February: K-2

Food Plants and Ecosystems

South Carolina
Farm to School Lessons

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Overview

Welcome to the South Carolina Farm to School February Nutrition Education Lesson. This lesson contains information & hands on activities where K-2 students will be learning about plants and how components in nature interact with each other in ecosystems. Our goal for this lesson is to help children explore the connection between food production and ecosystems interactions.

These lessons are designed to be delivered over a four week period, noting that introduction & activities will be supplemental to existing curriculum.
Estimated Total time: 80-100 minutes.

Teacher Background

Most plants and animals live in areas with very specific climate conditions, such as temperature and rainfall patterns, that enable them to thrive. Any change in the climate of an area can affect the plants and animals living there, as well as the makeup of the entire ecosystem. Some species are already responding to a warmer climate by moving to cooler locations. For example, some North American animals and plants are moving farther north or to higher elevations to find suitable places to live. Climate change also alters the life cycles of plants and animals. For example, as temperatures get warmer, many plants are starting to grow and bloom earlier in the spring and survive longer into the fall. Some animals are waking from hibernation sooner or migrating at different times, too.

Plants and animals have adapted to changes in the environment for millions of years. However, today's changes are happening faster and on a larger scale than in the past, which makes it difficult for plants and animals to adapt. Changes in climate can affect the types of plants that can grow in an area. Animals' food supplies, water, life cycles, breeding habits, and ranges will be affected, too. Some animals will adapt to changing conditions or move elsewhere, but others could have trouble surviving. Some unwelcome invaders (invasive species) could benefit from climate change by expanding their range or being able to survive through the winter in new places. All these changes will affect the way ecosystems function, and changes to ecosystems affect people, too. That's because we rely on ecosystems to provide us with many services, like clean water, food, and medicines.[1]

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It is easy to forget that food is a product of ecosystems. We usually purchase it in supermarkets and restaurants, where it bears little resemblance to the original plant or animal. Yet, without sunlight, soil, water, plants, and animals interacting in an ecosystem, we would have no food.
Food gives us the energy we need to stay alive, grow, and reproduce, and we can get this energy only from other organisms. Although the sun emits enormous quantities of radiant energy every day, our bodies cannot use it directly. Instead, we rely on plants to convert it to chemical energy (food) through photosynthesis. This energy may then pass through a food chain to us. Photosynthesis, pollination, predation, decomposition, the cycling of nutrients, and water are all involved in creating our food.

Although farms and gardens depend on ecosystem processes, they are different from natural ecosystems. Natural ecosystems contain plant and animal populations interacting in balance with one another and nonliving things, and can sustain themselves over time. In farms and gardens, people plant seeds, add water, amend the soil, weed, and remove pests to increase production, all of which can affect both balance and sustainability.

As seen in Nourish, these human impacts are often far-reaching, especially with industrial agriculture. For example, pesticides and fertilizers applied to industrial farms in the Midwest have created a dead zone—where almost nothing can live—thousands of miles away in the Gulf of Mexico.[2]

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[1] Adapted from: A Student's Guide to Global Climate Change (http://www.epa.gov/climatechange/kids/impacts/effects/ecosystems.html)

[2] Adapted from: Nourish Life (http://www.nourishlife.org/pdf/Nourish_Curriculum_Guide.pdf)

Lesson checklist

F2S Aim: Explore the connection between food and ecosystems interactions.

F2S Objectives

Students will be able to:

* Discuss and describe a food chain.
* Understand the term "ecosystem".
* Observe a local Ecosystem (i.e. schoolyard, garden)
* Taste the Palmetto Pick of the Month (winter squash).

Materials:

* Food Chain Chart (Appendix A)
* Food Chain Activity:
    * Pictures provided (Appendix B)
      Construction paper, glue
* Farm to School Planting Sheet (Appendix C)
* Planting Guide (Appendix D)
* Winter Squash Powerpoint (Appendix E)
* Food Chain Power Point (in Dropbox)
* Tasting activity materials
* Family Activity Sheet (Appendix F & Dropbox)
* Copies of the February Farm to School Lesson Assessment (Dropbox)

National Health Education Standards

1.2.1 2.2.2 4.2.2 5.2.1

7.2.1 8.2.1

SC State Standards

ELA 1-2.4	Create responses to informational texts through a variety of methods. Use functional text features (including table of contents)
ELA 1-3.1	Use pictures, context, and letter-sound relationships to read unfamiliar words.
ELA 1-3.3	Use vocabulary acquired from a variety of sources.
ELA 1-3.20	Use pictures and words to construct meaning.
ELA 1-6.1	Generate how and why questions about a topic of interest.
ELA 1-6.6	Follow one and two step oral directions.
SC 1.1.1	Compare, classify, and sequence objects by number, shape, texture, size, color, and motion, using standard English units of measurement where appropriate.
SC 1-1.3	Carry out simple scientific investigations when given clear directions.
SC 2.1.1	Carry out simple scientific investigations to answer questions about familiar objects and events.
SC 2.1.3	Represent and communicate simple data and explanations through drawings, tables, pictographs, bar graphs, and oral and written language.
SC 2.1.4	Infer explanations regarding scientific observations and experiences.

Lesson Essential Components

Lessons profile	Page(s)	Yes	No	Notes
Palmetto Pick of the Month	10	★		Tasting activities with Winter Squash
Health Education Standards	8-10	★		
SC-Cross Curricular Standards	8-10	★		
SC-F2S Behavioral Goals	8-10	★		
Cooking Activities	10	★		
Tasting Activities	10	★		
Physical Activity	8-10	★		
Food Safety	10	★		
School Food Garden	9	★		
Student to Farmer Connections (i.e. field trips, talks)			★	
Student to Chef Connections			★	
Farm to Cafeteria			★	
Provision of scientific knowledge/rationale	8-10	★		
Risk and benefits about healthy behaviors	17	★		Benefits of Winter Squash
Obstacles, Barriers & Solution			★	
Family involvement and other supports		★		Family Activity Sheet
Set goals and monitoring progress			★	
Other hands on activities:	8-10	★		Team projects

✎ Let's Learn!

What is a Living Organism?[1]
Estimated Time: 15 minutes

1. Review with the students what they have learned about food chains (This topic was introduced in the"November Farm to School Lesson: All about Food Plants").
2. Begin discussion on Food Chain by asking students the following questions:

What makes something living?

- Are you a living thing? How do you know?
- What do living things need in order to stay alive? (ex. food, water, air)
- What are some examples of living things in the classroom?
- What are some living things outside?

3. Using the Food Chain Powerpoint (in Dropbox), review parts of the Food Chain.
4. For additional information, see below.

Producers	These are living things which take the non living matter from the environment, such as minerals and gases and uses them to support life. Green plants are considered producers and the are at the beginning of the food chain.
Consumers	These living things need the producers to be their food. Animals who eat plants are called **herbivores**. They are considered consumers and are next on the food chain. Animals who eat other animals are called **carnivores**. They also are consider consumers. They are farther down the food chain since they need herbivores for their food. Animals and people who eat both animals and plants are called **omnivores** and are also part of the consumer piece of the ecosystem.
Decomposers	The last part of the ecosystem is the. These are living things which feed off dead plants and animals and reduce their remains to minerals and gases. Example: fungi, like mushrooms and bacteria.

☞ Activity

Paper **Food Chain**
Estimated Time: 15 minutes

Use paper to make a food chain and learn how Earth's creatures and plants are linked to each other and to the sun.

- Cut half-inch strips of colored construction paper, one color for each category: plants, insects, plant-eaters, and meat-eaters (do not use yellow). Draw or paste cutout pictures on the strips of plants, animals, birds, insects. (Appendix B)
- Link the strips together into food chains. some examples might be: grass>a rabbit> a fox; corn>a chicken> man; seeds>a quail>a bobcat; algae> a minnow> a bass> man; grass> a grasshopper> a

mouse> an owl; leaves>caterpillar> a bird> a snake> a hawk.

- Make a larger Sun from yellow construction paper.
- Link everything together.

You may choose to do this activity as a classroom. You can make one big large sun or yellow ring and link all students chains to one.

☞ Activity

Investigating Local Ecosystems
Estimated TIme: 20 minutes

1. Take students to observe on or more local ecosystems, such as a schoolyard, garden,etc. It may be best to rope off or make boundaries of a specific area.
2. Assist students in finding living plants or animals in the ecosystem. Are they interacting?

Ask several questions:

- Is this alive? How do you know?
- What do you see as you look at this (plant/animal)?
- What do you hear? Smell? Feel?
- How can plants and animals be like each other? How can they be different?

3. Let children explore on their own. Encourage them to physically get closer as they are observing. Allow them to share their observations.
4. Have students draw pictures and describe what living things they saw. Make a classroom booklet for each child on your Ecosystem.

✯ Gardening Activity

Preparing the Spring Garden
Estimated Time: 15-30 mins

Materials Needed:
Farm to School Planting Sheet (Appendix C)
Plant Guide (Appendix D)

Note: This activity is designed to help the school prepare for Spring planting in their Farm to School raised beds/in-ground gardens. Because schools are implementing lessons at different levels, please consult with the Farm to School Team at your school about the direction the school would like to take for planting the garden before doing this activity.

1. Review with the class the purpose of the school garden.
2. Explain the purpose of this activity is to design how the school garden will be planted. Take a few minutes to watch the following video: http://www.youtube.com/watch?v=a-WMWISI12s
It will discuss considerations when designing your garden such as water and sun access.
3. Next, review the produce that grows successfully in SC in the Spring. See Appendix B for more information. Decide which plants you would like to grow. Remember to look at the plants that will be most successful in your region of the state. For additional information about growing in SC regions, please visit http://www.clemson.edu/extension/hgic/plants/vegetables/gardening/hgic1256.html.
4. Use the **Farm to School Planting Sheet** (Appendix D) to design where your seeds/plants will be planted in your raised beds. Think about height of plants, width of plants, varieties of plants, etc.
Do not forget to visit your raised beds with your students and take pictures of the raised beds prior to planting. Have your students envision how the garden will look. Have them record in their garden journal predictions on how quickly the plants will grow. Monitor this and write about it throughout the Spring till harvest.

You can also divide the class into groups and each group will monitor and journal about different aspects of the school garden. Groups can journal about how each of these affect the garden: weather, sun, water/rain, etc.

✯ Palmetto Pick Activity

Noodle Mania!

Estimated Time: 15-20 mins

1. Have students wash their hands (with soap & warm water for 20 seconds) & reinforce that it is important. Show the students that you have washed the spaghetti squash before beginning.
2. Display the **Winter Squash** power point (will be sent electronically-Appendix E) while you are preparing the spaghetti squash.
3. Cut spaghetti squash in half. Scrape out the seeds or select two-three students to help scrape out the seeds.
4. Steam the squash in the microwave, rind side up, for six to eight minutes. *Be careful removing the squash, it will be hot. Wear oven mitts.
5. Separate strands with a fork. When finished, toss with olive oil and parmesan cheese.
6. Serve a 1 oz. portion for each student to taste.

Ingredients:

1 spaghetti squash
Olive Oil (to taste)
Parmesan Cheese (to taste)

Encourage students to discuss the "noodles" of the spaghetti squash. Record on the board some of their perceptions of the spaghetti squash:

- Did it taste like they thought it would taste?
- Does it taste like noodles?
- Is it fun to eat like spaghetti?

Note: One spaghetti squash should yield roughly 40 oz. of "spaghetti". If you are serving more than 30 students, add additional spaghetti squash. The squash will be very hot, please use caution and wear oven mitts. Spaghetti squash are hard, you may want assistance in cutting the squash and/or you may want to have it cut before you begin the PPM Activity.

✍ Evaluation

Formal Assessment:

1. Review **Ecosystem Hunt** and discuss the important job each part has to offer.

2. Optional resource: Administer the Farm to School February Lesson Assessment to your students (the electronic copy is in Dropbox). If you decide to use this assessment with your students, please contact us because we would like to summarize any information collected.

Informal Assessment: Observe participation in lesson activities. Complete survey at end of month (survey will be sent electronically).

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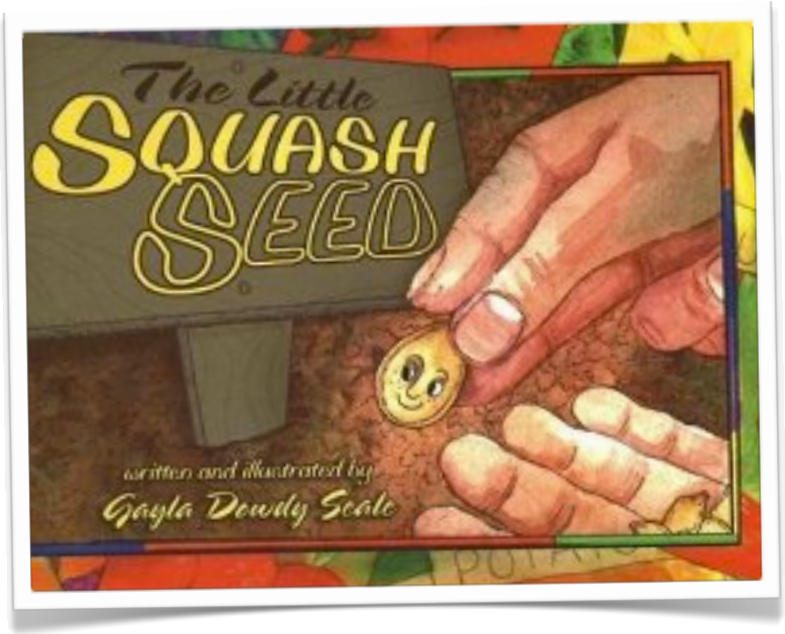
[1] Adapted from Koch P.A., Barton A.C., Contento I.R. (2007). Growing Food:Lesson 11 Webs of Interaction. Teachers Columbia University & the National Gardening Association, New York, NY.

Resources



Books:
Koch P.A., Barton A.C., Contento I.R. (2007). Growing Food. Teachers Columbia University & the National Gardening Association, New York, NY.

Pumpkins by Ken Robbins

Magic School Bus Chapter Books #17: Food Chain Frenzy by Anne Capeci

The Little Squash Seed by Gayla Dowdy Seale

Who Eats What? Food Chains and Food Webs by Patricia Lauber and Holly Keller

Websites:
To request nutrition education materials visit the Clemson University Nutrition and Resource Center (NIRC): www.clemson.edu/**nirc**

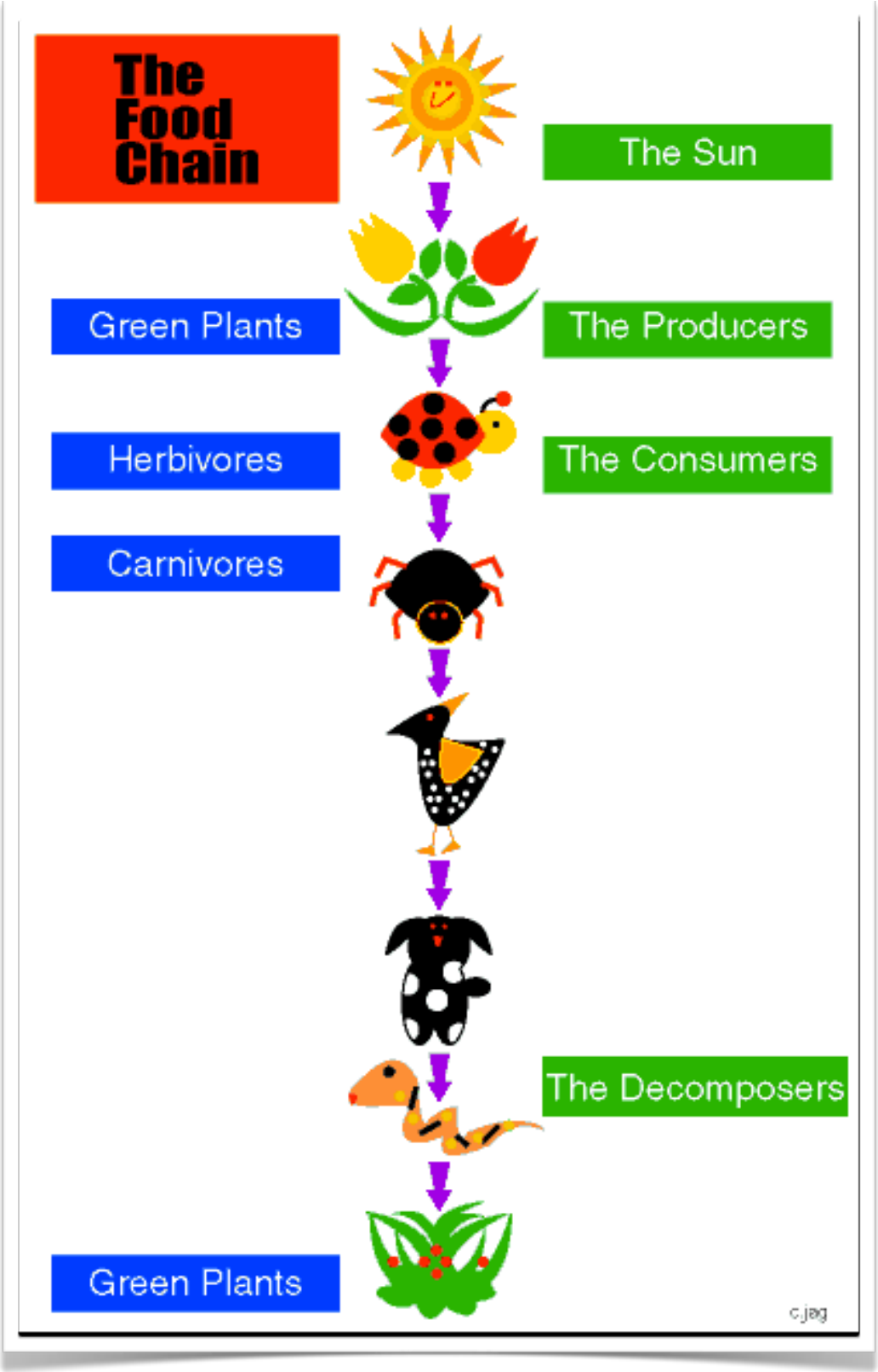
Nourish Curriculum Guide: /www.nourishlife.org/pdf/Nourish_Curriculum_Guide.pdf

Winter squash information guide:
http://www.clemson.edu/extension/hgic/food/nutrition/food_shop_prep/food_prep/hgic4258.html

Video:
Winter Squash (PAllen Smith)
http://www.youtube.com/watch?v=AJj5hv3Bk28&feature=related
Winter Squash (Natural Markets)
http://www.youtube.com/watch?v=VOsir2ESuis&feature=related

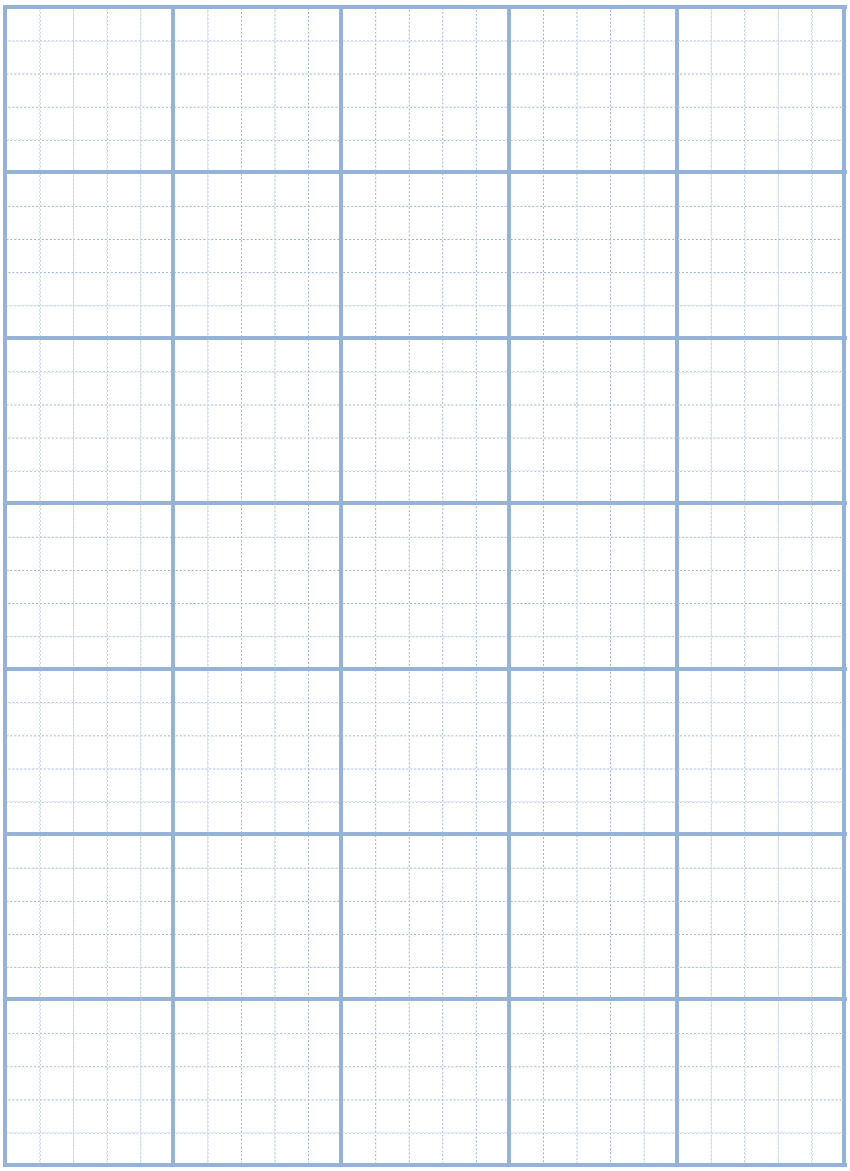
Food Chain
http://www.youtube.com/watch?v=JvqMNQuYqBk&feature=related

Appendix A


The Food Chain
The Sun
Green Plants
The Producers
Herbivores
The Consumers
Carnivores
The Decomposers
Green Plants
c.jag

Appendix B
Food Chain Activity Models

Farm to School Planting Sheet



What to Plant

Seeds can be started indoors between January and February and will need to be transplanted to your garden at a later time. Some vegetables, however, can be planted straight from the seed such as beans, beets, cantaloupe, carrots, corn, cucumbers, lettuce, okra, peas, pumpkins, and spinach. If you choose to grow vegetables that you will be able to harvest in a short amount of time, lettuce can be grown in 25 days and radishes can be grown in 45 days. Beets, broccoli, beans, or spinach will mature in 50 days. Additional vegetables and their corresponding planting ranges are listed in the following tables:

Warm Season Vegetables – Plant these in the spring to harvest before school is out for summer

Plant varieties	When to plant	Days to maturity from seed
Cantaloupe	Late March –Early May	30-35
Cucumbers	Late March – Early May	50-70
Eggplant	April – May	65-80
Southern Peas	April – May	65-125
Okra	April – Mid-May	60-70
Peppers	April – May	70-85
Sweet Corn	March – April	80-95
Squash	April – Mid-May	55
Tomatoes	April – May	55-105
Beans	Late March – April	55

Cool Season Vegetables – Plant these vegetables in the fall to harvest before winter break

Plant varieties	When to plant	Days to maturity from seed
Cabbage	Early August	60-80
Carrots	Early August	65-75
Collards	August	70
Lettuce	Late August	55-75
Radishes	September - November	21-28
Spinach	Late Sept – Early Nov	37-45
Beets	Early August	50-70
Broccoli	August - Early September	65-70
Cauliflower	Early August	60-70
Turnips	September – Early October	50-60

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For more information, visit http://agriculture.sc.gov/schoolgardens.

Appendix E
Winter Squash Power Point
(will be sent electronically at Dropbox)