



# Food Waste Recycling Project

*An Ongoing Collaborative Project Model for  
Sustaining Student Learning, Success, and  
Creativity Through Experiential Learning*



# Collaborative Project Team

## **Top (from left)**

- *Bassam Matar (Engineering)*
- *Yvonne Reineke (English)*
- *Kanapathipillai Prabakaran (Engineering)*

## **Bottom (from left)**

- *Jay Linford (Environmental Tech Center)*
- *Miriam Kleinman (Biology)*
- *Michele Marsee (English)*
- *Mary Beth Burgoyne (Library)*





3 bin waste collection system in the  
cafeteria accompanied by  
student-designed educational posters

**SAVE THE ENVIRONMENT**  
SORT YOUR LEFTOVERS

**LEFT OVER FOOD?**  
GREEN FOOD WASTE BIN

HELP ENRICH OUR SOILS,  
SAVE WATER, & INCREASE  
CROP PRODUCTION

**LEFT OVER  
LANDFILL?**  
BLACK LANDFILL BIN

KEEP OUR COMPOST  
& RECYCLABLES  
CLEAN

**CAN IT BE  
RECYCLED?**  
BLUE RECYCLE BIN

REDUCE SIX FEET OF  
LANDFILL BY RECYCLING  
YOUR PAPER & PLASTICS

CHANDLER-GILBERT  
COMMUNITY COLLEGE  
A MARICOPA COMMUNITY COLLEGE

Experiential Learning | Student Project Flyer





*Student-designed  
educational flyers  
about the Food  
Waste Recycling  
Program*

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Experiential Learning | Student Project Flyer

# RECYCLE WHAT YOU DON'T EAT




## 40%



of all food produced  
in the US is **wasted**  
Recycle it instead.



Look for the  
**GREEN BINS**  
on campus

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Experiential Learning | Student Project Flyer

## WHO'S THE NEW GUY?

Keep your eye out for the **GREEN BIN**  
Help the **Food Waste Recycling Program**



**Support the  
NEW GUY**  
Recycle Your Leftovers



- Reduce Landfill Waste
- Reduce Greenhouse Gases
- Recapture Valuable Nutrients



# Food Waste Collection & Compost



*Biology students weigh and traditionally compost the food waste collected on campus (during food digester construction)*





FALL 2018 - SPRING 2019

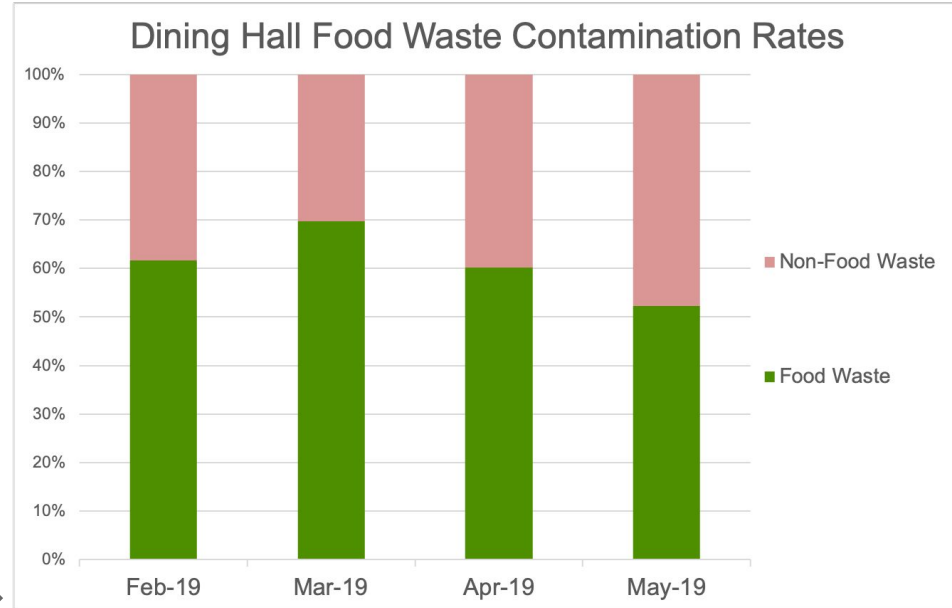


**1,370  
POUNDS  
OF FOOD  
WASTE**

collected on campus  
& diverted from the landfill

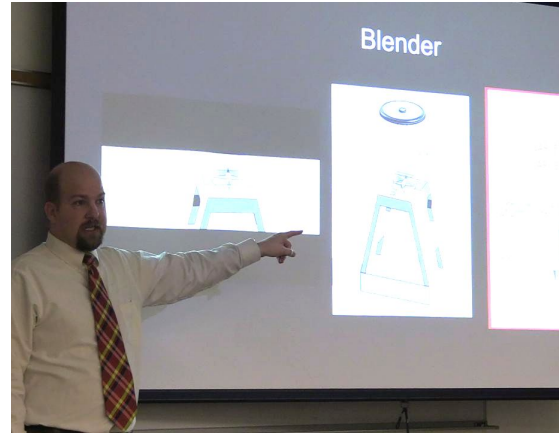
**37% CONTAMINATION RATE**

from non-food items in cafeteria  
collection bins





# Digester Design Presentations

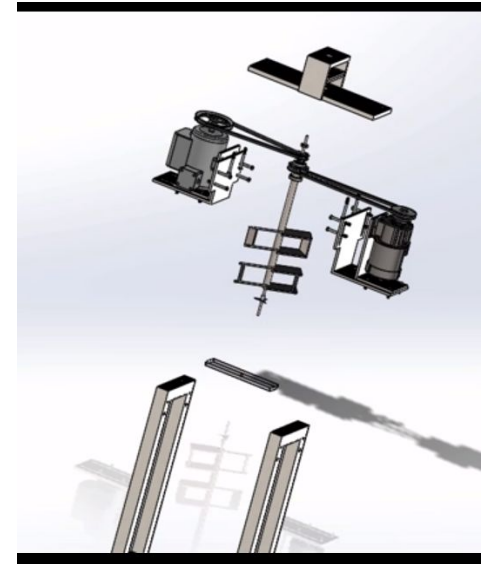
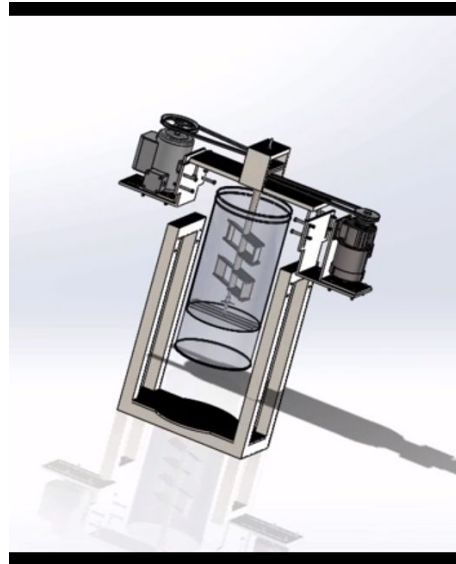


*Engineering students present four different designs to a panel of reviewers from various campus departments (including CGCC's President)*



## 3-D rendering of the food waste digester

Engineering students created a model in SolidWorks CAD software and produced a 3-D printed small scale model before constructing the full size machine







# *Engineering students and faculty construct the digester*





# Food Digester Machine Completed



The machine was completed at the end of Spring 2019, and successfully completed its first test run!



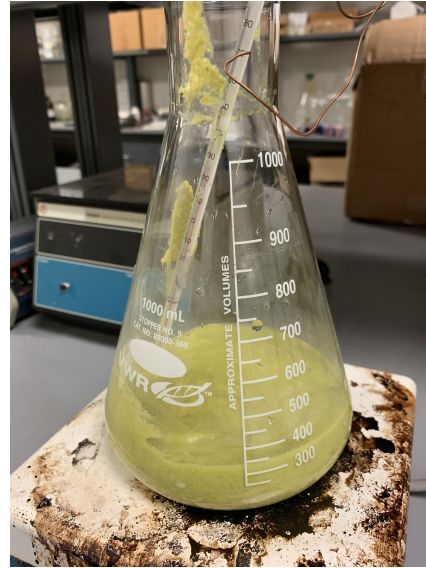
# Food Digester Pilot Test





# Comparative Plant Studies

A test batch of organic liquid fertilizer was created in the Biology lab for plant analysis while the digester machine was under construction





# Comparative Plant Studies

- Plants were divided into 3 groups: organic fertilizer, conventional chemical fertilizer, control group
- Fertilizer was applied over the course of 6 weeks

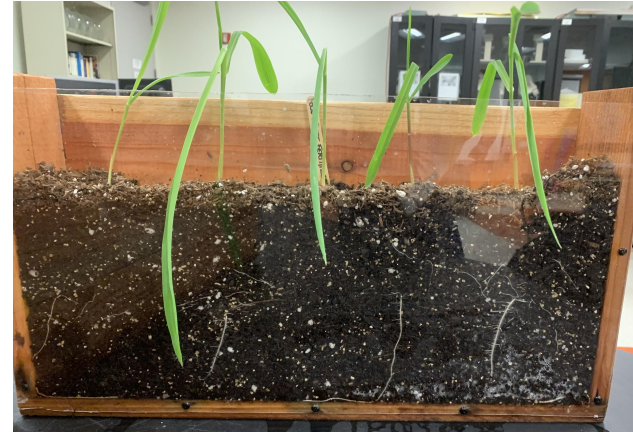




# Comparative Plant Studies



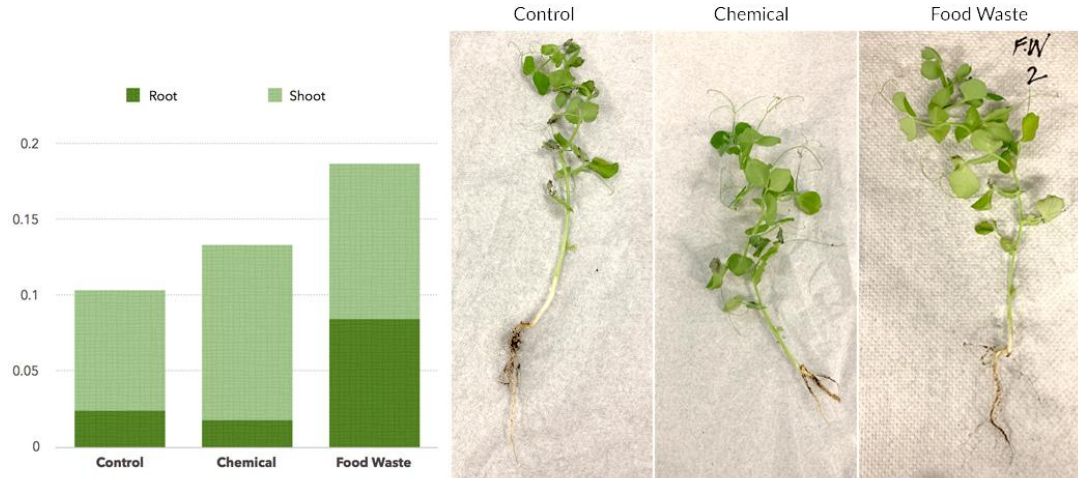
- After 6 weeks of fertilizer treatment, plants were removed from the soil for analysis.
- Root and shoot length were measured, then plants were dried and weighed.





# Comparative Plant Studies: Results

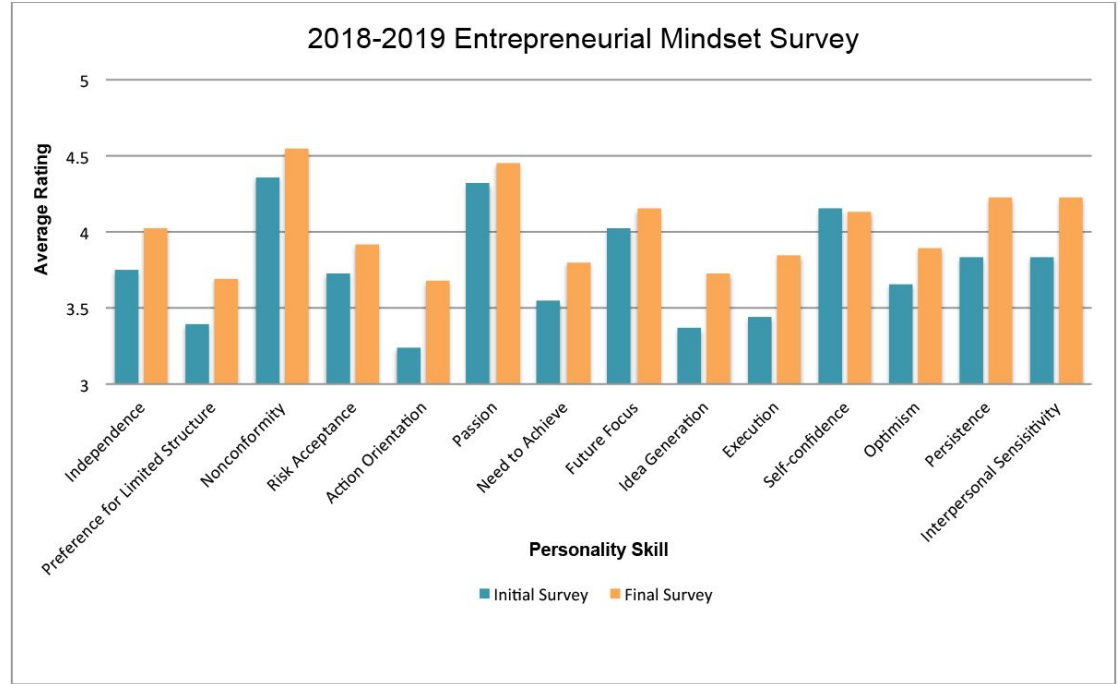
## Root and Shoot Analysis of Pea Plants



Pea plants were treated with water (control), chemical fertilizer (chemical), or food waste fertilizer (Food Waste) for 6 weeks. Plants were harvested at 6 weeks and root system separated for shoot system. Roots and shoots were dried in a drying oven (60°C for 6 hrs) and weighed to obtain dry mass (graph - left). Representative images of pea plants for each treatment group are shown (right).



*Survey assessing the impact of this project on the personal mindset of project participants in Biology*



The Entrepreneurial Mindset survey was administered to Fall 2018 and Spring 2019 BIO181 students participating in the Food Waste Recycling Project. An initial survey was conducted on the first day of class and the final survey was conducted following the completion of the assigned experiential-learning semester project. Initial Survey n=88; Final Survey n=63





# Future Plans



- Daily food waste processing using the food digester
- Assessing the organic liquid fertilizer formula on campus plant life
- Community partnerships and grant opportunities
- Incorporating additional academic disciplines
- Expanding awareness through broader marketing campaigns