Building a Compost System at PPCS

We are Creating a Compost System to…

- Reduce waste going to landfill
  - Food waste
  - Reduce methane emissions (from our landfill)
- Increase soil quality at PPCS
- Improve soil for our future school garden

By Owen T.

Our Compost Expert & Background Information

- Eric Hake - former industrial compost engineer
  - taught us about compost and how to maintain a compost system
  - helped us figure out the best size and system design based on food waste
  - can work with future classes to refine the compost system

What is Compost

- Compost is organic matter that has broken down and decayed.
  - Made of food scraps, leaf litter, wood chips, etc.
- Compost is nutrient-rich and good for plants
- The heat kills fungi, mold, and bacteria
- Compost mimics nature’s recycling

PPCS Food-Waste Data

Food waste was collected and measured from the lunchroom in December 2022

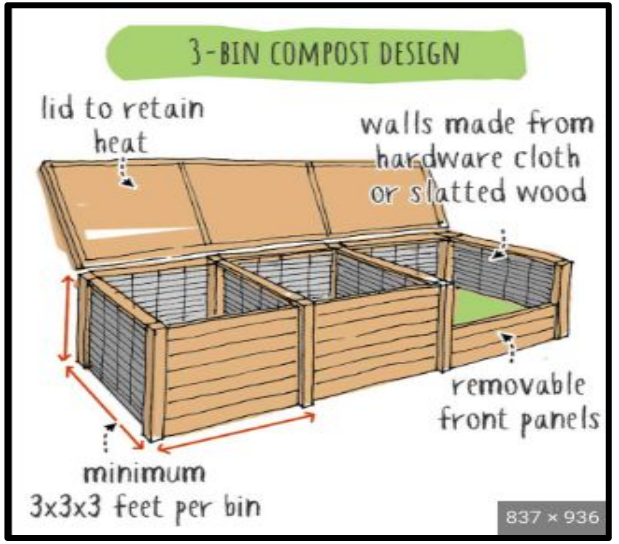
- Food Waste Totals:
  - 5 gallons of waste per day (about one bucket)
  - 867 gallons per school year (170 school days)
  - 8lbs/lunch period or about 25 lbs/ day
  - 4,000 lbs per school year

- Based on volume, our expert recommended that we will need a three or four bin compost system

- https://docs.google.com/spreadsheets/d/16TQvixuI6tIGsIG_NTbMMsdWyWfyBA8NKYwSozjNEx8/edit?usp=sharing

Design Instructions

- We recommend using using a three bin system, with the option of adding a fourth one
- This website will give you the instructions
- Rather than using three different bins, have one long board with the bin walls branching off of it
- You will need to find a way to add a lid
    - If you cannot find a way to make a lid, a thick layer of wood chips will work when the compost is not being used



This is what we want

This is Eric's compost system

By; Flora

Site Selection

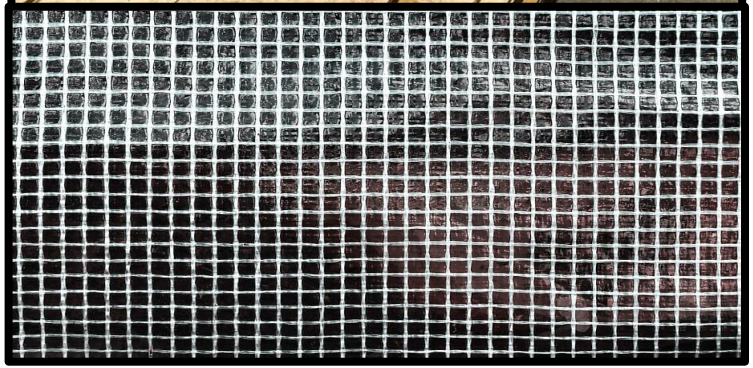
Several Options

Building Materials

The building materials we will need are:

- Cedar wood
  - 7 pieces: 6”x 12’
  - 9 pieces: 6” x 10’
  - 2 pieces: 2” x 10’
  - 2 pieces: 6”x 10’
  - 2 pieces: 6” x 12’
  - 2 pieces: 4” x 12’
- 1 roll of 36’ x 3’ wire netting.
- 4 fence posts

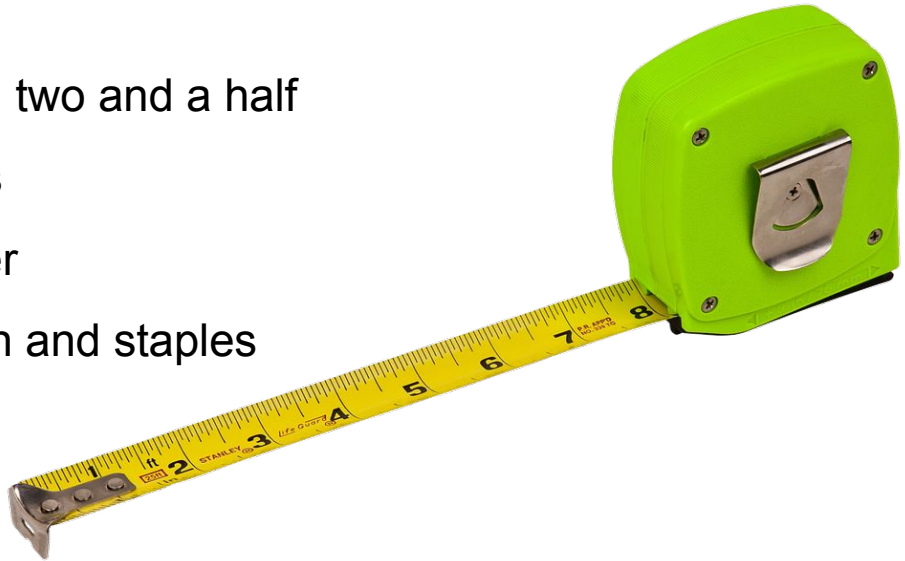
https://commercialforestproducts.com/roasted-woods/



Found at:
https://www.goodhousekeeping.com/home/gardening/a20706669/how tobuildcompostbin/

Building Tools

- 1 saw
- 1 drill
- 1 measuring tape
- 1 box of 75,2 inch wood screws
- 1 box of 75, two and a half inch screws
- T-post driver
- 1 staple gun and staples



By: Tylen

Cost of the Materials

Made by: Hazel Scott, and Connor Perry.

Circular saw	$50
Cedar wood	$500
Hardwire Mesh	$60
Metal fence posts	$8 each
T-post Driver	$40
Staple gun	$17 with staples
3 Shovels (from M.B.S)	$10 each
One drill	$22
2 ½ inch wood screws	$12 for 75 screws

Picture found at: Amazon

Picture of 2 ½ inch wood screws

Picture of hardwire mesh

Picture found at: Home Depot

Location Ideas

Red Location

Pros:

- Easily accessed
- Enough space if we have three bins

Cons:

- Not enough space if we add a fourth bin
- Possibility of storage use or other purposes
- Students could get into the compost

By Zeke and Bella

Orange Location

Pros:

- Space for 3-4 compartments
- Access to water and sunlight
- Close to the building for ease of access

Cons:

- Hard to get to without a gate installed
- Slide parts in the way
- If not maintained right, could cause stink near playground

By Zeke and Bella

Green Location

Pros:

- Easily accessible
- Able to put extra trash in the blue dumpster

Cons:

- Could be mistaken as a trash bin
- Could be in the way of the cargo containers

By Zeke and Bella

Blue Location

Pros:

- Able to have multiple compartments
- If the school expands we won't need to move compost

Cons:

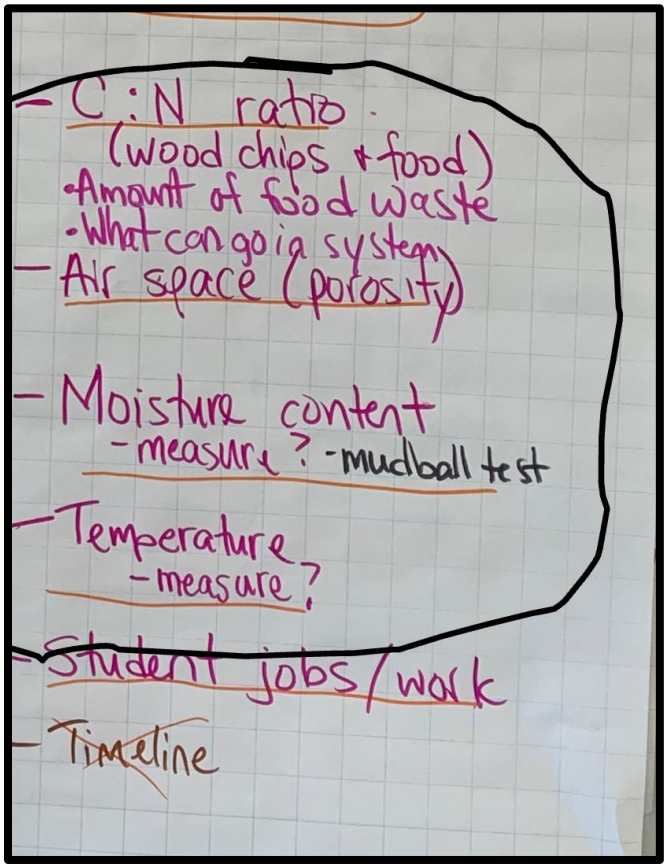
- Will have to walk up hill with 15 lbs of food each day
- Located in far distance where it could be vandalized

By Zeke and Bella

System Maintenance

It will be important to maintain proper conditions:

- Carbon to Nitrogen Ratio (C:N)
- Porosity (air space)
- Moisture content
- Temperature



By Tayla and August

by:Hazel Stevens

Wood Chips

Why are wood chips important?

- Wood chips are part of the carbon to nitrogen ratio and help with several things:
  - Wood chips help heat up a compost system
  - Help regulate the temperature of the compost
  - Wood chips will absorb extra liquid
  - Wood chips help with the smell if the compost mix is off
  - Adds structure to make sure compost gets air
- Where are we going to get wood chips
  - Local arborist
  - We need twice as many wood chips as food waste
  - David Herbold (PPS parent) can likely help us with wood chip supply

C:N Ratio

Carbon to Nitrogen Ratio

- What is the carbon to nitrogen ratio? (C:N)
  - The proper combination of food scraps (Nitrogen) and wood chips (Carbon).
- Why is the C:N ratio important?
  - Helps decomposition process speed up
  - Hopefully will help temperature reach up to 131 degrees fahrenheit
- The ideal ratio is 25:1 C:N
  - Volume would be 2:1 C:N
- When ratio is off, compost pile will stink
  - Decomposition takes longer
- When people don't finish lunch, leftover food scraps will go to our compost pile

Food scraps: Nitrogen

Wood chips: Carbon

By: Ashlyn

Porosity

https://www.leaflimb.com/TopTenReasonstoChooseWoodChips/

- Wood chips are helpful because it has a lot of carbon
- Mixing the compost is good so there's more aeration
- Hardwire cloth Is the mesh wire that works best with compost
- The mesh wire help get airflow into the compost
- But it can't be to big of holes, or it won't be stable.

https://www.pinterest.com/pin/22236591886702582/

Moisture Content

- Moisture content is crucial ~40-60% by weight
- Too much moisture
  - Compost shuts down
  - Foul smell
  - Anaerobic
- Too little; composting shut down
- Students need to maintain the right moisture content
  - Mudball test helps keep moisture content in the correct range

Mud-Ball Test

Photo of the mudball test

Temperature

- Temperature is a important part of maintaining the compost system
- Should be minimum of 55°C (131°F) for three days.
- Check the temperature daily to make sure its not getting too hot or too cold

Speaker notes

Student Jobs

There are lots of jobs around having a composting bin such as:

- Carry food scraps out of the lunch room every day
- Put wood chips in the bin
- Stir the compost with a pitchfork
- Checking moisture content by doing the mudball test
- Check temperature daily

This is a photo of Hazel Stevens and Henry Brunner doing the mudball test.

Compost Safety

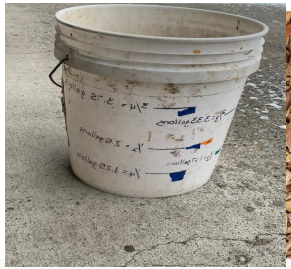
When taking care of the compost, some issues might come up

- Need to keep little kids away from the compost because:
  - they might play with the tools
  - They might hurt themselves around the equipment, like pitchforks
- Animals might get in without the lids
- When you are touching the compost, you can get pathogens on your hands
  - After someone is done taking care of the compost they should wash their hands.

http://www.vegetable-gardening-online.com/

Long Term Tools

- We will need:
  - One large shovel
  - Wood chips
  - One thermometer
  - Several buckets
  - Two pitchforks
  - Five pairs of garden gloves
  - Latex gloves
  - A tote (for mixing)






Overall Cost

- All of our materials and building tools add up to a total of about $1,400 minimum.
- Our long term tools will cost about $400 (we could potentially borrow the shovels.)
- $200 for extra costs.
- Our budget is probably around $1,600.
- We can also borrow a few tools and fundraise money to buy the long term tools that we need.

Circular saw	$50
Cedar wood	$500
Hardwire Mesh	$60
Metal fence posts	$8 each
T-post Driver	$40
Staple gun	$17 with staples
3 Shovels	$10 each
One drill	$22
2 ½ inch wood screws	$12 for 75 screws

Made by: Hazel Scott, Connor Perry

Speaker notes for funding and timeline

Funding Ideas

Here are some ideas for funding the compost system…

- Write a grant
- GoFundMe
- Put posters around the university to generate community interest
- Ask Palouse Prairie families to donate
- See if the City of Moscow is interested in funding

By Cora, Hazel St. and Zeke

Speaker notes

Timeline

We need to pass down this project to different classes as they become 7th graders. We are creating the design for it, and the…

- Fundraising will happen between summer and fall of 2023
- Current 6th graders actually build it
- Current 5th graders will start composting
- Current 4th graders actually use compost for a garden and the school grounds

Cora

Conclusion

Overall Recommendations

What do we suggest?

We suggest that next year's 7th graders continue our work and build a compost system

- Our compost system should be a three bin system with a lids
- The possibility is that we end up adding a fourth bin

- As you continue, students will have to create jobs and work together to maintain our compost system
- Continue working with our expert, Eric Hake

By: Flora

7th-Grade Class

Henry Brunner
Nathan Fiorillo
Bella Hadley
Owen Hudelson
Cora Lingo
Adria Ogle
Connor Perry
August Rittenhouse
Haven Schnider
Hazel Scott
Ashlyn Seeley
Tylen Snodgrass
Flora Stevens
Hazel Stevens
Aspen Stewart
Owen Townsend
Zeke Valentine
Kaden Vasquez
Tayla Whitehall

Teacher:
Andrika Kuhle