

**Activity 5.01.01**

**North Carolina Crop Webquest**

**Ag Stat Book** – Crop Statistics: <http://www.ncagr.gov/stats/2013AgStat/index.htm>

1. What crop has the earliest (closest to January) usual planting date? \_\_\_\_\_
2. What crop has the latest (closest to December) usual harvesting time? \_\_\_\_\_
3. What is the percentage of Upland Cotton Biotechnology Planted in 2010 for the following?
  - a. Insect Resistant (BT) - \_\_\_\_\_ (NC) \_\_\_\_\_ (US)
  - b. Herbicide Resistant - \_\_\_\_\_ (NC) \_\_\_\_\_ (US)
  - c. What is a stacked gene? Can use outside resources \_\_\_\_\_  
\_\_\_\_\_
  - d. How is this related to the recent decrease in Insect and Herbicide Resistant Cotton?  
\_\_\_\_\_
4. In 2012 what was true of the following Floriculture Crop statistics:
  - a. Remember flats are the trays of small plants grown to be transplanted elsewhere.
  - b. Top 2 Flats for quantity : \_\_\_\_\_ & \_\_\_\_\_
  - c. Total Wholesale Value of Bedding Plants \$ \_\_\_\_\_
  - d. Total Wholesale Value of Potted Flowering/Indoor \$ \_\_\_\_\_
  - e. Total Wholesale Value of Herbaceous Perennial \$ \_\_\_\_\_
5. What County had the highest production of Sweet Potatoes in 2012? \_\_\_\_\_
6. What county do you live in? \_\_\_\_\_ How many acres of sweet potato were planted there in 2012? \_\_\_\_\_
7. List the top 2 counties for each horticultural commodity:
 

a. Apple	_____ & _____
b. Blueberry	_____ & _____
c. Tomato	_____ & _____
d. Wheat	_____ & _____
e. Soybeans	_____ & _____
f. Peanuts	_____ & _____
g. Cotton	_____ & _____



NC Rankings in the US <http://www.ncagr.gov/stats/crops/Ranking.pdf>

1. Fill in the following Chart using the website provided:

NC Rank	Item	Amount Produced
1		
1		
1		
2		
2		
2		
2		
2		
2		
3		
3		
4		
4		
4		
4		

2. What percentage of Christmas trees produced in the US are produced in NC? \_\_\_\_\_
3. What state ranks #1 ahead of us in Christmas Tree Production? \_\_\_\_\_



Watermelon												
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**Your Turn – What is your favorite crop to eat? Use any websites previously used in the webquest to fill in the following information:**

1. My favorite crop to eat is \_\_\_\_\_.
2. When is this crop in season (harvest dates)? \_\_\_\_\_.
3. What are the top 3 counties in NC for production of this crop? \_\_\_\_\_
4. Where does NC rank in the production of this crop? \_\_\_\_\_
5. How often do you eat this crop in a day? \_\_\_\_\_
6. What are some items you would buy at the store that would contain your crop?  
\_\_\_\_\_

## Activity 5.02.01

### The Three Sisters Native American Legend

This legend serves as a great opportunity to integrate other cultures in your classroom and also to introduce the topic of intercropping.

After students read the following legend have them answer the following questions:

1. What did the three sisters look like?
2. What crop corresponds with each sister?
3. What role does each of the sisters play?
4. What do you think the benefit was to all three sisters being grown together?
5. Does this system resemble how we grow crops today? How so? How not?

*The Three Sisters Legend* - <http://blogs.cornell.edu/garden/get-activities/signature-projects/the-three-sisters-exploring-an-iroquois-garden/a-legend/>

*The following story, entitled "The Three Sisters," was recorded by Lois Thomas of Cornwall Island, Canada. It is one of a collection of legends compiled by students at Centennial College, Toronto, Canada. Out of respect to native culture, we ask that you share the legend in a spirit of respect.*

## A Legend

Once upon a time very long ago, there were three sisters who lived together in a field. These sisters were quite different from one another in their size and also in their way of dressing. One of the three was a little sister, so young that she could only crawl at first, and she was dressed in green. The second of the three wore a frock of bright yellow, and she had a way of running off by herself when the sun shone and the soft wind blew in her face. The third was the eldest sister, standing always very straight and tall above the other sisters and trying to guard them. She wore a pale green shawl, and she had long, yellow hair that tossed about her head in the breezes.

There was only one way in which the three sisters were alike. They loved one another very dearly, and they were never separated. They were sure that they would not be able to live apart.

After a while, a stranger came to the field of the three sisters, a little Indian boy. He was as straight as an arrow and as fearless as the eagle that circled the sky above his head. He knew the way of talking to the birds and the small brothers of the earth, the shrew, the chipmunk, and the young foxes. And the three sisters, the one who was just able to crawl, the one in the yellow frock, and the one with the flowing hair, were very much interested in the little Indian boy. They watched him fit his arrow in his bow, saw him carve a bowl with his stone knife, and wondered where he went at night.

Late in the summer of the first coming of the Indian boy to their field, one of the three sisters disappeared. This was the youngest sister in green, the sister who could only creep. She was scarcely able to stand alone in the field unless she had a stick to which she clung. Her sisters mourned for her until the fall, but she did not return.

Once more the Indian boy came to the field of the three sisters. He came to gather reeds at the edge of a stream nearby to make arrow shafts. The two sisters who were left watched him and gazed with wonder at the prints of his moccasins in the earth that marked his trail.

That night the second of the sisters left, the one who was dressed in yellow and who always wanted to run away. She left no mark of her going, but it may have been that she set her feet in the moccasin tracks of the little Indian boy.

Now there was but one of the sisters left. Tall and straight she stood in the field not once bowing her head with sorrow, but it seemed to her that she could not live there alone. The days grew shorter and the nights were colder. Her green shawl faded and grew thin and old. Her hair, once long and golden, was tangled by the wind. Day and night she sighed for her sisters to return to her, but they did not hear her. Her voice when she tried to call to them was low and plaintive like the wind.

But one day when it was the season of the harvest, the little Indian boy heard the crying of the third sister who had been left to mourn there in the field. He felt sorry for her, and he took her in his arms and carried her to the lodge of his father and mother. Oh what a surprise awaited here there! Her two lost sisters were there in the lodge of the little Indian boy, safe and very glad to see her. They had been curious about the Indian boy, and they had gone home with him to see how and where he lived. They had liked his warm cave so well that they had decided now that winter was coming on to stay with him. And they were doing all they could to be useful.

The little sister in green, now quite grown up, was helping to keep the dinner pot full. The sister in yellow sat on the shelf drying herself, for she planned to fill the dinner pot later. The third sister joined them, ready to grind meal for the Indian boy. And the three were never separated again.

### The Three Sisters

Every child of today knows these sisters and needs them just as much as the little Indian boy did. For the little sister in green is the bean. Her sister in yellow is the squash, and the elder sister with long flowing hair of yellow and the green shawl is the corn.

—A Mohawk legend

If your class is interested in planting the Three Sisters visit <http://blogs.cornell.edu/garden/get-activities/signature-projects/the-three-sisters-exploring-an-iroquois-garden/how-to-plant-the-three-sisters/>

## Activity 5.02.02

### Center of My Universe

In this activity students will take on the mindset of a No Till farmer. As discussed during the notes on this topic, No Till farmers go about crop production a different way and this requires special equipment. For this activity you will research tools or pieces of equipment used in No Till and choose which one you think is most essential to No Till. This is the “Center of Your Universe”. Think about what is most essential to a No Till farmer, what they need the most to do their job. Now, the assignment is to draw that object large and colorful on a paper provided by your teacher. On the back of your paper you should provide a four-sentence justification of why you picked that object AND five other tools/equipment that a No Till Farmer would use that you found while doing your research. The explanation is the most important part! Put your name on the back and look forward to your work being hung up around the class.

#### Rubric:

- Pick an appropriate center of your universe (10pts)
- Drawing of center of your universe takes up the whole page (2 pts), and is as accurate, creative, and colorful as you are able to make it (8pts)
- 5 essential tools of the trade, appropriate and relevant (2 pts each – 10pts)
- Total: 30 pts

### Activity 5.02.03

## Intercropping Plan

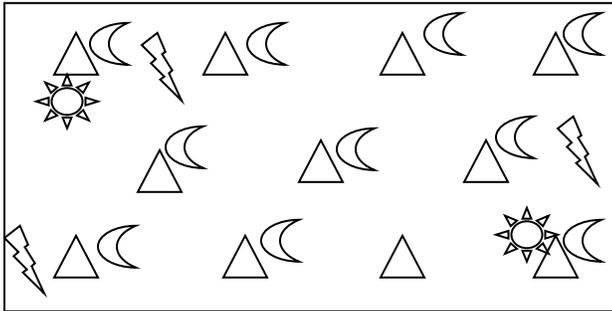
Make an intercropping plan for a 10'x10' small space in the backyard.

Remember to look over your notes on what considerations you need to have for intercropping (sunlight, water, and growth habit). Include at least three crops in your garden using whatever pattern of intercropping you would like. You should also include one non-crop plant in your garden to deter pests or trap pests. Some research will be needed.

To present your design and choices you will:

- Draw a top view that shows where plants/seeds are planted – pictured below
- Draw a side view that shows the growth habits and how those will fit together – pictured below
- Label your crops with a key
- Write a paragraph explaining how your different crops and non-crop plants will benefit the garden overall.

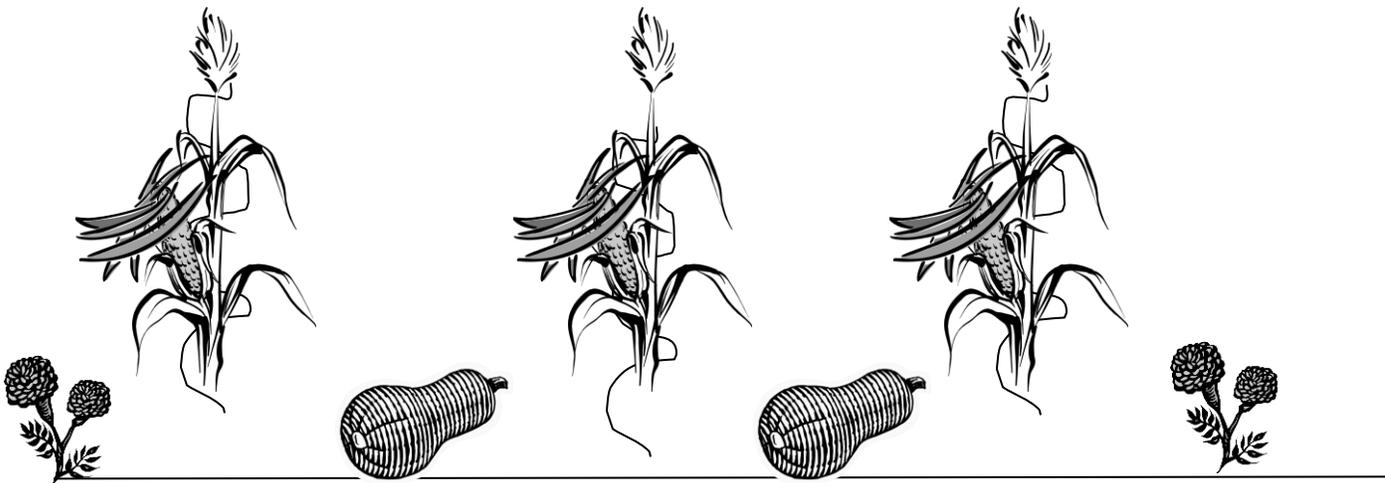
Top View



Key: Corn =   
Beans =   
Squash = 

Marigold =

Side View



## Activity 5.02.04

### Crop Taboo

#### Taboo Rules:

- Group students into groups of 3 or 4.
- Give each group a set of the cards below (Cut out)
- Students start by placing the deck of cards face down on their table and choosing a member to draw the first card. The player drawing the first card will try to get other group members to guess the word in the top box of the card without saying that word or any of the other words listed on cards
- The player who guesses correctly gets to keep that card as a record of the point they earned for guessing correctly.
- The person who guessed correctly then draws a card and repeats the process.
- The person with the most cards at the end of the game is the winner.
- Winners can be given pride and a sense of accomplishment, candy, or extra credit.
- \*Note: This is meant to get students to be more familiar with the vocabulary for the unit, rules against signing or acting things out are encouraged: be creative with their word choice.

<p style="text-align: center;"><b>Tobacco</b></p> <ul style="list-style-type: none"><li>• Leaf</li><li>• Number 1</li><li>• Smoke</li></ul>	<p style="text-align: center;"><b>Christmas Trees</b></p> <ul style="list-style-type: none"><li>• December</li><li>• Mountains</li><li>• Number 2</li></ul>	<p style="text-align: center;"><b>Soybeans</b></p> <ul style="list-style-type: none"><li>• Acres</li><li>• Highest Value</li><li>• Tofu</li></ul>
<p style="text-align: center;"><b>Sweet Potato</b></p> <ul style="list-style-type: none"><li>• Pie</li><li>• Root</li><li>• Number 1</li></ul>	<p style="text-align: center;"><b>Crop Rotation</b></p> <ul style="list-style-type: none"><li>• Move</li><li>• Alternate</li><li>• Change</li></ul>	<p style="text-align: center;"><b>Poaceae</b></p> <ul style="list-style-type: none"><li>• Grass</li><li>• Corn</li><li>• Wheat</li></ul>
<p style="text-align: center;"><b>Solanaceae</b></p> <ul style="list-style-type: none"><li>• Tomato</li><li>• Pepper</li><li>• Nightshade</li></ul>	<p style="text-align: center;"><b>Fabaceae</b></p> <ul style="list-style-type: none"><li>• Pea</li><li>• Legume</li><li>• Bean</li></ul>	<p style="text-align: center;"><b>Brassicaceae</b></p> <ul style="list-style-type: none"><li>• Mustard</li><li>• Cabbage</li><li>• Broccoli</li></ul>

<p style="text-align: center;"><b>Curcubitaceae</b></p> <ul style="list-style-type: none"> <li>• Cucumber</li> <li>• Melon</li> <li>• Squash</li> </ul>	<p style="text-align: center;"><b>Chenopodiace</b></p> <ul style="list-style-type: none"> <li>• Spinach</li> <li>• Beets</li> <li>• Goosefoot</li> </ul>	<p style="text-align: center;"><b>Convolvaceae</b></p> <ul style="list-style-type: none"> <li>• Sweet potatoes</li> <li>• Morning Glory</li> <li>• Thanksgiving</li> </ul>
<p style="text-align: center;"><b>Malvaceae</b></p> <ul style="list-style-type: none"> <li>• Mallow</li> <li>• Okra</li> <li>• Cotton</li> </ul>	<p style="text-align: center;"><b>Intercropping</b></p> <ul style="list-style-type: none"> <li>• Same</li> <li>• Space</li> <li>• Multiple</li> </ul>	<p style="text-align: center;"><b>Three Sisters</b></p> <ul style="list-style-type: none"> <li>• Squash</li> <li>• Corn</li> <li>• Indian</li> </ul>
<p style="text-align: center;"><b>Trap Crop</b></p> <ul style="list-style-type: none"> <li>• Draw</li> <li>• Pest</li> <li>• Attract</li> </ul>	<p style="text-align: center;"><b>No Till</b></p> <ul style="list-style-type: none"> <li>• Residue</li> <li>• Crop</li> <li>• Erosion</li> </ul>	<p style="text-align: center;"><b>Conservation Tillage</b></p> <ul style="list-style-type: none"> <li>• No Till</li> <li>• 30%</li> <li>• Covered</li> </ul>
<p style="text-align: center;"><b>Permaculture</b></p> <ul style="list-style-type: none"> <li>• Ecosystem</li> <li>• Natural</li> <li>• Organic</li> </ul>	<p style="text-align: center;"><b>High Tunnels</b></p> <ul style="list-style-type: none"> <li>• Heat</li> <li>• Stand</li> <li>• Sun</li> </ul>	<p style="text-align: center;"><b>Quonset</b></p> <ul style="list-style-type: none"> <li>• Hoop house</li> <li>• Round</li> <li>• Half Moon</li> </ul>
<p style="text-align: center;"><b>Gothic</b></p> <ul style="list-style-type: none"> <li>• Peak</li> <li>• Steep</li> <li>• High Tunnel</li> </ul>	<p style="text-align: center;"><b>Multi-bay</b></p> <ul style="list-style-type: none"> <li>• Large</li> <li>• Connected</li> <li>• Gutter</li> </ul>	<p style="text-align: center;"><b>Caterpillars</b></p> <ul style="list-style-type: none"> <li>• Low</li> <li>• Temporary</li> <li>• Protection</li> </ul>

## Activity 5.04.01

### Planning the Garden

Using the two publications provided, plan and design a vegetable garden for the space your teacher assigns. Remember, you need a minimum of six hours of sun for most vegetables. In addition, you must incorporate your irrigation into your design.

Create a year-long calendar (use google calendar or another computer application or a printed calendar) for your assigned garden space. Be sure to maximize your yield, pay particular attention to sizes of mature plants and include all details into your gardening calendar. Incorporate and highlight sustainable agricultural practices you have learned. Consider color coding your calendar. Calendar details and dates should include:

- Sowing or planting dates
- Days to harvest, harvest dates
- Garden maintenance dates
- Soil health/amendment dates
- Fertilizer dates
- Irrigation placement dates

Create a graphical representation for your garden space which will illustrate your design for the CURRENT season. Draw the garden (to scale) and also includes cultivars or varieties you choose to use in your garden and where they will be placed. Find a seed catalog on the internet or grab one from your teacher. Use these plants in your garden design and be sure to include their cultivar name and the information about their germination time, days to harvest, and spacing. Highlight any unique characteristics of this particular cultivar, as well. Your teacher may allow you to cut out the images or print the images of the cultivars you choose to place on your graphic.

Resources:

<http://www.wqseeds.com/documents/WQVegPlantGuide-revised.pdf>

<https://content.ces.ncsu.edu/central-north-carolina-planting-calendar-for-annual-vegetables-fruits-and-herbs>

## Activity 5.04.02

### Experiencing Crop Production

Follow the steps outlined in the curriculum to make a garden on site.

- a. Soil Preparation
  - i. Take a soil test
  - ii. Implement the results of the soil test to improve the garden's soil
- b. Planting
  - i. Depends on the crop being grown.
- c. Nutrient Management
  - i. Should consider soil test results
  - ii. Test compost or manure for nutrient content before application
  - iii. Determine how much fertilizer is needed. Add compost or purchase fertilizer. Apply.
- d. Pest Management
  - i. Integrated Pest Management
  - ii. Select appropriate pesticides
- e. Irrigation
  - i. Select appropriate irrigation system
  - ii. Install and use irrigation system
  - iii. Minimize water use
- f. Drainage
- g. Harvest
- h. Postharvest

#### Additional Ideas:

- Plant into a container to grow a crop. This works well with strawberries, lettuce, and tomatoes. Container growing tends to increase the amount of water required.
- Have students bring in a variety of items that would have otherwise been thrown away or recycled and have students make those into upcycled containers. Examples include pairs of pants, milk jugs, etc.
  - Tip: Make sure adequate drainage is required.
- Challenge your students to grow a prize winning pumpkin. There is a lot of information about this online. The first step would be researching. One extension reference from Ohio State can be found at <http://ohioline.osu.edu/hyg-fact/1000/1646.html>
  - Tip: This process would need to start around April indoors.
- Straw Bales as discussed in Straw Bale activity.

## Straw Bale Gardening

**Do you have nasty soil?**

**Do you live in a place where you just don't have enough space for a garden?**

**Do you have difficulty stopping or bending?**

**Then Straw Bale Gardening is the answer to growing your plants.**



This is the perfect way to garden sustainably and organically without having to do too much work. The method that we will discuss is for a four, stacked straw bale garden. With this method, you can grow a multitude of different plants and reap a harvest that will make many traditional gardeners envy.

### Getting Started

You can go to any garden store or home repair shop to grab some straw bales. Wheat straw is a good choice for this area. Purchase four bales or one (if you want to start small). The four bales will be arranged to form a shape like a box. Once these are home, stack them in the following arrangement:

Plan your spot carefully with full sun. Once the bales are placed, they are extremely heavy. Place the bales so that the twine is not showing from a bird's eye view. I've never tried to weigh a soaking wet bale of straw, but that's because I couldn't even budge it to begin with. You'll not want to change your mind and move things around.

You can grow any vegetable, but remember you will need to stake those that grow tall. Try putting a vegetable that is tall in the center compost with something like a tomato cake or create a trellis for peas. You can plan on two to three tomato plants, four pepper or cucumber plants, or four to six lettuce plants per bale. Each vegetable usually requires one to two square feet per bale. Usually, the maximum planting is three plants per bale.

### Bale Preparation

You'll have to prepare the bales to make sure they're past the initial heat of decomposing. With the proper fertilizers and water your straw bale should warm up to a temperature of about 100 degrees. As in many gardening techniques, there are proponents of several different methods. You can prepare your bales by just keeping them wet for three to four weeks prior to planting. If you prefer a more proactive approach, here's one widely recommended method.

Days 1-3: Water the bales thoroughly and keep them damp.

Days 4-6: Sprinkle each bale with a 1/2 cup of a high nitrogen fertilizer like ammonium nitrate (34-0-0) or

ammonium sulfate per day, and water it well into the bales. If you'd like you can substitute blood meal for the nitrate.

Days 7-9: Cut back to 1/4 cup of fertilizer per bale per day, and continue to water it in well.

Day 10: No more fertilizer, but continue to keep the bales damp.

Day 11: Stick your hand into the bale. If it has cooled down to less than your body heat, you may safely begin planting as soon as all danger of frost has passed.

### **Bale Cultivation**

Watering— You will most likely have to water every other day. A good idea is to get a soaker hose and loop that around the bales and in the center. As the bales continue to decompose, you should have to water less frequently.

Fertilizing- Once plants have been established for a couple weeks, it is great idea to start fertilizing again. You could just use the good old liquid feed like Miracle Gro (the blue stuff) or a slow release fertilizer like Osmocote (looks like little babes). If you are an organic grower, try using compost tea or vermicompost.

### **Assignment**

Students should work in teams to design and install a raised bed garden. Students should determine cost of supplies, watering mechanisms, plant nutrition, and create a general maintenance and harvest schedule. Create a garden planner that elaborates on all aspects of the project and get growin'!

### Activity 5.03.04

## Harvest and Postharvest Commodity Report

Go to [http://postharvest.ucdavis.edu/Commodity\\_Resources/Fact\\_Sheets/](http://postharvest.ucdavis.edu/Commodity_Resources/Fact_Sheets/) and choose one of the commodities listed for postharvest information and several images. Students can fill in this sheet and submit virtually or create a poster or submit a written report. Use this sheet as a guide.

Name of commodity	Common:	Botanical:
Key maturity and quality indicators		
Notes about how and when to harvest (this may not be found on the same site)		
Temperature for storage/shipment		
Relative humidity for storage/shipment		
Other atmospheric controls for storage/shipment		
Notes about ethylene		
Physiological and physical disorders (list and describe two)		
Citations	Look at the UC Davis site (at the bottom of each commodity page) to learn how to properly cite the source used.	
Include five labeled images to illustrate quality, physiological and physical disorders		