



Roosevelt Farm Manual



& Class Manifesto

(AKA everything you need to know to rock it Roosevelt style)

Table of Contents

A brief history of the RUF squad.....	3
General syllabus outline.....	3
Good connections to have in the school.....	4
Staples of the program.....	5-6
Troubleshooting the aquaponics system.....	7
Vermicomposting care.....	8
Hydroponic system care	8
Urban farm maintenance.....	8-10
Rain garden maintenance.....	10

A Brief History of the Roosevelt Urban Farming Squad

- The 2017-18 school year was our 6th year at Roosevelt.
- It started with a weekly partnership with a biology class (Annie Clarke née Canney), and then a physics class, and turned the old, unused greenhouse into a functioning aquaponics system over 2 years
- The next year and a half the systems were cared for by an after school student group (partnered with beacons and coordinated with Katie Carter) and working with the CTE classes (Ms McCutcheon).
- The greenhouse outside was built in spring 2015.
- The elective class began spring semester of 2015-16 school year. The first semester we worked alongside Mr. Corts, and it was a difficult group of students and an imperfect teacher matching. The elective program in 2016-17 school year was a huge success (partnered with Ms. Clarke again) and was then increased to two class periods with Ms. Nordby in the school year of 2017-2018.
- The class is officially coded as Ecology in Minnesota and although it is considered an elective it does provide a credit in the field of science that counts towards the students graduating requirements.

General Syllabus Guidelines and Musts

In order to ensure that the program is successful these general subjects must be covered as they deal with food safety requirements, general knowledge and proper care of the various systems, and the overall Spark-Y mission.

- Food safety plan and harvesting techniques
- What is sustainability and the 5e's
- Permaculture
- Introduction to Aquaponics
- Recycling, composting and vermicomposting
- Plants, plant needs, plant care, plant deficiencies and seed germination
- Farm planning (include a complete map of the farm to be used in the Spring)
- Pollinators

Good connections to have in the school

- Nurture your relationships with the cafeteria staff - Scott and Todd. They are the main reason what we do with Garden-2-Caf is successful.
- Shannon Nordby (Shannon.Nordby@mpls.k12.mn.us) is the teacher that currently leads the Ecology in Minnesota (Roosevelt Urban Farming) course that is paired with Spark-Y. Shannon is an extremely intelligent and strong-spoken person who advocates for her students more than anything and is an excellent teacher to work with. Shannon brings many ideas and connections to outside sources to the table. If anything is ever unclear or you have a scheduling conflict don't hesitate to speak with Shannon, she is very understanding and flexible.
- Pam Priess (Pam.Preiss@mpls.k12.mn.us) is the keeper of the keys and the gatekeeper to Michael Bradley. Be friends with her. She is also the person who can keep you updated on access during the summer time
- Ernie is the head engineer. Be friends with the engineers. They can fix things and order compostable bags and loan you tools and ladders.
- Patti Kendall (Patricia.Kendall@mpls.k12.mn.us) handles a lot of the spending at Roosevelt. If there are ever materials or tools you need to buy for the farm through a grant, filling out an order form and sending it to Patti to purchase is the best way to get it done. Before creating an order form be sure to speak with her first to let her know and to discuss which grant you will be utilizing.
- Christol Kjome (Christol.Kjome@mpls.k12.mn.us) is in charge of scheduling, and also coordinated the social media and newsletter. She seems a bit blunt when you first meet her but she warms up and is very powerful within the school and a great asset for information or coordination of classes / enrollment / outreach
- Katie Carter (Katherine.carter@mpls.k12.mn.us) is the biology teacher who used to help coordinate the after school program, and is hugely invested in getting Roosevelt recycling. She is a friendly and energetic friend on campus, and will help coordinate after school recycling programs. She is appreciative of Roosevelt's Spark-Y partnership and will be a great ally!
- Ben Rengstorf (ben.rengstorf@mpls.k12.mn.us) is the leader/teacher of the Beacons culinary after-school program. Beacons is a program Ben has started this year that teaches students how to not only cook food for themselves, but also teaches them culinary skills for an industrial sized kitchen as well. Ben is highly invested in our program as he plans to buy some of the RUF squad produce to utilize in his program, and in turn he also gives any leftover food scraps/waste from the program back to our program to be used to feed our worms. Ben is a really nice guy and easily approachable, I would suggest connecting with him and asking what the students in his program intend to cook and what produce they would most need before planting in any of the systems.

Staples of the Program and A Brief Description of Current Systems

Indoor Systems (All located in Room 161)

Aquaponics System

- The aquaponics system is an excellent learning resource for the students, as well as a viable food production system as well, that ideally produces food throughout the entire school year. At the moment the fish in the system are White Tilapia, and will crowd the glass in the fish tank and look hungry at all hours of the day (even if they have just been fed). The system is rather old and can at times be very problematic, but all in all works very well and is an excellent thing to show guests or anyone who is curious about the class.

Vermicomposting Systems

- The vermicomposting bins are brand new to Roosevelt and were constructed by the students in the winter of 2017-18. There are two systems that are fully mobile and complete with two worm bins each creating a grand total of four worm bins. Along with the two mobile vermicomposting systems there is also a worm tower as well that was implemented at the same time. All five worm bins are fully operational and consistently produce nutrient-rich worm castings that can in turn be used in the urban farm and hydroponics system. Some of the food waste comes from the aquaponics system and outdoor farm, but the majority of the food for the worms comes from an after-school Beacons culinary program provided by the YMCA and led by Ben Rengstorff.

Outdoor Systems

Urban Farm and Greenhouse

- The urban farm and greenhouse is the bread and butter of the Roosevelt urban farming class, meaning it yields the most produce and when it is in season it provides the students with quite a bit of work and hands-on learning. In the winter having the students fully plan and prepare a map of the farm complete with plant spacing, companion plants, and their reasoning behind planting specific plants in the different grow beds is an excellent project and not only provides them with more autonomy over what they will be planting in their farm, but also creates a well thought-out map to be used come Spring when it is finally time to plant in the garden.

Pollinator Garden

- The pollinator garden is located right next to the urban farm and is used to attract pollinators to the garden (#SaveTheBees). Using native MN flowers and other pollinators is highly recommended. This garden will need weeding and adding diversity every year or so. Its installation was funded by Wild Ones, who may be happy to send out a local expert to advise on this.

Baby Garden

- The baby garden is a very, very small elevated grow bed that is located within the daycare center located within Roosevelt. Although the garden is small, it's impact is huge! The baby garden is mainly used to grow a type of vegetable or edible produce that the students can then give to the daycare providers who, in turn, give to the babies. The

students find it rewarding to grow food for the babies, and if nothing else provides another area for them to maintain.

Piano Planter

- The piano planter is located right at the front entrance of the school and looks quite beautiful during the summer and fall when the flowers are in bloom. Blooming native MN plants are usually ideal to grown in the planter. If there is ever a lack of rain it is KEY (haha) to water the planter using the hose close to the urban farm, it won't reach all of the way so it's a bit tricky but just be creative. There are also two watering cans in the greenhouse that can be used to water the planter as well, it is all up to personal preference.

Turtle Planter

- The turtle planter is an art piece that was constructed by Christopher Lutter-Gardella throughout the 2017-2018 calendar year. The idea behind the turtle planter is that it acts as a living sculpture and has vining plants creep up the shell and make it look more like a turtle (at the moment it just kind of looks like a weird dome, but it will get there!). The sculpture is massive and includes a ramp for students to access the inside of the sculpture and sit on benches that surround the inside.

Rain Garden

- The rain garden is a project that was completed in the fall of 2018, installed in part by interns through the Spark-Y 2018 internship project and then expanded by the fall RUF squad in 2018. The rain garden includes a central circular section, planted with MN natives like sedge, milkweed and asters. The rain garden expansion includes a swale on contour that runs parallel to the perimeter of the circular rain garden, as well as a swale along the north side of the school building. These swales are planted with blueberries, elderberries, highbush cranberries and a serviceberry.

Troubleshooting the Aquaponics System (How to know when the system needs a little love)

The aquaponics system (apart from the urban farm) is arguably the flagship system of the Roosevelt Urban Farming class, especially in the winter when the outdoor farm is out of commission. That being said, the system somehow knows this and therefore tends to be the most problematic. DON'T PANIC! There is a definite learning curve and you will eventually get the hang of things. It is an excellent system to sharpen your teeth on. Here are some common problems you may run into and helpful tips:

- The pump in the system is extremely finicky, even just a small adjustment on the valve can really fluctuate the water levels between the grow bed, fish tank, and sump. If you ever have to fiddle with the pump (which you for sure will), adjust the water flow and then wait a while to see if you over-adjusted to ensure that the sump, gutters, or grow bed do not overflow. If one of these areas does overflow don't worry too much, it's bound to happen. Just adjust the system accordingly and ensure that the water flow leading into the fish tank matches the water flowing out of the grow bed into the sump tank.
- The gutters hanging above the sump tank are a great area to grow as well, but every now and then they need to be cleaned out to make sure they don't overflow and that water is flowing properly out of them. There is also a valve at the top of the gutter systems that you can turn to regulate water flow in them as well, but be aware that any change in water flow to these systems will affect water flowing into the fish tank and grow bed as well.
- Try not to plant cucumbers or anything in the cucurbit family in the aquaponics system as they tend to grow a fungus.
- When it begins to get cold out adding fish heaters immediately to ensure the water temperature does not drop too low is CRUCIAL. We have lost many poor fish friends due to cold weather in the winter. It also may be a good idea to invest in a space heater before winter as well. Due to the large glass windows the room temperature can drop pretty low and that may be the best way to regulate room temp. Don't close the greenhouse doors when it is cold as heating comes from the hallway.
- If you decide to plant tomatoes they do tend to grow very well in the system, but when they start to fruit they may become stagnant and stay green. Pruning the tomato plant to promote growth and send nutrients to the fruit is a good way to remedy this.
- Directly seeding in the system can work, but germinating outside of the system and then transplanting into the system seems to work much better, and is much easier to keep track of what was planted where.

Vermicomposting System Care (How to know when the worms are feeling welcomed)

The vermicomposting systems are a great addition to the RUF farm as they can be used to eliminate any waste from the aquaponics system, hydroponics system, and outdoor farm along with any food leftover from the Beacons program led by Ben Rengstorf. The vermicomposting systems truly bring to light the idea and practice of “closing the loop” which is something that is stressed in the Spark-Y model. With that in mind, the systems won’t work if the worms aren’t happy so making sure they have all they need in order to thrive (and most importantly poop!) is essential.

- The Carbon-Nitrogen ratio for vermicomposting bins is 70-30, meaning 70% of the bin should be carbons (so paper bags, paper, cardboard, dead leaves), and 30% should be nitrogen (this would be the food waste that is being pulled from the waste stream).
- The bins tend to dry out very fast, so watering them every other day to ensure they stay moist is good practice. A good test to ensure that the bins aren’t too wet or too dry is to pick up the carbons in the bin and squeeze them; if you squeeze three drops of water out of the carbons then the bin is properly watered. Any more or less water means that the bin is either too wet or too dry.
- Pouring water over the burlap sacks to hold more moisture in tends to work well too.
- Make sure to empty the collection bins under the systems after the water has completely drained out, otherwise they will overflow.

Hydroponics System Care (Hydroponics? But there’s soil in it!)

The hydroponics system truly does not need a lot of care or maintenance and can be checked in on periodically to ensure the plants are growing well and the soil is moist enough. If any problems arise in the system contacting Craig from Eco Garden systems to ask him for assistance in troubleshooting and he will get back to you in a very timely manner. The system is currently outdoors as it gets more sunlight there and is near an outlet for a water source where it can be connected.

Urban Farm Maintenance

The urban farm and greenhouse, as mentioned earlier, is an amazing and extremely hands-on learning tool that yields a lot of produce and permeates throughout programming and learning the entirety of the school year. The best way to explain maintenance needs is to break up urban farm maintenance by season, beginning with the start of the school year in the fall.

Fall

- In the Fall the urban farm will be filled with produce that is ripe and ready to harvest. With that in mind having the students jump right in and start harvesting the produce to sell to the cafeteria. Before this can begin the students all need to be trained in proper food safety practices to ensure that they follow the food safety requirements and procedures as outlined by MPS Culinary and Wellness Services when harvesting.

- There is always work to do on the farm, so students who are not harvesting should be performing maintenance or interacting with the farm in other ways.
 - The compost bins behind the greenhouse will need to be turned periodically and this can be a pretty labor-intensive task. The bins are separated into two bins by a divider in the middle. Having the students flip the compost pile from one side to the other is the easiest way to turn it and for you to see if there is any compost ready to be utilized.
 - Identifying and removing weeds from the garden.
 - Watering the garden and greenhouse if needed
 - There is a hose connected to a spigot on the side of the school that can be used to do this. The watering key is attached to a wooden stand to ensure that it doesn't get lost and should be kept in the greenhouse if not in use.
 - At the moment there is quite a bit of Jerusalem artichoke in the pollinator garden located right next to the raised garden beds. Jerusalem artichoke is a tuber and if the plant is simply pulled up the tuber below will often break in half causing it to regrow and essentially double. With that in mind having the students simply trim off the tops of the plants to essentially contain them in just one area of the pollinator garden and to make sure they don't find their way into the raised garden beds is best practice.
 - Jerusalem artichokes are edible and can be used as a substitute for potatoes, but taste much better after they go through a frost. The idea is that after this next winter the artichokes can be harvested and sold to either the beacons program or the cafeteria.
 - The students can also pick up any trash that is lying around in the garden area.
- When it is near the end of fall and there is no more produce to harvest make sure to cover the beds with straw to prepare them for winter and ensure they will be ready to plant in come spring.

Winter

- In the winter there is obviously far less maintenance to do, but instead of maintenance it is a good idea to have a unit in which the students first learn how to, and then plan what they intend to plant in the spring, keeping in mind items such as:
 - Plant spacing and square foot gardening
 - What crops will produce the most yield
 - Companion planting
 - Crop rotation
 - Cafeteria needs
 - Feasibility
 - Time to maturation
- When it nears the last frost date have the students begin germinating seeds that can then be transplanted into the farm when the time comes.

Spring

- With winter finally being over it's time for the students to finally start interacting with the farm again! Ideally plants should be ready to either be transplanted or directly seeded in their designated locations on the farm map created by the students in the winter.
 - First remove and compost the straw covering the garden beds
 - Every spring Hennepin County delivers a pile of compost through a recycling grant in which we report the amount of recycling, trash, and compost being hauled at Roosevelt. Before planting in the garden the students should cut in and turn the compost into the soil in the farm.
 - After compost has been added to the garden beds the students can transplant plants or directly seed.
- The entire farm will need to be watered quite heavily as it will most likely be extremely dry, this can either be done in one shot or broken up, but making sure the soil is extremely moist is very important.

Summer

- During the summer the farm will still need to be maintained and kept looking nice until fall comes around so that it is ready for the students to interact with and harvest from.
- If there is any produce that needs to be harvested in the fall finding a way to sell that produce (be it at farmer's market or some other viable revenue source) would be ideal.
 - The Nokomis farmer's market is usually willing to hold a booth for Spark-Y if asked about openings in advance.
- Other general farm maintenance will need to be done as well, and in the past interns located at Roosevelt through the Spark-Y summer internship program have been the ones to maintain the farm. General maintenance that needs to be completed is as follows:
 - Identifying and removing weeds from the farm.
 - Watering the farm as needed.
 - Removing pests that are detrimental to the farm.
 - During the summer of 2018 the farm ran into a pretty extensive Japanese beetle pest problem. Picking them off plants routinely and throwing them in buckets filled with soapy water is a good way to get rid of them.

Rain Garden Maintenance

The rain garden requires minimal maintenance, however it will be important to check regularly throughout the year to ensure water is still flowing to the garden space during rains. Supplemental watering may be needed during dry spells. It would be worthwhile to test soil quality and water quality quarterly. Soil acidifier should be added every spring for the blueberries to have optimal health and production. In the summer and fall months, there should be harvestable berries starting in 2020!