



NC's Top Five Commodities (Greenhouse/Nursery) – 2nd Grade

Purpose

The purpose of this lesson plan is to introduce students to one of the major North Carolina commodities-the greenhouse/nursery industry. Students will interact with the environment to learn the importance of plants in the landscape and the resources required to produce plants through a hands-on activity. They will also understand how plants are produced from seeds, using Gail Gibbon's vocabulary and illustrations in the book, *From Seed To Plant*.

Subject Area(s)

English Language Arts, Science, and Social Studies

Common Core/Essential Standards

ELA

- **CCSS.ELA-Literacy.RI.2.4** Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
- **CCSS.ELA-Literacy.RF.2.4.A** Read grade-level text with purpose and understanding.
- **CCSS.ELA-Literacy.W.2.8** Recall information from experiences or gather information from provided sources to answer a question.
- **CCSS.ELA-Literacy.SL.2.1.C** Ask for clarification and further explanation as needed about the topics and texts under discussion.
- **CCSS.ELA-Literacy.SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- **CCSS.ELA-Literacy.SL.2.3** Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.

Science

- **2.L.S.2.1** Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Social Studies

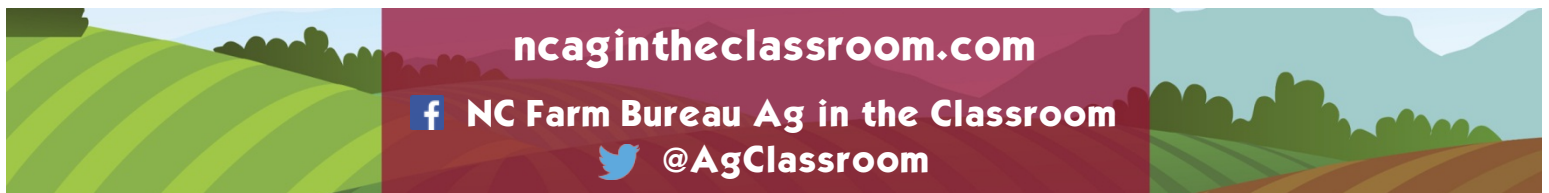
- **2.G.2.1** Give examples of ways in which people depend on the physical environment and natural resources to meet basic needs.

Agricultural Literacy Outcomes

Agriculture and the Environment

- Describe the importance of soil and water in raising crops and livestock.

Plants and Animals for Food, Fiber & Energy



- Explain how farmers work with the lifecycle of plants and animals (planting/breeding to harvest a crop).
- Identify the importance of natural resources (e.g. Sun, soil, water, minerals) in farming.
- Recognize that agriculture provides our most basic necessities: food, fiber, energy, and shelter.
- Trace the sources of agricultural products (plant or animal) used daily.

Culture, Society, Economy & Geography

- Identify places and methods of exchange for agricultural products in the local area.
- Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes.
- Identify the people and careers involved from production to consumption of agricultural products.
- Trace the sources of agricultural products (plant or animal) used daily.

Essential Questions

1. What does the term *ornamental plant* mean?
2. Why is gardening important?
3. Explain the life cycle of a plant.
4. Why are plants important?
5. What are some products that come from plants?

Vocabulary

Horticulture: the science of growing fruits, vegetables, flowers or ornamental plants.

Nursery: a place where plants are grown for sale, planting or experimentation.

Greenhouse: a building or structure that provides protection from weather elements in which plants are grown.

Green Industry: businesses, organizations, and individuals who produce, maintain, use or sell plants.

Gardening: the activity of tending a garden, including planting, harvesting, etc.

Propagation: the process of creating new plants from a variety of sources: seeds, cuttings, bulbs and other plant parts.

Ornamental Plants: plants that are grown for decorative purposes in gardens, or landscape projects.

Landscape: improve the appearance of a piece of land by adding ornamental plants.

Annuals: a plant that goes through a full life cycle in one season.

Seed: a reproductive part of a plant that can be used to create new plants.

Bulb: a kind of plant stem that stores food for the plant to use for growth later.

Compost: Decaying plant matter, and other organic material that helps the plant grow.

Pollination: when pollen is placed on a plant part to produce a flower, seed, fruit or vegetable.

Prune: to cut back plants.

Seedling: a young plant that has grown from a seed, cutting, or some other form of propagation.

Till: to prepare soil for planting.

Flower: the part of the plant that becomes the fruit or seed pod.

Pistil: the center of the flower.

Stigma: the sticky part at the top of the pistil.

Stamens: parts of the flower around the pistil.

Pollen: a yellow powder produced by the stamens.

Ovules: tiny egg cells at the bottom of the pistil.

Student Motivator

Print the *Greenhouse and Nursery Crops KWHL Chart* provided in the **Essential Files**. This should be kept on chart paper so that it can be used and posted throughout the entire lesson. Ask the students the following questions and place their answers in the first three columns. The fourth column will be filled in at the conclusion of **Activity 3**.

1. What I Know.
 - a. What do you know about greenhouses?
 - b. What is a plant nursery?
 - c. Have you ever been to a greenhouse or nursery?
 - d. Do you know the names of any plants?
2. What I Want To Know.
 - a. What is an ornamental plant?
 - b. What is the life cycle of a plant?
 - c. What types of plant products do I use?
 - d. Would you like to grow a plant?
 - e. Why is gardening important?
3. How Can I Learn More?
 - a. Who can I ask about plants?
 - b. Where can I find more information about greenhouses and nurseries?

- c. Are there any greenhouses or nurseries nearby?

Background Knowledge

Ornamental plants, or plants used for decorative purposes in the landscape or home, were introduced when settlers arrived and began to settle on the eastern North American coast. The settlers discovered that many plants were already growing and thriving here, which makes them *native plants* to our region. Over the years, many new plants have been introduced to North Carolina. Plants are introduced in regions where they grow best, such as rhododendron, and mountain laurel in the western part of the state, and ornamental grasses in the eastern part of the state. Plant breeders have to be careful about introducing non-native plants to the landscape, as some plants can be *invasive*.

Originally, most nursery stock produced in North Carolina were fruit trees and fruiting plants. As North Carolina became more urbanized there was a change in the nursery industry, and growers started growing more ornamental plants used for beautifying the home. Technology has also changed the *green industry*. At the turn of the century, the development of trucks, and cars allowed plants to be shipped across the country. The development of mechanical harvesting reduced the amount of labor needed to handle the plants. The development of plastic nursery containers extended the harvest season to a 12 month, year-round industry.

Technology has also changed the way plants are grown. Traditionally, plants were grown from seeds, but now there are many ways to *propagate* plants. The development of man-made rooting hormone allows for many species of plants to be propagated by rooting cuttings (pieces or parts of a larger plant used to create a new plant). All of these technological advances allow for a larger selection of plants for landscapers to choose from, creating a vast industry and market for plant production, and one of North Carolina's top commodities.

Horticulture and gardening has begun to appeal to a larger age group, gaining popularity among younger generations. There are many health benefits to gardening. Studies show that people who spend time gardening are less stressed, have a higher self-esteem, increased brain function and dexterity (performing tasks using your hands). Gardening is also a moderate-intensity exercise and contains various ecological benefits. Many living organisms benefit from plants, like the insects that live in the soil, to the animals that use gardens for a food source or shelter.

Greenhouses and Nurseries

Greenhouses are structures used for growing plants that need protection from hot or cold weather. These types of structures are important to growers of plants such as poinsettias, and vegetables (or plants that

cannot handle extreme temperatures). Greenhouses also allow growers to grow many tropical plants such as big leafy elephant ears or banana trees. Specialty crops like poinsettias and tropicals are usually what growers use greenhouses for; consequently, plants native to North Carolina are grown outside of greenhouses because of their ability to grow well in the state's climate. Greenhouses are also widely used in areas of our state where the weather may be more extreme during certain parts of the year and growers need more protection for their crops such as the mountain region.

A plant *nursery* is a place where ornamental plants are typically grown in plastic containers for sale, planting or propagation. Many container nurseries grow plants on plots of land, and in large quantities. These plants are sold to local garden centers, or to the general public.

Refer to the *Greenhouse and Nursery Pictures* file for examples.

Production and Gardening

A growing season refers to the amount of time a plant takes to grow before harvest or sale. Growing seasons are different for each specific plant. There isn't an ideal climate that plants like. Each individual plant has its own particular climate, weather and temperatures that it prefers. Most plants are propagated and then transplanted (moved or transferred) into larger containers for sale. Depending on the plant, it can take anywhere from three months to three years from the time plants are propagated until they have developed a root system which allow them to be moved or sold. Smaller plants, such as groundcovers (plants that spread along the ground to cover an area) or bedding plants/*annuals* (plants that flower in one season) take less time to finish growing than trees or larger growing woody plants.

Pollination occurs when a pollen grain from a flower lands on the *pistil* of the same kind of flower. It grows a long tube through the pistil into an *ovule*. This is the beginning of a *seed*. Once the seed grows, it becomes bigger, replacing the flower (which often dies off), and produces a fruit or a seed pod (depending on the type of plant). When the fruit or seed pod ripen, the seeds are dispersed. Some fall to the ground near the mother plant. Wind can blow some of the seeds away. Sometimes animals can eat the fruit or seeds, and the dispersal occurs when the animal drops the seeds.

Materials

- *Greenhouse and Nursery Crops KWHL Chart*
- *From Seed to Plant* by Gail Gibbons (book)
- *Gardening Vocabulary Worksheet*
- *Plant Life Cycle Chart* (worksheet)
- Grass Seed (2-3 Tablespoons of seed per student)

- Ankle hosery/tights
- Potting soil
- Rubber bands
- Plastic or clay pots
- Googly eyes
- *What's In Season Chart*
- *School Walk Worksheet*
- Sunflower (optional)
- Dandelion (optional)

Procedures

Activity 1

1. Give each student a *Flower Vocabulary Worksheet*. Read the book *From Seed to Plant* by Gail Gibbons. The students should match the words with the correct definitions as they hear them during the reading.
2. Tell the students that *they will be learning about the life cycle of plants*. Show the students the [Sunflower Time Lapse Video](#). Be sure to point out the four life cycle stages during the video (seed, seedling, plant, wilted plant (which produces new seeds)). Allow the students to examine the sunflower plant – they can be purchased at a local florist, garden center, or a grocery store.
3. Pause the video at the end and show the students how the flower head turns into seeds that can be harvested or planted to create new sunflowers. Next, show the [Time Lapse Dandelion Flower video](#). When the white seed head starts to form, ask the students, *How are the dandelion seeds different from the sunflower seeds?* Allow the students to examine the dandelion plant – they can be purchased at a local florist, garden center, or a grocery store.
4. Give each student a *Plant Life Cycle Chart*. They will draw pictures of each life cycle stage. Ask the students to write the definitions for *Seed* and *Seedling* beside their drawings for those two stages. Deepen the learning by asking the students, *What do the seeds need to grow? What do most all plants need to grow?*
5. Once the students have completed their *Plant Life Cycle Charts*, explain to the students that they will be learning about *propagation* in the next activity, and define propagation to the class.

Activity 2

1. Begin the *Grass Heads Activity*. Give each student 2-3 tablespoons of grass seed, and have them put the grass seed in the bottom of the ankle stocking. Then, each student will fill the stocking with soil until it is a round shape, like a head or ball.
2. Secure the open end with a rubber band until it is tight enough to prevent soil from escaping the stocking.
3. Shape the ball until it is round. Take a piece of the ball on one of the sides and pull out to create a nose. Secure the nose piece with a rubber band.
4. Next, attach a pair of googly eyes above the nose and sit the head on top of a small clay or plastic pot.
5. Water thoroughly and allow to drain. Water weekly or every couple of days to keep the head moist, but not soggy.
6. Place the heads in a sunny location. The hair should start growing within 12 days. Refer back to the *Plant Life Cycle Charts* by reviewing what the Grass Heads need to grow the “hair” (sunlight, soil, water, etc.).
7. Once the grass (“hair”) has started growing, have the students measure the length of the growth each week for 34 weeks (or longer if you prefer).
8. Each student should record their measurements in a journal. At the end of the measuring weeks, have the students compare their records with each other. Ask the students, *Where did the “hair” come from? What did the “hair” need to grow?* to deepen the understanding of propagation, and the plant life cycle.

Activity 3

1. Begin the lesson by asking the students to identify objects in the classroom that may have come from plants. Ask the students to *tell you the type of plant each object came from*. For example, a house was made with the wood from a tree. A t-shirt was created using cotton from a cotton plant. Show the students the *What’s In Season Chart*, and explain that the plants on the chart are where we get our fruits and vegetables from. Use pumpkins as an example and explain to the students that pumpkins are in season from September to October which is the time they will see them for sale at the grocery store, pumpkin patches, market, etc.
2. We receive vegetables from plants, and food gives us energy, etc. Ask the students, *Do you have plants at your house? Where did those plants come from?*
3. Define nursery, and greenhouse to the students. Ask the students if they have ever visited a nursery or greenhouse. Show the *Greenhouse and Nursery Pictures* to the students.
4. Explain the term *ornamental plants* to the students. Tell the students that nurseries and greenhouses are where ornamental plants are produced, and the art and science of growing plants is called *horticulture*.

5. Take a walk around your school and have the students identify the ornamental plants that are planted around campus. Ask the students to identify the animals/insects they see. They will use the *School Walk Worksheet* to record their observations. Encourage the students to draw pictures of the plants and animals they see.
6. As you are walking around your school's campus, define *landscaping* to the students, and point out how the plants you see were purposefully planted, and how each originally came from a greenhouse or nursery.
7. Once back in the classroom, ask the students to review their *School Walk Worksheets*. For the animals and insects observed, have the students write how the animal was interacting with the plants in the landscape on their worksheets. Prompt the students by asking, *Was the animal using the plant for shelter, food, or another reason? Are the plants important to these animals?*
8. Once the students have determined why plants are important to the animals or insects they saw on the school walk, ask *Why are plants important to you?* Refer back to when the class determined that their clothes were made from cotton. Ask the class to brainstorm other things they get from plants, and explain the importance.
9. Lastly, refer the students back to the KWL Chart and have them fill in the last column for *What Have I Learned?*
10. Once the students finish filling in the last column, ask the students the questions found in the **Essential Questions** for clarification and knowledge.

Suggested Companion Resources

- *All Kinds of Gardens* by Mari Schuh (book)
- *Garden* by Robert Maass (book)
- Illinois Horticulture Ag Mag <http://www.agintheclassroom.org/TeacherResources/AgMags/Horticulture.pdf>
- USDA Living Science Career Poster—
Horticulturist <https://www.agriculture.purdue.edu/USDA/Careers/horticulturist.html>

Essential Files

- [*Greenhouse and Nursery KWL Chart*](#)
- [*Flower Vocabulary Worksheet*](#)
- [*Plant Life Cycle Chart \(Worksheet\)*](#)
- [*School Walk Worksheet*](#)
- [*Greenhouse and Nursery Pictures*](#)
- [*What's In Season Chart*](#)

Essential Links

- Grass Heads How-To
<http://www.redtedart.com/2012/04/04/kids-crafts-grass-heads/>
- Time Lapse Video of a Sunflower
<https://www.youtube.com/watch?v=Z-iPp6yn0hw>
- Time Lapse Video of a Dandelion
https://www.youtube.com/watch?v=UQ_QqtXoyQw

Ag Facts

- There are currently over 2,000 different species of ornamental fruit, turf, and woody plants produced in the state of North Carolina.
- Nursery crops are grown in all 100 counties of North Carolina, and there are over 1,200 certified and registered nurseries in North Carolina.
- Arbor Day is a national holiday on the last Friday in April that celebrates the environment. On Arbor Day, individuals and groups are encouraged to plant trees.
- Many nurseries and greenhouses grow crops year-round, but the best time for planting in the landscape are the Spring and Fall seasons.
- North Carolina ranks first in the nation for the production of tobacco, and sweet potatoes, and second in the nation for the production of Christmas trees (Fraser firs).
- There are 8 arboretums in North Carolina.

Extension Activities

- Plan a trip to a local garden center, nursery, arboretum or greenhouse.
- Have students read and research the [North Carolina Nursery Crops Commodities website](#) and take the [Plants and Nursery quiz](#).
- Ask the students to define words such as floriculture, turf, balled and burlapped, and bare-root, using the [North Carolina Nursery Crops Commodities website](#).
- Have students find the definitions and write sentences for words such as: viticulture, olericulture, arboriculture using the [Illinois Horticulture Ag Mag](#).
- Students can complete the *School Walk Worksheet* at a local garden, park or arboretum for more examples of ornamental plants, and animal interaction.

Sources & Credits

- <http://www.ncagr.gov/agscool/commodities/>
- <http://www.agintheclassroom.org/TeacherResources/AgMags/Horticulture.pdf>

- <http://learn.eartheasy.com/2014/09/6-unexpected-health-benefits-of-gardening/>
- <http://www.redtedart.com/2012/04/04/kids-crafts-grass-heads/>
- http://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=46&search_term_lp=plants
- <http://www.ncagr.gov/agscool/teacher/commodities/plant2.htm>
- <http://www.ncagr.gov/markets/commodit/horticul/ornment/index.htm>
- <http://www.ncagr.gov/markets/commodit/horticul/greenhouse/>