

## **WI Master Naturalist – Capstone Project Summary**

Erica Hill Pfeiffer

May 4, 2015

### **Expanded Garden Curriculum for Pleasant Ridge Waldorf School**

#### **INTRODUCTION & BACKGROUND**

As a horticulturist and educator, it is my passion and pleasure to explore an expanded garden curriculum (using both outdoor garden and indoor greenhouse space) for Pleasant Ridge Waldorf School (PRWS) as they acquire the Flower Basket business. My project involved meeting with PRWS administrators, teachers and their master gardener volunteer as well as writing a curriculum overview, sharing examples of detailed lesson plans and suggesting “next steps” in their process.

I met with four PRWS teachers, Anne-Marie and Heidi (class K), Christina (class 3), and Kate (subject: Spanish). Each teacher spoke to me about their current use of garden space and how they may like to use expanded gardens and greenhouse space with their students. They also spoke about how gardening fits into their classroom routines and rhythms. Kate explained how subject teachers collaborate with class teachers. I met with their long-term master gardener volunteer, Arwyn, who showed me around the existing gardens and the potential greenhouse space that will be acquired. These meetings gave me insight to Waldorf pedagogy and how a gardening curriculum aligns. My meetings with teachers and the master gardener contributed over 4 hours of communication for PRWS toward development of their gardening program.

Pleasant Ridge Waldorf School is on the brink of an exciting endeavor. They have the future potential to produce food, offer a unique natural science outdoor classroom space for their students and the community beyond. Gardens are enriching spaces for students of all ages, where there are truly unlimited possibilities for learning. They are a wonderful place to demonstrate and participate in meaningful work. These spaces can meet the needs and behaviors of a wide spectrum of students, as I have observed many times in my own personal experience as an educator and horticulturist.

Creating a custom garden curriculum that meets the needs of both students and teachers takes collaboration and time. There is not a “one size fits all” approach. Teachers need to feel supported and guided in their use of garden spaces. In my previous experiences developing unique farm curriculum for grades K-8, it took hours of meetings, revisions of lessons and trial through the seasons to form an amazing curriculum. Based on my experiences and the information that I have gathered from PRWS administrators, teachers and current gardeners, I have made suggestions and given examples of how they may want to move forward. My capstone project is really just the “tip of the iceberg” for Pleasant Ridge Waldorf School’s development of an expanded garden curriculum.

**Suggested next steps in developing an expanded garden curriculum:**

1. Articulate clear overarching goals for the school-wide garden curriculum.
2. Identify how Waldorf pedagogy guides each specific class/year’s use of the garden.
3. Continue discussions with teachers to understand how gardening fits into their particular class/year’s schedules. How are they using the gardens now? How would they like to use the gardens (& greenhouses) in the future?
4. Begin to develop specific lessons/activities that meet the needs of the students, teachers & align with the Waldorf culture.
5. Form a working document similar to the “Garden Curriculum Overview” or “Annual Farm Activity Plan” below, so that everyone involved (administrators, teachers, parents) has a clear understanding of the direction of the garden curriculum.
6. Practice, revise, do, do, do!

**EXAMPLE GARDEN CURRICULUM OVERVIEW:**

*\*The table below is incomplete and needs more time and collaboration to solidify. All print in green indicates the current activities under PRWS’s existing garden curriculum. The overarching goals are my suggestions based on my knowledge of the project.*

<b>Pleasant Ridge Waldorf School Garden Curriculum Overview</b>		
<b>Overarching Goals of PRWS Garden Curriculum:</b>		
<ol style="list-style-type: none"> <li>1. Experience and observe the natural world in the garden setting.</li> <li>2. Participate in meaningful work.</li> <li>3. Grow food for PRWS.</li> </ol>		
<b>Class/Year</b>	<b>Activities/Blocks</b>	<b>Waldorf Pedagogy</b>
K	Visit the school garden & greenhouse occasionally as a “field trip”. Possibly plant and harvest pumpkins.	Early childhood learning through imitation. Routine & rhythm very important. Garden stories and verses.
1	Collect and clean seeds Plant potatoes	
2	Dig potatoes Plant cabbage	
3	Daily garden chores Plant and weed garlic	“Living on the Earth” studies
4	Harvest cabbage and make sauerkraut Plant 3 sisters (corn, beans, squash)	Man & animal
5	Harvest 3 sisters Start seeds in greenhouse	Botany studies
6	Cut and dry herbs Harvest and store garlic Start seeds in greenhouse	
7	Plant sale economics Start seeds for May Day plant sale	
8	Harvest fall greens	

Subjects	Spanish: Garden vocabulary & songs	
----------	------------------------------------	--

## SUGGESTED GARDEN & GREENHOUSE ACTIVITIES

To grow, care for, harvest and process for food:

- dry beans
- grains (wheat, oats, barley)
- hard shelled squash
- root crops (carrots, beets)
- garlic
- early greens in hoophouse (bok choy, spinach)
- microgreens in greenhouse
- herbs
- asparagus
- raspberries

To grow and use for handcrafts:

- broom corn
- pumpkins and gourds
- herbs

*\*all of the crops in the above lists are suitable for PRWS's garden & expanded greenhouse space, and align well with the school year calendar.*

Units or Blocks (involving regular garden visits) could be developed around:

- soil science
- composting
- animal care (worms, bees, chickens)
- ecosystems (companion planting, symbiotic relationships)
- plant sale economics
- botany
- horticulture (landscape plants, floral industry, plant propagation)
- food storage (building a root cellar, drying, canning, fermenting food)
- social studies (farming practices through history)
- permaculture, biodynamic & other sustainable garden practices

Ideally each PRWS class/year would have an annual garden curriculum plan that compliments and reinforces what students are learning with their teachers. Annual garden plans could then be detailed into individual lessons. Included below are several examples of annual garden plans for specific grade levels (examples shown are for K and 7) and samples of the detailed farm lessons that go with them. I created the following plans and lessons while working for Prairie Crossing Learning Farm in collaboration with classroom teachers at Prairie Crossing Charter School in Grayslake, Illinois. These plans are unique to the teachers, students and land of Prairie Crossing Learning Farm and were formed through much collaboration and trial and error. Pleasant Ridge Waldorf School has great potential for expanding their own unique garden curriculum reflective of the students, teachers, land and space available.

## EXAMPLES OF ANNUAL FARM ACTIVITY PLANS:

<b>Grade K</b>			
	<b>Farm Lesson Name</b>	<b>Classroom Connections</b>	<b>Additional Activities</b>
<b>Aug</b>	Farm Mapping	Basic map skills, social studies	
<b>Sep</b>	Introduction to Chickens	Understanding where food comes from sequencing, counting basic animal needs	
<b>Oct</b>	Hen House Helpers		Move worms to winter home
<b>Nov</b>	Chicken Reflection		<b>Farm to Table</b> , Wheat activity with 5/6
<b>Dec</b>		Little Red Hen performance	
<b>Jan</b>			
<b>Feb</b>	How a Seed Grows	Plant science, Lifecycles	
<b>Mar</b>	Seed Sowing - Bok Choy Transplanting – Bok Choy		Chick visit
<b>Apr</b>	Harvest – Bok Choy Earth Week Plant Sale Prep	Service Learning	<b>Farm to Table</b> , Move worms to summer home
<b>May</b>			Second bok choy harvest
<b>Jun</b>			Butterfly release at farm (led by PCCS teachers)

<b>Grade 7</b>			
	<b>Farm Lesson Name</b>	<b>Classroom Connections</b>	<b>Additional Activities</b>
<b>Aug</b>	Grain Harvest	Middle Ages Culture & Communal Work	
<b>Sep</b>	Legume Harvest		
<b>Oct</b>	Grain & Legume Process Gleaning	Science – Nitrogen Cycle, Crop Rotation	Gleaning Cook-Off (in classroom)
<b>Nov</b>	Build Compost Piles Turn & Monitor Compost Piles	Science – Nitrogen Cycle, Transfer of Matter	Monitoring compost piles Chicken observations
<b>Dec</b>			
<b>Jan</b>			
<b>Feb</b>	Farm to Table	Middle Ages Culture & Communal Work Science – Nitrogen Cycle, Crop Rotation	
<b>Mar</b>	Farm to Table Crop Planning (in classroom)		
<b>Apr</b>	Service Learning – Plant Sale Prep 1	Service Learning	
<b>May</b>	Grain Planting	Middle Ages Culture & Communal Work Science – Nitrogen Cycle, Crop Rotation	
<b>Jun</b>	Bean Planting & Weeding		

## EXAMPLES OF “FARM LESSONS” FROM THE ANNUAL PLANS (above):

---

Kindergarten

### **Bok Choy Harvest**

April

1 hour, in hoophouse

#### Overall Themes

- Plant growth
- Lifecycles

#### Objectives

- Students understand that food comes from plants
- Students feel proud of what they’ve accomplished

#### Supplies

10 pairs kid-sized scissors

Salad spinner

3 Buckets of water

Plastic bags

#### Welcome (10 minutes)

- Meet in hoophouse
- Gather in a circle around the plant beds
- Make observations
- Today we will be harvesting the bok choy plants (that you planted!) to use in the Farm to Table lunch. What does harvesting mean? Any ideas about how we could do this?
- Question of the day: What was your favorite part of growing bok choy and why?

*Divide class into three groups: harvesters, washer/dryers, and plant book*

#### Harvesting, washing, and bagging (25 minutes)

Demonstrate:

1. How to hold scissors
2. Cut plant at base of stem (where stem and soil meet)
3. Cut three plants and carry to wash station
4. Washers dunk bok choy
5. Put into salad spinner
6. Bag dry bok choy

#### Complete “My Plant Book” page

#### Closing (10 minutes)

Question of the day: What was your favorite part of growing bok choy?

*Lesson Notes 2009:*

Planted the right amount of Bok Choy (2 rows in hoophouse) – perfect amount for two classes.

Harvest total 2009: 6lbs, 5oz

Possibly, move up planting schedule (by 1-2 weeks) to allow more time in GH and hoophouse.

Erica Hill Pfeiffer – WI Master Naturalist Capstone Project  
Expanded Garden Curriculum for Pleasant Ridge Waldorf School

---

Grade 7

## **Bean Processing**

October -1 hour at Farm

### **Overall Themes**

- People in the middle ages lived and worked communally (usually honoring a hierarchical system)
- Matter does not disappear, but just changes form

### **Bean Processing - Lesson Objectives**

- Students discuss the importance of beans and other legume crops to people of the middle ages and today
- Students continue to gain understanding of the concept and significance of crop rotation in middle ages farming methods and today
- Students work together to process and store their bean crop

### **Supplies**

Beans (previously harvested and dried)

Clean table cloths or sheets – 3

Bowls or containers for sorting beans into – may be 5-7 different bean varieties to sort!

Large Ziplock baggies – 5-7 or as many needed for different bean varieties

Permanent marker to label Ziplocks

Scale

Buckets for chaff/debris

Johnny's and Seed Saver's catalog to reference bean varieties

*Possible:* burlap or cloth bags for threshing

*Possible:* baskets for winnowing

### **Preparation – Farm Educator**

Keep eye on beans as they dry in greenhouse. When dry, put in garbage cans or other containers to protect from rodent damage. Remember to save ½ of the dry beans for each of two 7<sup>th</sup> grade classes. Decide how to group students to winnow and sort beans. Set up children's garden picnic tables with clean table cloths and bowls for sorting beans.

### **Key words:**

dry bean varieties – all of the beans that we plant, harvest and process are different varieties of the species *Phaseolus vulgaris*

chaff - the pods, stems, and leaf debris of the beans that we separate during threshing

thresh - to separate the beans by hand or some other mechanical means from the chaff

winnow - to free the beans from the lighter particles of chaff, dirt, etc., esp. by throwing it into the air and allowing the wind or a forced current of air to blow away impurities

### **Question of the day:**

What does it take to process and store dry beans? How is our process today similar or different than during the Middle Ages?

**Introduction:** (Children's Garden) 10 minutes

- Welcome; review the importance of beans/legumes
  - Store well for long periods of time
  - Nutrients: good protein source
  - Crop rotation, nitrogen fixation
  - How will 7<sup>th</sup> grade use these beans?

**Activity – Process Dry Beans** (Children’s Garden) 35-40 minutes

1. Thresh
  - a. Use hands to break open pods and pull out beans.
2. Winnow (clean away chaff and debris)
  - a. Use hands to separate away chaff.
  - b. Place chaff in compost buckets.
3. Sort
  - a. Remove any bad beans. Beans are bad if:
    - i. They are not dry (can sink your fingernail into)
    - ii. If there is any mold growing on beans
    - iii. If they are shriveled or misshapen
    - iv. If they are split
    - v. If they have strange discoloration
  - b. Bad beans can go in compost bucket – all bad beans and chaff can go in “brown” compost pile in compost alley
  - c. Sort good beans by variety into different bowls
4. Weigh
  - a. Place sorted beans by variety into ziplock bags
  - b. Use scale to weigh each kind of bean variety in ziplock
  - c. Label ziplock with weight, class name and date
5. Freeze
  - a. Place all ziplock bagged beans into the freezer (between tool storage room and egg sales room) to kill any pests or bacteria

**Hand Washing** 5 minutes

**Closing:** (Children’s Garden) 5 minutes

- Discuss question of the day:
  - What does it take to process and store dry beans? How is our process today similar or different than during the Middle Ages?

Grade 7

**Building and Monitoring Compost Piles**

November & December

Part 1: 1 hour, 15 min at Learning Farm, Part 2: 45 min - 1 hour at Learning Farm

**Overall Themes**

- People in the middle ages lived and worked communally
- Matter does not disappear, but just changes form

**Lesson Objectives**

- Students use their knowledge about composting to build and manage a pile for best decomposition results
- Students understand that matter in a compost pile changes form over time (observing and recording that the size and make up of the pile changes form)

- Students understand that making compost by hand has been done for many centuries and is a basic practice of a sustainable farm system
- Students understand the whole cycle of composting as a system that uses plant and animal matter from the farm to create nutrient rich compost to feed the soil and plants on the farm which become food for people and animals and material for making compost.

### **Supplies**

Wheelbarrows (3) for greens, browns and manure  
 Pitchforks (6)  
 Shovels (6)  
 Pruners (1-2) to cut up large pieces of organic material if needed  
 Hose with spray nozzle (1)  
 Branches or scrap wood for building base  
 Yard stick for measuring pile (1)  
 Thermometer (1)  
 Blank sign  
 Outdoor paint marker  
 Compost Data Sheets (1 per class)

### **Preparation – Farm Educator**

Make sure that there are adequate amounts of materials in all compost ingredient piles (manure, greens, browns) in Compost Alley. There should be space in Compost Alley clear and ready to build new compost piles. Signs can be spray painted over ahead of time so that they are ready to repaint as “7<sup>th</sup> grade compost” signs.

### **Background Info**

In the United States each person produces approximately 3.5 pounds of trash a day, of which 25% is food and yard waste that is biodegradable. When this waste is put in a landfill, it can take years to decades to decompose. When it is composted, it will decompose in as little as a few weeks to a few months. Once this material is turned into soil, it can be used as fertilizer in gardens or left on the ground to fertilize the local flora and fauna. If this trash is put in a landfill, those valuable nutrients will not return to the ground to be used by plants

Compost piles need a balance of carbon materials, nitrogen materials, exposure to air, moisture, decomposer organisms and heat. Carbon in fallen leaves or woodier wastes serves as an energy source. Nitrogen in the green materials provides microbes with the raw element of proteins to build their bodies. The more surface area the microorganisms have to work on, the faster the materials will decompose. Temperature plays an important role in the composting process. Decomposition occurs most rapidly between 110° to 160°F. Within two weeks, a properly made compost pile will reach these temperatures and will appear to settle over time. These are good signs that the pile is working properly.

### **Key Words**

Nitrogen - a colorless, odorless, tasteless gas that makes up about 4/5, or 80%, of the Earth’s atmosphere. It is used by plants and animals after being converted into a compound (combined with other elements such as oxygen). Plants and animals need nitrogen in order to make proteins for growth.

Carbon – an element found in molecules that make up living organisms, and is an important part of soil humus.

Composting - the managed accelerated decomposition of plant-based matter.

Decomposition - the breaking down of once living matter into soil, air, and water.

Microorganisms – living creatures so small that magnification is necessary to view them, including bacteria, fungi, & protozoa.

## Question of the Day

What does it take to make “Black Gold”?

### Introduction (Children’s Garden) 15 minutes

- Welcome students & begin discussion of introduction questions:
  - Do you consider yourself a conscientious recycler?
  - What do you do with your veggie scraps?
  - What is composting exactly?
- Explain/review basics of composting – necessary components of a compost pile, what a working pile will look like.
- Explain that composting is a “system”, which they will be part of & a very important part of sustainable farming.
- Introduce question of the day: **What does it take to make “Black Gold”**

### Part 1 Activity – Build Compost Pile & Record Data (Compost Alley) 45 minutes

- Assign & explain student jobs:
  - “Director” (1) – ensure that the pile is keeping its shape and size
  - “Clippers” (1-2) – clip any organic material that is too large
  - “Browns” (3-4) – layer brown materials
  - “Greens” (3-4) – layer green materials
  - “Manure” (3-4) – layer manure
  - “Rain Maker” (1) – water in layers
  - “Sign Designers” (2) – make sign for pile
- Have students build pile:
  1. lay down an approximate 4’x 4’ foundation of branches to build pile on
  2. build the pile by layering brown, green & manure (each layer should be approximately 4”-6” thick) making sure to spray each layer after it is added, until just moist
  3. continue to add and moisten layers until the pile is at least 3’ in height
  4. pay special attention to the shape of the pile – a cube shaped pile has more surface area (for moisture, air, etc.) than a mound shaped pile – make sure that the pile is growing upward, in a cube shape
  5. take temperature of pile upon completion.
- Students record data on LF Compost Data Sheet

### Closing (Children’s Garden) 10 minutes

- Review data collected
- Discuss question of the day: What does it take to make “Black Gold”? (emphasize communal work and important components & management of compost piles)
- Explain what they will do next time
- Thank students for their hard work

### Part 2 Activity – Turn Pile & Record Data (Compost Alley) 45min. – 1 hour

- Students measure and take the temperature of their original pile before turning.
- Students turn their compost pile by shifting all material over (next to their original pile). The ingredients on the top of the existing pile will now become the bottom of the new pile. This allows for all parts of the pile to receive air and for the decomposition process to continue.
- Students record observations about their new pile.