Introduction

Dear Intern,

Thank you for your interest in interning at Manzo Elementary! The purpose of this manual is to outline what to expect during your time at Manzo. While most of this information is unique to the way Manzo operates, some of the information may be generalized to other schools with similar infrastructure. This manual is intended to provide an introduction to school gardens, Manzo Elementary, and general operations you may come into contact with throughout your internship. Resources are provided in the back of this manual to give you further support and provide a relative introduction to paperwork integral to day-to-day operations at Manzo.

This manual was written as a senior capstone project for the College of Architecture, Planning and Landscape Architecture during the 2015-2016 school year. I interned with Manzo through the UA Community and School Garden Program for one year and have tried to remain involved when my schedule has allowed it since then. I chose to create this manual as more involvement between the University of Arizona and the community was established with Manzo to further enhance students learning and teacher development.

Statewide, Arizona has become a leader of sustainability that will forever change the future of our education system. Teaching young, curious minds the basics of sustainability and garden ecology is only the beginning to develop future innovators and community leaders. Your role as an intern helps establish the foundations for the many bright students of Manzo to become successful later in life.

Manzo is a wonderful resource for anything and everything you need to know about school gardens, sustainability, cultural relationships, and teacher development. This school has so much to offer and I genuinely hope by reading this manual you will have a better idea of what is yet to come in your internship.

Sincerely,
Kellie Sheehan
Spring class of 2016
Bachelors of Science, Sustainable Built Environments

Table of Contents

Introduction....1
School Gardens in Arizona....3
TUSD and Manzo Elementary....4
Site Description....5
Daily Operations....6
Summary of Sustainable Features....7
Role of an Intern....9
Intern Orientation....10
Basic Intern Duties....11
University of Arizona and Community Involvement....12
Classroom versus Garden....13
Tips From Past Interns....14
Resources: Helpful Websites....15
Resources: Important Paperwork....17

School Gardens in Arizona

The state of Arizona has been a leader in developing school gardens, training teachers effectively, and using the garden as a core part of curriculum development. In Maricopa County alone there are over 100 school gardens and even more are throughout the state. Gardens in Arizona that are on a school campus have a choice to become certified through the Arizona Department of Health Services to use the produced food in the cafeteria to distribute to students. Most schools in Arizona have not yet achieved this status but there are some in the process or working towards it.

One key characteristic of school gardens is that they teach food security to students that may not have access to healthy and affordable food. According to a study performed by the Arizona Department of Education in 2015, 58% of the state qualified for free or reduced lunch due to their families' socioeconomic status. The Garden to Cafeteria certification helps resolve this problem and decrease that percentage by showing students how to produce their own healthy food. Most students in the state may have never seen food production this way nor been encouraged to eat the healthy foods that can be grown in schools throughout Arizona. Getting students excited about growing their own food and providing them the tools to do it confidently will encourage them to take that knowledge back to their families. The ripple effects of students eating healthier may be able to decrease the diabetes epidemic and influence other diet-related chronic health problems.

Access to school gardens creates opportunities for lessons in food security, biodiversity, local heritage, and agriculture. Furthermore, it presents experiential learning opportunities that facilitate personal, and educational growth. Activities in the garden can cover all subject matter required by the Department of Education. My experience in working with Manzo has shown me math lessons that asks students to count worms, compare and contrast leaf structure among a variety of plants, and even landscape architecture lessons that challenge students to plan their own garden plot. I have seen science lessons that answer a specific question about the garden that is testable, immediately observable and encourages students to think outside the box. I personally have written lessons on the tortoise habitat and pollinator garden, observational games that allow younger students to expand their vocabulary in describing objects in the garden, and so much more. The opportunities the garden presents are endless as long as interns have the courage and willingness to explore their ideas and understand the potential that Manzo has to offer.

TUSD and Manzo Elementary

Tucson Unified School District has been instrumental in supporting efforts at Manzo Elementary and others in the district that share the same passion for school gardens. TUSD has taken its own sustainable initiative by installing solar panel arrays throughout the district in order to reduce the carbon footprint of schools and to effectively save money. More information on this particular project and the recognition the district has gotten for it is further discussed in the Summary of Sustainable Features on page 7. The resources available to teachers throughout the district have made the school gardens successful and effective in teaching students the many lessons available. Manzo Elementary was the first school garden in Pima County to achieve certification for Garden to Cafeteria events. The process Manzo went through to achieve this certification laid the groundwork for the schools that wish to follow in their footsteps.

The garden at Manzo was originally started as a school-counseling tool by then counselor, Moses Thompson, who joined Manzo in 2006. Thompson chose to use the school garden as a way to help students manage anger, problem solve, and to teach them cooperation. This tool helped the school garden develop into the huge success it is today and Thompson has moved to being the school garden coordinator for TUSD and The University of Arizona.

Current operations at Manzo are extremely successful and can be used as a leading example for other schools that wish to have a similar set up. Manzo teaches their students to explore the world in front of them and to think beyond what they can imagine. Students have access to a greenhouse, aquaponics system, chickens, composting, water harvesting, native pollinators and plants, a tortoise, and food production they can complete themselves with guidance. Students at Manzo are challenged to think critically, explore their culture and local environment, and to value the natural world around them. New families that wish to join the Manzo family will most often get a tour from a fellow student that is an expert in all that Manzo has to offer.

The garden at Manzo was the first one in Pima County to be certified for Garden to Cafeteria events in which the food harvested from the garden, when handled safely and appropriately to Arizona health code standards, may be used in the cafeteria. Another important event to Manzo is the Manzo Market that happens a couple times a month. At this event fifth graders learn cash exchange and run the cash register to sell garden goods to community members and families of students. Sean O'Connor, an author for National Geographic, wrote a wonderful article about Manzo and its development. If interns would like to know even more about how this garden development, follow this link to the article written in 2012 titled *Cultivating Life in the Sonoran Desert*: http://education.nationalgeographic.org/news/cultivating-life-sonoran-desert/

Site Description

Starting in the top left corner with the blue box, this is the location of the native plant garden. In this garden students complete the Native Notebook where stations are set up at a specific plant that they will continuously monitor throughout the school year. In doing this activity, students will learn and observe first hand how plants change over time. They will also work with a program called iNaturalist, which allows students to take pictures of plant species they can't identify, post it to a forum, and receive responses from people all over the world with information about that specific plant.

Next, the yellow box is the solar panel installation that TUSD added to the site.

The green block is where you can find the smaller garden plots used by Kindergarten and PACE students to learn on a smaller scale that they can understand and apply easier. This area is great for introducing simple concepts while still allowing students to be a part of an outdoor classroom.

The purple is the main garden courtyard. Here you will find the aquaponics system housed in the greenhouse, the chicken coop, the largest food production area on campus, the kiva sitting area, all the garden tools, a washing area, a few cisterns and several native plants.

The first courtyard, highlighted in orange houses the tortoise habitat and native pollinator garden, the worm bin, and the chicken tractor.

Finally, in the front of the school, shown above in red, displays cisterns and native landscaping. Signage around this area pays tribute to several local organizations that helped make the garden possible.

Daily Operations

Farm chores are central to the functionality of the school garden. Mr. Oswald's third grade class is primarily responsible to complete these responsibilities. Mr. Oswald has a very specific system that lists all the jobs required that correlate with a given number. Each number is then matched with a student and it rotates each Monday to provide new learning experiences for all students. The information below details the duties students are expected to complete each day.

Compost: complete the temperature log, add carbon or water as needed, aerate the compost by turning it, take bins and buckets to the cafeteria for lunch composting, record the start and end times to calculate the elapsed time it takes to do the job

Aquaponics: feed the fish, water seedling trays, log the data from the weather station, (separate job from aquaponics) and water the pots inside the green house

Vegetable garden: water plants, pull out weeds, plant or harvest as needed

Chicken coop: check food and water, clean (collect food scraps), take chickens to and from the chicken tractor

Other: sweeping, watering pots outside the greenhouse

Other duties outside of farm chores primarily involve the cafeteria composting. It starts each day at 11:45 and ends around 1:00pm. An intern is posted at the station set up for composting to help guide students on separating their food scraps appropriately. Older students will generally volunteer to help but interns should **only allow a maximum of two student helpers.** The bins students will separate their leftovers are *compostable food, chicken scraps, trash, and recycling*. Once lunch is completed, fifth graders will take all the bins and buckets to their respective locations to be disposed of properly. Compostable and chicken food gets **weighed and recorded to the daily food waste log.** Contents of the compost bucket will go to a pre-designated pile to begin the process of breaking down. Once all buckets have been emptied appropriately, they are to be rinsed and placed where they belong.

Summary of Sustainable Features

Manzo has several sustainable features throughout the site that have attributed to this school being named the Best Green School of 2012 by the U. S. Green Building Council's Center for Green Schools. TUSD specifically has encouraged schools to focus on sustainability initiatives and have launched solar panel installations at most schools throughout the district. Manzo Elementary was one of those schools. Other sustainable features on the site include water harvesting cisterns, a greenhouse and aquaponics system, and the use of heirloom varieties that pays tribute to the local historical culture.

Solar Panels

In summary, the TUSD Solar Project was initiated by the district in efforts to reduce the carbon footprint and save money. With more than 200 days of sunshine in Tucson over 40 schools in the district will have solar panels installed soon. Due to the size of this project and efforts of TUSD, the Environmental Protection Agency recognized the district for their efforts in sustainability and green power leadership. This 18-month project will save $170,000 in the first year and is projected to save more than $11 million in its entirety. It was decided by the district that over 38,000 panels would be placed over playgrounds to provide more shade for students during their time outdoors. Manzo is a prime example of this design technique as the panels are placed in the rear grassy area near the playground. The information provided in the image below is explicit to the panel operation of Manzo Elementary. The information summarized here and the graph below was found on the TUSD website page for the solar project that can be found at:

http://www.tusd1.org/contents/distinfo/solar/index.asp

System Size:	252 kW
System Type:	Shade Structures
Est. 1st Year Output:	437,664 kWh
Est. kWh Offset:	81%
No. of Solar Panels:	840 (300 W-DC)

Cisterns

In the simplest of terms a cistern is a tank that holds harvested water. Typically it is considered an active water harvesting technique because it collects and stores water for later use. There are many different kinds of cisterns that are made of different materials and can come in many different sizes. The size and material of a cistern has to do with the amount of rainfall and roof runoff of the site, intended use of the collected water, and several other factors. Manzo Elementary has a total of 17 cisterns that provide a majority of the water used to irrigate the gardens. There is a capacity of about 17,000 gallons of water that can be collected and used on this site. The first group of cisterns was installed under a grant provided by the Department of Fish and Game as a condition to provide a native pollinator garden such as the one found in the tortoise habitat in the front courtyard. As an intern, your

involvement with the cisterns may be to clean out the gutters that lead into the cistern to decrease the effect plant waste may have on water collection. If you are interested in exploring more information about water harvesting techniques, local Tucson resident, Brad Lancaster wrote an excellent book that is used as the primary text for the UA Water Harvesting course. To find a copy of this book its citation is below:

ISBN: 978-0977246434

Lancaster, Brad. *Rainwater Harvesting for Drylands and Beyond, Volume 1, 2nd Edition: Guiding Principles to Welcome Rain into Your Life and Landscape*. Tucson: Rainsource, 2013. Print.

Greenhouse

The greenhouse in the main garden courtyard was initially built to house the aquaponics system. As educational opportunities for students continued to expand, more and more technology was added to the greenhouse to further encourage student exploration of sustainable curriculum. Added educational opportunities include a weather station, misting benches for heirloom fruit tree propagation projects (through Mission Gardens and the Tucson Audubon Society), vegetable starts and seedling trays, water quality testing materials, as well as the Mini-LEO project with Biosphere 2. Tilapia is raised in the aquaponics system and is occasionally harvested for the Manzo Market. Other uses for the tilapia are to teach students about food growth, water quality testing, and fishery sciences. The most important thing to remember about the aquaponics system is that it is **not** part of the Garden to Cafeteria Program. There is currently no established set of standards to ensure safe handling for consumption by students like the garden foods already have.

Heirloom Varieties

An heirloom plant variety is an old cultivar that is maintained by gardeners and farmers. These varieties will typically have a different taste or color than the varieties we know today since they most often contain the genetics from long ago that have not been altered by the plant processes we use today. Manzo tries to use heirloom varieties that are locally adapted as much as possible to instill the value of local food production to students. The cultural connection to using these kinds of varieties is extremely important to help students connect to not only their heritage but to their local community as well.

Role of an Intern

The role of an intern is one of the most important things to be clear of as you consider this internship. There is no other internship anywhere in Tucson that is exactly like the experience you will get here at Manzo so please read the descriptions below to fully understand how your position as an intern is molded depending on your audience.

To the garden director, an intern is responsible to help with daily chores and activities that take place in the garden. Any ecology-related activities that an intern may provide support in is integral to know and be comfortable with. Interns are also expected to provide classroom support for teachers and students as it relates to ecology projects, general classroom support and student management, teaching lessons and finally, supporting specific events like Manzo Market and Garden to Cafeteria events. The resources in the end of this manual are important to understand and be well rehearsed with when it comes to helping with events and classroom management.

To the teacher, an intern is necessary to help with classroom management and act as an outside resource for unique information. Interns are not required to have background in ecology, plant science, agriculture or education. Successful interns have a passion and drive to actively research any necessary information to help clarify and develop lesson plans as they relate to garden activities. One of the most important characteristics of you being an intern is the representation the University of Arizona or the local Tucson community. Young students at this school see the U of A as their future and interns provide that real life proof that college is a possibility. Always remember to represent the U of A in a positive way.

To the student, interns are a positive role model that represents the University and the local community. Interns are a secondary authority figure in the classroom that provide structure but also a friendly adult that is there to help. Students will naturally associate interns with the school garden. Younger students especially see the garden as a privilege and will constantly be excited any time they see an intern they are familiar with. The garden is something that the older students typically have more involvement in so interns are the connection to the garden the younger students get excited about.

Intern Orientation

Interns at Manzo Elementary are required to complete an Intern Orientation. This event is intended for interns to be introduced to teachers they are most likely to work with and to pair interns with teachers that match interests and yearly goals. This orientation is mandatory and will occur in the beginning of the semester once students are placed at their respective sites. The primary goal of this orientation is familiarizing interns with Manzo and its operations and also to establish relationships with the staff. No materials are necessary to bring to this orientation but there are some things to keep in mind and have decided before attending, those are as follows:

- Have a consistent schedule pre-decided and follow it
    - Consistency is key to a successful internship here
    - Make sure interns can commit to established schedule each and every week
- Decide what form of communication works best for interns to be paired with a teacher with the same requirement
    - Personal email exchange is the most common
- Be confident and comfortable with open communication
    - Don't be afraid to communicate with interns designated teacher and garden manager anything that may come up that could effect internship performance and consistency
- Teachers are wiling to work with interns; they understand that interns are a college student first. Be open and honest with the partnered teacher to ensure success for the internship as well as the students interns work with.
- All interns schedule should be clearly discussed with the garden manager, as they are the primary resource for guidance and instruction. Maintaining open communication and a consistent schedule will be expected of all interns.

Basic Intern Duties

There isn't one particular job each intern will have sole responsibility for. All interns will be expected to be flexible and be trusted to place in any job or situation, as it is needed. First and foremost interns must be familiar and comfortable with the daily farm chores that make the garden operate successfully. These chores are detailed on Page 6 of this manual and interns will be trained on these as well. Curriculum development is of great importance to the continual success of the garden program at Manzo. Interns may be asked to assist in developing curriculum for the garden manager or a teacher. Any additional questions about daily chores or curriculum development should be directed to the garden manager.

On occasion, events for Manzo Market and Garden to Cafeteria (GTC) harvesting will occur. As an intern, expected involvement with Manzo Market is to assist with harvesting as needed, oversee the market to assure appropriate exchange is taking place between students and community members. Garden to Cafeteria events are much more closely monitored as there are specific regulations in place that must be followed according to health code. The resources under *Resources: Important Paperwork on page 18*, are necessary to be familiar with for every single GTC event. These guidelines are in place to ensure the health safety of anyone who comes into contact with the food produced in the school garden and are expected of all interns to be followed in its entirety.

If interns are not in the UA Community and School Garden program through the School of Geography, there will be times that students will be at Manzo that interns have never worked with. These students are referred to as Green Academy Interns, which is a branch of the school garden course. The interns of this particular program are placed at gardens throughout the Tucson community and act as leaders in their respective site. These students may come to Manzo to receive special training on the operations set up at Manzo.

University of Arizona and Community Involvement

The local Tucson community and The University of Arizona have had incredible involvement in the success of Manzo's garden. The U of A currently has several classes that offer internships with Manzo including, but not limited to, the UA Community and School Garden Program, SPAN 480 which is an introduction to diverse community issues, and a course through the border studies program that offers students on exchange from other universities to experience the Tucson community.

Aside from University involvement, Manzo will also occasionally see students from local high schools help out, as well as AmeriCorps and AmeriCorps VISTA members on site. These service members are typically Coverdell Fellows completing a graduate program through the University of Arizona.

Involvement and support from local community organizations have brought projects like fruit tree propagation and the mini-LEO to Manzo students. The list below states some of the other community partners.

- The University of Arizona, School of Geography and Development
- The University of Arizona, School of Social and Behavioral Sciences
- Arizona-Sonora Desert Museum
- Biosphere 2
- Community Food Bank (provides intern trainings)
- Tucson Village Farm (provides intern trainings)
- Mission Gardens
- Tucson Audubon Society
- Earlham College
- Saguaro National Park
- Native Seed Search
- AmeriCorps

Classroom versus Garden

The biggest distinction between working in the classroom and working in the garden is obviously the environment in which interns are teaching. The classroom would typically require interns to work with the class as a whole, it is an enclosed space that is easy to control, and the student's behavior is expected to be a certain way. In the classroom the teacher is the primary authority and the students respect that as such.

The garden is a vastly different teaching environment. Interns may have small groups or the entire class with the help of the teacher. There may or may not be someone there to help interns manage the students behavior and safety. When teaching in the outdoor classroom, all interns must make clear their expectations before and during any outdoor activity. Understanding the teachers disciplinary and behavior control techniques while in the classroom will help manage students outside, as they will understand the same rules apply. Safety is the number one priority in the outside classroom as there are more dangers present. Cacti and distractions will prove to be a challenge but if interns make their lessons short, fun, and interesting, students will have little to no problem keeping up.

In the classroom it is also easier to stick to a pre-determined lesson plan. The materials, resources and assistance are readily available if the lesson is pre-planned. Being in the outdoor classroom makes this a little more difficult. Materials necessary will have to be thought of and packed accordingly to make sure students are ready to complete their task and return to the classroom to allow another group out. Planning, the ability to think quickly and be creative will definitely help at this time.

Tips From Past Interns

"I wish I had an idea of a more concrete role that I would be playing at the school where I worked, JB Wright-for the students, the teachers, and the school. Examples of lessons that were successful at my site would have additionally been helpful, differing resources available, times available, etc. Talking to the teachers from the beginning about what they value and want their students working on in the garden would have also been a huge help to start off with"

Diana Englert, Senior
Sustainable Built Environments: Landscape Architecture

Houston Harris participated in the UA Community and School Garden Program by interning with Ruskruge Middle School. Although she did not directly intern with Manzo, her experience in school gardens is relative to the same kind of problems that come up for interns at Manzo. *Houston advises interns to "really make sure that you build the relationship with your teacher if there is a specific one you work with the most. Maintaining that constant line of communication and making a connection as early as possible will truly help interns be successful. Houston also advises interns to be prepared to be flexible. Students or teachers may have a rough day before your arrival that could potentially affect your plan for that day. Be able to think of your feet and mold your plan to the needs of the student, as that is your first priority. Houston finally advises interns to get to know your students! They have a lot to offer and are very curious about the world."*

Houston Harris, Senior
Sustainable Built Environments: Landscape Architecture

Maggie Zamarripa completed her Manzo Internship through her Spanish 480 course that was intended to show students an introduction to diverse community issues. Along with the tips the other two past interns stated, *Maggie expressed that she would have liked to know where certain plants were on the site so they were easier to identify.* Her background is in heritage conservation so she didn't have much experience in plants or agriculture. Knowing where the plants were would have helped her answer the questions students had as well as be more familiar with the site or at least a plant list to know what to look for. To resolve this, there is a link in the *Resources: Helpful Websites* section on page 16 that leads to the Pima County Cooperative Extension Master Gardener website that provides a detailed introduction to plants. Further research on plants native to Tucson or southern Arizona will help interns identify plants easier.

Maggie Zamarripa, Senior
Sustainable Built Environments: Heritage Conservation

Resources: Helpful Websites

Manzo
Manzo Elementary Website: www.gomanzo.com
Facebook: www.facebook.com/ManzoEcology

TUSD
http://tusd1.org
Solar Project - http://www.tusd1.org/contents/distinfo/solar/index.asp

Community Partner Websites
The University of Arizona, School of Geography and Development
https://www.geography.arizona.edu
Community and School Garden Program – schoolgardens.arizona.edu
Presentation on TUSD and UA Partnership - http://www.tusd1.org/contents/govboard/packet09-09-14/9-9-14-BAI9-Presentation.pdf

The University of Arizona, School of Social and Behavioral Sciences
https://web.sbs.arizona.edu

Arizona-Sonora Desert Museum
https://www.desertmuseum.org

Biosphere 2
https://biosphere2.org
- Mini-Leo Project pictures can be found on the Manzo Facebook page under the photo album "B2 Mini- LEO project"

Community Food Bank (provides intern trainings)
https://www.communityfoodbank.org
Facebook: https://www.facebook.com/foodbankofsouthernarizona/

Tucson Village Farm (provides intern trainings)
https://tucsonvillagefarm.arizona.edu

Mission Gardens
http://www.tucsonsbirthplace.org

Tucson Audubon Society
http://www.tucsonaudubon.org

Earlham College
http://www.earlham.edu

Saguaro National Park
https://www.nps.gov/sagu/index.htm

Native Seed Search
http://www.nativeseeds.org

AmeriCorps
http://www.nationalservice.gov/programs/americorps

Other Helpful Websites

University of Arizona CALS Cooperative Extension
Pima County - https://extension.arizona.edu/pima
Food Safety Guidelines - http://cals.arizona.edu/agliteracy/sites/cals.arizona.edu.agliteracy/files/UA-School-Garden-Food-Safety-Guidelines.pdf
Arizona Master Gardener - https://cals.arizona.edu/pubs/garden/mg/

- The master gardener manual gives a thorough description of topics like entomology, plant pathology, plant damage, pesticides and so much more. If you do not have a background in agriculture or plants, this would be a great place to start!

Arizona Department of Education
http://www.azed.gov

- This website has state standards for curriculum in grade levels K-12 which will be very helpful in lesson planning.

http://www.azed.gov/health-nutrition/school-gardens/

- This link is the Department of Education website for School Gardens. Here you can find links to other helpful websites such as the Department of Health Services, you can find example lesson plans and the results of studies such as the one mentioned on Page 3 of this manual.

Pima County Food Alliance
http://www.pimafoodalliance.org

- This link has information on local non-profit organizations that help out with school gardens and their necessary resources. If you navigate on the website from resources > school gardens, you will find such information

Arizona Department of Agriculture
Specialty Crop Guide - https://agriculture.az.gov/2015-specialty-crop-guide

- This guide was created to inform the public on the importance and availability of agriculture and to discuss locally produced fruits, veggies, nuts, and nursery crops. This provides a solid introduction to Arizona crops as well as places or events in the community you can go to learn more first hand.

Resources: Important Paperwork

Daily Logs

- Compost Log
- Daily Chicken Feed Log
- Daily Egg Collection Log
- Daily Food Waste Log
- Weather Station Data

Planting Calendar

Garden to Cafeteria Rules – Arizona Department of Health Services

Green Academy Lesson Plan Outline

COMPOST BIN TEMPERATURE LOG

MON	**Date (m/d/yr)**	**Name**	Temp Bin 1	Temp Bin 2	Temp Bin 3	Temp Bin 4	Temp Bin 5	Temp Bin 6	Temp Bin 7	Temp Bin 8

1. Hottest bin temperature rounded to the nearest 10 = 2. Coolest bin temperature rounded to the nearest 5 = 3. Range= (hottest minus coldest)

TUES	**Date (m/d/yr)**	**Name**	Temp Bin 1	Temp Bin 2	Temp Bin 3	Temp Bin 4	Temp Bin 5	Temp Bin 6	Temp Bin 7	Temp Bin 8

1. Hottest bin temperature rounded to the nearest 10 = 2. Coolest bin temperature rounded to the nearest 5 = 3. Range= (hottest minus coldest)

WEDS	**Date (m/d/yr)**	**Name**	Temp Bin 1	Temp Bin 2	Temp Bin 3	Temp Bin 4	Temp Bin 5	Temp Bin 6	Temp Bin 7	Temp Bin 8

1. Hottest bin temperature rounded to the nearest 10 = 2. Coolest bin temperature rounded to the nearest 5 = 3. Range= (hottest minus coldest)

THURS	**Date (m/d/yr)**	**Name**	Temp Bin 1	Temp Bin 2	Temp Bin 3	Temp Bin 4	Temp Bin 5	Temp Bin 6	Temp Bin 7	Temp Bin 8

1. Hottest bin temperature rounded to the nearest 10 = 2. Coolest bin temperature rounded to the nearest 5 = 3. Range= (hottest minus coldest)

FRI	**Date (m/d/yr)**	**Name**	Temp Bin 1	Temp Bin 2	Temp Bin 3	Temp Bin 4	Temp Bin 5	Temp Bin 6	Temp Bin 7	Temp Bin 8
*										

1. Hottest bin temperature rounded to the nearest 10 = 2. Coolest bin temperature rounded to the nearest 5 = 3. Range= (hottest minus coldest)

***FRIDAY**

*Are there any *outliers*? Yes No If yes, please list outliers by bin and day:

*What was the average temperature of Bin 4-5 this week? (To find the average, add up all the daily temperatures for bin 4-5, then divide by the total number of days.)

DAILY CHICKEN FEED LOG

	Teacher	Names of Feeders	Qts. Feed Given (Qts. = quarts)
Mon Date&Time			
Tues Date&Time			
Weds Date&Time			
Thurs Date&Time			
Fri* Date&Time			
*Total Qts. of feed this week:			

DAILY EGG COLLECTION LOG

	Teacher	Names of Collectors	Total # of Eggs Today	Egg Color Tally (IIII)			
				White	Green	Brown	Light Brown
Mon Date&Time							
Tues Date&Time							
Weds Date&Time							
Thurs Date&Time							
Fri* Date&Time							
*FRIDAY: What was the ***average*** number of eggs laid per day? (To find the average, divide the Total by the number of days in a week.) _____			Total # of Eggs this Week	Week Total # White	Week Total # Green	Week Total # Brown	Week Total # Lt. Brn.

DAILY FOOD WASTE LOG

	Teacher	Names of Data Collectors	Pounds of Compost	Pounds of Chicken Scraps	Total Pounds of waste (compost + chicken scrap)
Mon Date&Time					
Tues Date&Time					
Weds Date&Time					
Thurs Date&Time					
Fri* Date&Time					
*Total pounds of food waste this week:					

WEATHER STATION DATA LOG

	Names of Data Collectors	Greenhouse Temp. (*F)		Degrees of Difference	Outside Temp. (*F)	Wind Speed (mph)	Wind Direct-ion (N,S, E, W)
		Mercury	W.S.		W.S.		
Monday Date Time							
Tuesday Date Time							
Weds Date Time							
Thursday Date Time							
Friday Date Time							

School Calendar Planting Guide

Tucson Region

August

From Seed
Green bean
Sunflowers
Chiltepin
Amaranth
60 Day Corn

From Starts
Pepper
Tomato
Cucumber
Summer squash
Eggplant

September

From Seed
Green onions
Lettuce
Cilantro
Garlic
Spinach
Turnips
Radishes
Swiss chard
Kale
Beets
Arugula

From Starts
Collards
Basil

October

From Seed
Sonoran white wheat
Lentils
Favas
Peas
Snow peas
Runner beans
Lettuce
Spinach
Cabbage
Potatoes

November

Winter Break

December

From Seed
Swiss chard
Radishes
Beets
Carrots
Collards
Lettuce
Spinach
Kale
Onions (sets)
Green onions (slips)

January

From Seed
Swiss chard
Radishes
Beets
Carrots
Green onions (slips)

February

From Starts
Onions (slips)
Summer squash
Peppers
Eggplant
Tomato
Tomatillo
Cucumber

March

From Seed
Radishes

April

Summer Break

May

Plant Seedling Starts Indoors

- Kale
- Chard
- Cabbage
- Chinese cabbage
- Collards
- Cucumber

- Kale
- Chard
- Cabbage
- Chinese cabbage
- Collards
- Cucumber
- Beets

- Tomatoes
- Peppers

- Zucchini
- Summer squash
- Cucumber

RECOMMENDED VARIETIES

Cabbage: Copenhagen, Chinese
Cucumber: Armenian, Dragon Egg
Eggplant: Japanese
Garlic: Silver Rose
Mellon: NS/S Tohono O'Odham Yellow-Meated
Onion: Southern Bell (Short Day varieties)
Squash: Patty Pan, Golden Glory, Spaghetti, NS/S Black Beauty, NS/S Yellow Crookneck, NS/S Gray
Tomato: Punta Banda, Yellow Pear
***NS/S = Native Seed Search**

Garden to Cafeteria Rules – Arizona Department of Health Services

The following summary is based off information found on the website for the Arizona Department of Health Services which can be viewed by following this URL: http://www.azdhs.gov/preparedness/epidemiology-disease-control/food-safety-environmental-services/index.php#school-garden-program-home
In short, all interns involved with the Garden to Cafeteria process must be familiar with and strictly follow the rules on this page.

In order for students to participate in the Garden to Cafeteria harvesting, the following rules must be completed:

- Students should have no open wounds or bandages on their hands
- Students should not be sick or show signs of illness, for example, no coughing, runny nose, high temperature, sneezing, etc.
- Students should wash their hands according to the following procedure:
    - *Wash your hands with warm water and soap for at least 20 seconds before*
    - *and after handling food*
- Once hands are washed, students must NOT touch their face, mouth, other students, or anything that could potentially contaminate food or cleanliness
- Place harvested food in baskets specifically for Garden to Cafeteria Events (garden manager will identify these baskets as necessary)
- Food will be washed in sinks that are NOT used for hand washing to limit contamination
- To ensure students health safety, interns should be cautious about student participation. Manzo wants all students to have access to this wonderful event but overall safety is the most important.
- Students unable to participate due to any of the above reasons shall be encouraged to have involvement in something else to be sure to include them.

The following procedures and information is taken directly from the website listed at the top of this page.

Produce Contact Surfaces
Gardeners should protect the produce from contaminated equipment by ensuring the following:

- Harvesting and garden maintenance equipment (shovels, rakes, pitch forks, spades, knives, scissors) are clean and sanitized
    - Washed with hot soapy potable water, rinsed with clean water, and then sanitized with a chlorine or quaternary ammonia solution. The solution must be tested with a test kit to ensure it is at the proper concentration per the manufacture specifications.
- Harvesting storage containers are made of food grade quality and/or new, unused plastic or paper grocery bags can be used for harvest and transport.

- Harvesting storage containers are cleaned and sanitized after each use
    - Washed with hot soapy potable water, rinsed with clean water, and then sanitized at the proper concentration with a chlorine or quaternary ammonia solution.

Other information that is important to the health and safety of Garden to Cafeteria events has to do with the water used. Since Manzo uses harvested rainwater for their gardens, it is important for interns to understand that the use of this water is monitored under the certification Manzo has to use their produced food in the cafeteria. Water testing is one form of management used to ensure safe water is used for any food that could be consumed through the cafeteria.

Soil composition and its amendments are another component of the school garden that is managed by the certification. During the process of initial certification and when it's renewed, soil must be tested by a third party entity to ensure non-bias and a reliable test. This also includes testing compost that is used in the garden as well. Regulations for compost may be explained during ones internship but the rules are still in the process of being amended to better suit the school.

Ecology Integration Lesson Plan

Lesson Title:

Teacher: Grade Level: Date:

Common Core Standard:	
Enduring Understandings/ Essential Questions:	
Content Objective: *Math Reading Writing Other:*	
Language Objective:	

Vocabulary	**Materials**

Seasonality				
Monsoon July-Sept.	*Autumn* Oct.-Nov.	*Winter* Dec- Feb.	*Spring* Mar.-Apr.	*Dry Summer* May-June
Guiding Questions:				

Ecology Integration Lesson Plan

Anticipatory Set:
This is a question you will pose to students to prepare them for the learning they are about to do.

Activity/Investigation:

Closure Question:
Similar to the anticipatory set, closure provides an opportunity for students to summarize their learning in their own words and make some sense of the activity they just completed.

Teacher Reflection:
What went well, what could be improved upon, what will you keep in mind for the next lesson, etc.