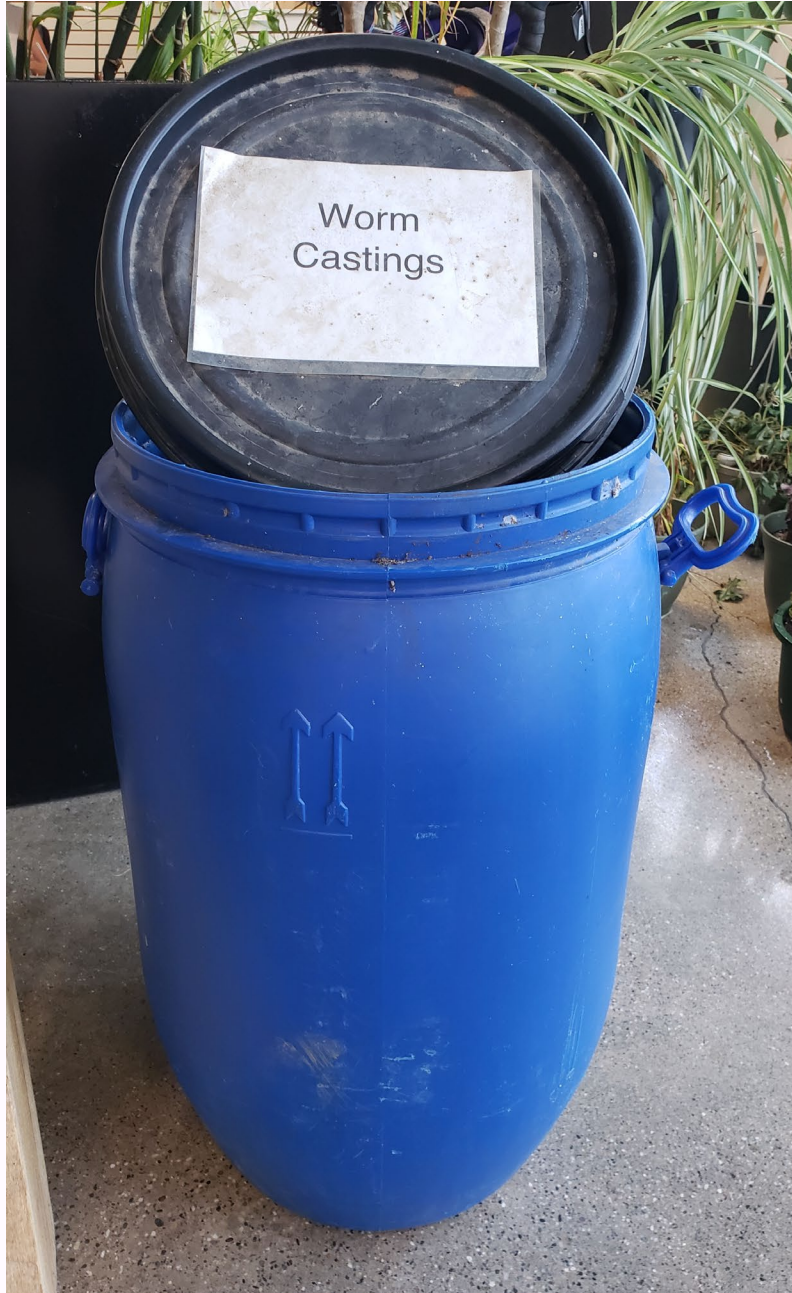
# **THE VERMICOMPOSTING NURSERY**



# OUTDOOR HOOP HOUSE VERMICOMPOSTING BIN



- **Vermicomposting**
- **Goals:**
  - **Comparing outdoor vermicomposting to indoor**
  - **Produce worm castings for the Gibbs house and the community**
  - **Show that a larger vermicomposting site is feasible and encourage more of these to be built**



# **RESULTS FOR OUTDOOR VERMICOMPOSTING BIN**

- **Four 20-gallon bins full of Worm Castings**
- **About 38 pounds each (~152 pounds)**
- **About a year**
- **Used at various locations**
  - **Gibbs House**
  - **Community Garden**
  - **On Campus Greenhouse**
  - **Students and Staff**
  - **People coming to the office with their own container**



# THE TUMBLING COMPOST BIN



- **Tumbler 1**
- **Outdoor Composting**
- **55-gallon Drum**
- **Goals:**
  - **Using what we have**
  - **To determine if this is easier/more effective than other methods**
  - **Produce worm castings for the Gibbs house and the community**





- **Static Pile**
- **Goals:**
  - **Collect our yard waste at the Gibbs House**
  - **Testing how different plants like comfrey effect the temperature & other parameters of the pile**
  - **Produce compost product for our Gibbs House site**

# **THE GIBBS HOUSE STATIC PILE SYSTEM**



# FOOD FOREST LASAGNA BEDS

- Five annual locations in the food forest
- Garlic has been planted in one bed
- Will plant other annuals in the spring
- Goals:
  - Having some soil already in the places we need for planting in the spring
  - Having room for growing not just perennials in the food forest







- **Static pile**
- **Three rows**
- **Goals:**
  - **Composting more product at a faster rate**
  - **Composting where rain-water would not have an affect**

# **OUTDOOR HOOP HOUSE STATIC PILES**



# COLLABORATION AND OUTREACH



- **Facilities Management**
- **Landscape Services**
- **Dining Services**
- **Kalamazoo College**
- **Bronco Buckets Program**
  - About 20 department collaborators so far
- **Testing Compost with the Biology Department**
  - Biology class tested our soil for a lab
  - Graduate research into microbial content/data sequencing



# NEXT STEPS

- **Real time sensor system connected to webpage**

- Temperature
- Oxygen
- Humidity/Moisture
- pH
- Electrical Conductivity
- Carbon Dioxide
- Gas (Methane)
- Air quality (Carbon monoxide)
- NPK
- Other nutrients

- **Decrease pre- and post-consumer food waste from cafeterias**

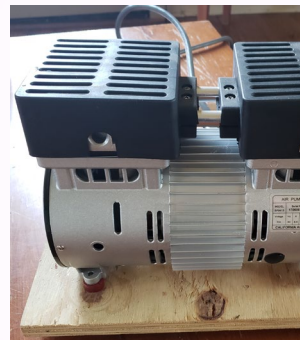
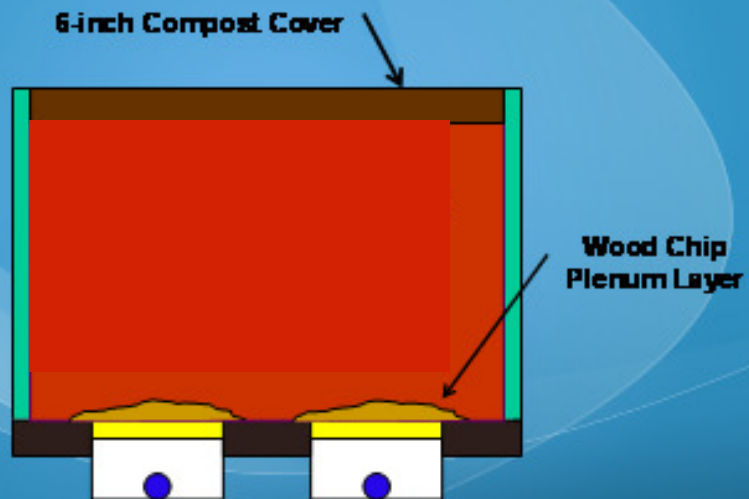
- Conducting a waste audit at each cafeteria
- Contacting local farmers that may want to help
- Taking the food from the pulpers (starting with one cafeteria)
- Begin aerated static pile systems



# NEXT STEPS

- **Aerated static pile systems**
  - Induce air flow in pile with electric blower
  - No turning needed
  - Maintain aerobic conditions
  - Controls pile temperatures

Placing the Compost Cover





**THANK YOU**

