

Learning the Life Cycle of a Sweetpotato

Grades: K-2

Purpose

The purpose of this unit is to encourage the understanding of the sweetpotato plant, its life cycle, and the sweetpotato as a healthy vegetable. Students will be exposed to the parts of a sweetpotato plant, understand how sweetpotatoes are grown, describe the importance of sweetpotatoes as a nutritious food, and discover other sweetpotato uses.

Subject Area(s): Reading, Math, Science

Common Core/Essential Standards

English/Language Arts

Kindergarten

- **RI.K.1** With prompting and support, ask and answer questions about key details in a text.
- **RI.K.4** With prompting and support, ask and answer questions about unknown words in a text.
- **RI.K.7** With prompting, describe the relationship between illustrations and the text in which they appear (e.g. what person, place, thing, or idea in the text and illustrations depicts).
- **RF.K.1** Demonstrate understanding of the organization and basic features of print.
 - **RF.K.1. A** Follow words from left to right, top to bottom, and page by page.
 - **RF.K.1. B** Recognize that spoken words are represented in written languages by specific sequences of letters.
 - **RF.K.1.C** Understand that words are separated by spaces in print.
 - **RF.K.1. D** Recognize and name all upper and lowercase letters of the alphabet.
- **RF.K.3** Know and apply grade-level phonics and word analysis skills in decoding words
- **RF.K.4** Read emergent-reader texts with purpose and understanding
- **L.K.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.
- **L.K.5.A** Sort common objects into categories (eg. Shapes, foods) to gain a sense of the concepts the categories represent.

First Grade

- **RI.1.1** Ask and answer questions about key details in a text.
- **RI.1.4** Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- **RI.1.6** Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.

- **RI.1.7** Use the illustrations in a text to describe its key details.
- **RL.1.5** Explain major differences books that tell stories and books that give information, drawing on a wide reading of a range of text types.
- **RL.1.6** Identify who is telling the story at various points in the text.
- **RL.1.7** Use illustrations and details in a story to describe its characters, setting, or events.
- **RL.1.1** Ask and answer questions about key details in a text.
- **RF.1.3** Describe characters, settings, and major events in a story, using key details.
- **L.1.4.A** Use sentence-level context as a clue to the meaning of a word or phrase.
- **L.1.5.A** Sort words into categories (colors, clothing, etc.) to gain a sense of the concepts the categories represent.

Second Grade

- **RI 2.3** Describe connection between historical events, scientific concepts, or steps in technical procedures in text.
- **RI 2.4** Know and use various text features to locate key facts or information in a text efficiently.
- **RI.2.5** Know and use various text features (e.g. captions, bold print, subheadings, glossaries, indexed, electronic menus, icons) to locate key facts or information in a text efficiently.
- **RI 2.7** Explain how specific images contribute to and clarify a text.
- **RI.2.10** By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.
- **RF.2.3** Know and apply grade-level phonics and word analysis skills in decoding words.
- **RF.2.4** Read with sufficient accuracy and fluency to support comprehension.
- **L.2.3** Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- **L.2.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 2 reading and context, choosing flexibility from an array of strategies.

Math

Kindergarten

- **K.CC.3** Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
- **K.CC.4** Understand the relationship between numbers and quantities; connect counting to cardinality.
- **K.CC.5** Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.
- **K.CC.6** Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g. by using matching and counting strategies.

- **K.MD.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- **K.G.1** Describe objects in the environment using names of shapes and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.

First Grade

- **1.MD.1** Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- **1.MD.2** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.
- **1.MD.4** Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Second Grade

- **2.MD.1** Measure the length of an object by selecting an using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- **2.MD.2** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
- **2.MD.3** Estimate lengths using units of inches, feet, centimeters, and meters.
- **2.MD. 9** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-numbers units.
- **2.MD. 10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Science

Kindergarten

- **K.P.1** Understand the positions and motions of objects and organisms observed in the environment.
- **K.P.1.1** Compare relative position of various objects observed in the classroom and outside using position words such as: in front of, behind, between, on top of, under, above, below and beside.
- **K.P.2** Understand how objects are described based on their physical properties and how they are used.
- **K.P.2.1** Classify objects by observing physical properties (including size, color, shape, texture, weight, and flexibility).

First Grade

- **1.L.1** Understand characteristics of various environments and behaviors of humans that enable

plants and animals to survive.

- **1.L.1.1** Recognize that plants and animals need air, water, light (plants only), space, food, and shelter and that these may be found in their environment.
- **1.L.1.2** Given examples of the needs of different plants and animals can be met by their environment in NC or different places throughout the world.
- **1.L.1.3** Summarize ways that humans protect their environment and/or improve conditions for the growth of the plants and animals that live there (e.g. reuse or recycle products to avoid littering).

Second Grade

- **2.L.2** Remember that organisms differ from or are similar to their parents based on the characteristics of the organism.
- **2.L.2.1** Identify ways in which many plants and animals closely resemble their parents in observed appearance and ways they are different.

National Agricultural Literacy Outcomes

Agriculture and the Environment

- (a) Describe how farmers/ranchers use land to grow crops and support livestock
- (b) Describe the importance of soil and water in raising crops and livestock
- (c) Identify natural resources
- (d) Provide examples of how weather patterns affect plant and animal growth for food

Plant, Animals, Food, Fiber, and Energy

- (a) Explain how farmers/ranchers work with the life cycle of plants and animals (planting/breeding) to harvest a crop
- (c) Identify examples of feed/food products eaten by animals and people
- (e) Identify the importance of natural resources (e.g., sun, soil, water, minerals) in farming

Food, Health, and Lifestyle

- (a) Identify healthy food options
- (b) Recognize that agriculture provides our most basic necessities: food, fiber (fabric or clothing), energy, and shelter
- (c) Understand where different types of foods should be stored safely at home

Culture, Society, and Geography

- (a) Discuss what a farmer does
- (b) Explain why farming is important to communities
- (c) Identify places and methods of exchange for agricultural products in the local area
- (d) Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes

- (e) Identify the people and careers involved from production to consumption of agricultural products
- (f) Trace the sources of agricultural products (plant or animal) used daily

Essential Questions

- How does a farmer grow sweetpotatoes?
- Other than human consumption, how are sweetpotatoes used?
- What are the plant parts of a sweetpotato plant?
- What is the life cycle of a sweetpotato?
- What can sweetpotatoes provide for the human body?

Materials

- *Tops & Bottoms* by Janet Stevens (book)
- [*From Farm to School – Crops of North Carolina: Digging for Sweetpotatoes*](#) by Heather Barnes and Karen Baltimore (book)
Printed by North Carolina Department of Agriculture and Consumer Services
Publication supported by U.S. Department of Agriculture's (USDA) Agriculture Marketing Service North Carolina
- Chart paper
- Markers
- 5-gallon bucket
- Sweetpotatoes (at least 5)
- Soil
- Computer
- Document camera (optional)
- SMART Board
- Notebook paper
- Index cards
- White paper
- Magnifying glass (student size)
- Pencil
- Rulers (inch/centimeter)
- Observation journal
- Toothpicks (5-6 per student group)
- Plastic cup or a large mouth mason jar
- School garden or a raised garden bed

Essential Files/Links

- [*From Farm to School – Crops of North Carolina: Digging for Sweetpotatoes*](#) (book)
- [*Sweetpotato Word Cards*](#) (Activity 1)

- [Sweetpotato Tops and Bottoms PowerPoint](#) (Activity 3)
- [Sweetpotato K – 2 Project Rubric](#) (Activity 3)
- [Above and Below Sorting Activity](#) (Activity 1)
- [Sweetpotato Math Problems](#) (Activity 5)
Includes: sweetpotato measuring, data collection sheet for students, sweetpotato blank bar graph, sweetpotato math problems
- [Reading Rotation Stations](#) (Activity 5)
Includes: sweetpotato research writing paper, sweetpotato word tiles and sentence paper, and sweetpotato facts rewrite activity

Vocabulary

Annual: plants that grow for only one growing season. They must be replanted to grow again.

Fibrous Root: thin, branching roots growing from the stem. Fibrous roots are shallow roots that collect water for plant growth.

Flip Plow: equipment farmers use to dig the mature sweetpotatoes from under the soil’s surface and flip them on top of the soil for harvesting.

Flower: part of the plant for reproduction that can produce seeds.

Harvest: to gather or pick a crop when it has reached maturity.

Hill: a group of sweetpotatoes growing below the surface of the soil.

Leaves: uses energy from sunlight for photosynthesis.

Nodes: part of a plant stem which one or more leaves will emerge.

Perennials: plants that grow for many growing seasons without having to be replanted.

Setter: equipment farmers use to transplant (plant) sweetpotato sprouts into the field.

Slips: shoots that are grown from a mature sweetpotato.

Stem: the body or stalk of the plant.

Storage Root: roots that are specifically modified for storage of starch, water, and nutrients. Storage roots, such as carrots, beets, and sweetpotatoes, are examples of roots that are specially modified for storage of starch and water. They usually grow underground as protection from plant-eating animals.

Transplant: replanting in a different location.

NC Ag Facts¹

- North Carolina grows nearly 60% of all United States sweetpotatoes (more than any other state in the United States).
- The sweetpotato is North Carolina’s state vegetable.¹ The single-word term helps differentiate the sweetpotato from the white or Irish potato, which is a tuber, not a root, and possess a different nutrient profile. Sweetpotato – *Ipomoea batatas*, a storage root is part of the morning glory family.⁶
- North Carolina sweetpotatoes are available every month of the year.¹

- Most sweetpotatoes are grown in the piedmont and coastal plain regions of North Carolina.¹
- There are hundreds of varieties of sweetpotatoes and many are grown across North Carolina. Some you may see most often in grocery stores include the Japanese sweetpotato, the White sweetpotato, and the orange flesh Covington sweetpotato.¹

Background Knowledge

Did you know that a sweetpotato is actually part of the morning glory family? It is a perennial (perennials regrow every spring); though it is cultivated as an annual (annuals live for one growing season, but often cannot be overwintered). The creeping stems of this amazing plant can grow up to 20 feet long and frequently send out roots at the nodes which, in favorable seasons, bear small potatoes. There are three main types of leaves: round, shouldered, and lobed or split. The color of the stems and leaves varies from dark green to light purple. No flowers are produced except in southern latitudes.²

The skin color of a sweetpotato can range from white to yellow, red, purple, or brown. The flesh also ranges in color from white to yellow, orange, or orange-red.³

So, is it a yam, a sweetpotato or are they the same thing? The truth: yams and sweetpotatoes are not the same thing at all. There are thousands of sweetpotato varieties. Sweetpotato varieties are classified as either ‘firm’ or ‘soft’ – firm varieties were produced before soft varieties. When the soft varieties were grown there was a need to differentiate between the two (firm or soft). Africans actually named the ‘soft’ sweetpotatoes ‘yams’ because they resembled the yams in Africa. Their native word was ‘nyami’ and if the n & i are removed the term ‘yam’ remains. Despite this identification, this is not true. In fact, while the ‘soft’ varieties look like yams, they are not yams at all; it is just a variety of sweetpotato.

Yams are often imported from the Caribbean; they are rough and scaly – very different from our smooth, orange flesh variety often sold in the United States. In the United States, people often use the word sweetpotatoes and yams interchangeably; however, this is not correct and often adds confusion for the consumer. When a consumer goes to the store and purchases ‘yams,’ they are more than likely purchasing a different variety of sweetpotato. Today, the U.S. Department of Agriculture requires labels with the term ‘yam’ to be accompanied by the term ‘sweetpotato.’³

According to the North Carolina SweetPotato Commission, North Carolina has ranked number one in sweetpotato production in the United States since 1971 (2018). North Carolina’s hot, moist climate and rich, fertile soil are ideal for cultivating sweetpotatoes. Sweetpotato production in North Carolina averages nearly 60% of the U.S. supply.⁴

Climate

Sweetpotatoes can be grown where there is a long frost-free period with warm temperatures in the growing season.⁴ Most cultivars require a minimum frost-free period of 90-120 days, with a minimum average daily temperature of 77 degrees Fahrenheit. Sweetpotatoes also require an inch of water per week uniformly distributed throughout the growing season for highest yields.⁴

Uses for Sweetpotatoes

Sweetpotatoes have many uses. They can be prepared in a number of dishes, canned, pureed, preserved and dehydrated. For drying, clean washed potatoes are placed in a suitable basket and immersed in boiling water for a short time; when taken out of the basket, they are cut into thin slices and spread over mats and exposed to the sun for two or three days. In order to make a superior quality, the skin of the potato is peeled off before slicing. Instances were reported wherein the dried product was successfully ground into flour.² In North Carolina a company named Glean produces a sweetpotato flour.⁵ Sweetpotatoes can also be used as food stock for animals. They have been successfully fed to hogs, cattle, horses and poultry.²

Student Motivator

Before the lesson begins, place the sweetpotatoes in the bottom of a 5-gallon bucket and fully cover them with soil. Have students come as a whole group to a designated area in the classroom and bring out the 5-gallon bucket. Sit the bucket in the middle of the floor and have students form a circle around the bucket. Ask one of the students to lift up the bucket (it will be heavy so guide them as they try to pick it up). Ask the students to guess what is inside the bucket (the students should notice the soil and identify it quickly). Give students clues such as, "In the soil, you may find something you can eat," or "It is orange." Allow time for the students to guess. If they are struggling with guesses, give them simpler hints such as, "Sometimes in the lunchroom you eat this food like fries but you don't use ketchup (at least most of you don't)." Allow students to stick their hands in the soil (just in the top). They will find they cannot feel anything except the soil. Reach into the bucket and pull out a sweetpotato for the students to see. Ask to see if any students know what it is. Tell the students, "This is a sweetpotato!" Tell the students that today and for most of the week, they will be learning interesting things about sweetpotatoes.



<https://www.hobbyfarms.com/build-five-gallon-bucket-garden/>

Procedures

Activity 1: Students will identify parts of the sweetpotato plant above and below the ground.

1. Have students gather as a whole group, in a designated area in the classroom.
2. Say to the students, “A sweetpotato has many parts. When we see a sweetpotato, this is what we see (show students a mature sweetpotato), but did you know that before a sweetpotato is served at a restaurant or goes to the grocery store, it looks like this in a farmer’s field (show the diagram of the sweetpotato plant below)?”

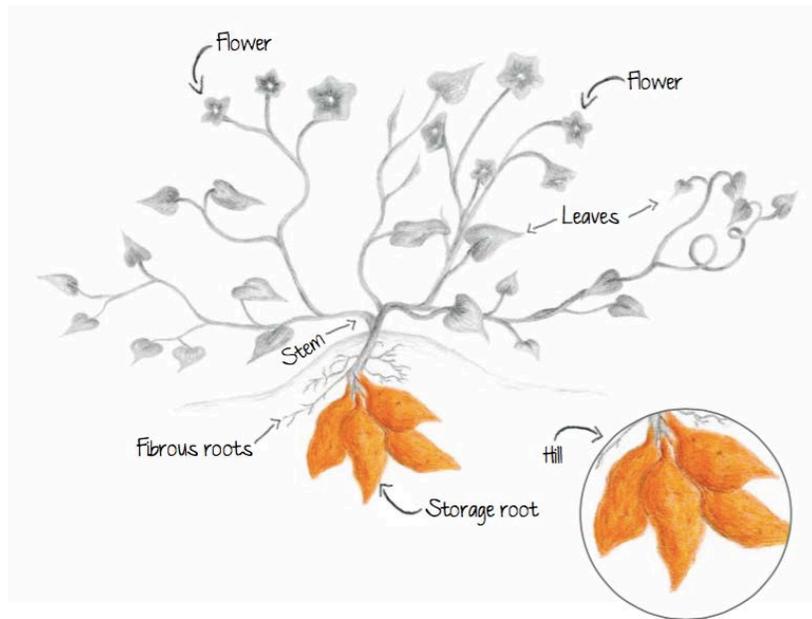


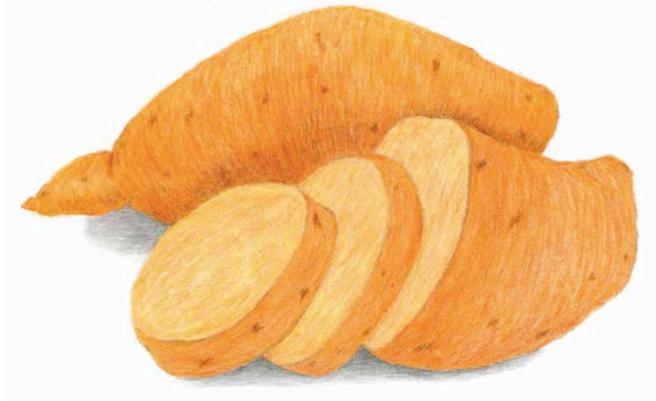
Photo credit: Farm to School - Crops of North Carolina: Digging for Sweetpotatoes

3. Print *Sweetpotato Word Cards* (see **Essential Files**) for this activity. Now, show students word cards: **flower**, **leaves**, **stem**, **fibrous root**, **storage root**, and **hill**. Ask students to count as you go through the cards and identify how many parts the sweetpotato plant has. Students should be able to identify numbers: 1, 2, 3, 4, 5, and 6. There are six words that describe the parts of a sweetpotato plant.
4. Ask students to identify the parts of the sweetpotato while using the diagram. You can encourage the students by saying, "I love the way (student name) is paying attention! I would like (student name) to place our first word card on the correct part of our sweetpotato plant." Place sticky putty on the back of the word cards and have students place the correct word card to the diagram for identifying the parts of the sweetpotato plant.
5. Discuss the purpose of each part of the plant with the students, as defined in the **Vocabulary** section. Ask critical thinking questions such as, "Why do you think a sweetpotato plant has a flower? What does the stem do? What is a fibrous root? What do you think a storage root is?" "What is the role of the farmer in caring for the sweetpotatoes?" (*For lower elementary these are great class discussions, upper elementary students may write down responses as an exit ticket or formative assessment*)
6. **Assessment/Project:** Students will categorize the parts of a sweetpotato plant into two columns titled: above ground and below ground. Students will write one sentence to explain one part of the sweetpotato plant from each column on the *Above and Below Sorting Activity* (see **Essential Files**).

Activity 2: Students will use knowledge from a text and pictures to understand the sweetpotato.

(This activity is more suitable for 2nd grade, but can easily be adjusted to any elementary grade level)

1. Start a discussion with the students about what they have learned about sweetpotatoes by saying, “Yesterday, we learned the parts of a sweetpotato plant while everyone created their own sweetpotato project (from activity 1).” Tell them that today, they are going to use that knowledge to help make connections as they are reading. Say, “As we are reading, we will notice things that happen from the beginning of the plant to growing and harvesting the sweetpotatoes.”
2. Use *From Farm to School—Crops of North Carolina: Digging for Sweetpotatoes* (see **Essential Files**) to guide this lesson. This book can be downloaded as a PDF and shown on a computer or SMART Board.
3. Show students the first page of the *From Farm to School—Crops of North Carolina: Digging for Sweetpotatoes*. Open up for discussion by asking, “Who has eaten a sweetpotato?” Instruct a student to record the data taken during discussion in a tally chart or bar graph. *This information can be revisited in the next activity.*



Have you ever wondered where the sweet potatoes served at your school come from?

4. In a designated area (carpet, etc.), have students sit in rows as a whole class so they can turn to the person beside them for “partner talk” to answer questions throughout the reading. Students will begin to focus and discuss information they are learning about sweetpotatoes.
5. Begin reading the story *From Farm to School – Crops of North Carolina: Digging for Sweetpotatoes*. Be sure to stop and pose questions to your students to create deeper, critical thinking.
 - pg. 4 – Quote: “North Carolina grows over half of all United States sweetpotatoes, more than any other state.” Explain to the students that this is one reason why the sweetpotato is our state vegetable. Say, “I am trying to think of a difference between fact and opinion. A fact is something that can be proven true and an opinion is something someone thinks. Turn and talk to your partner is this a fact or an opinion? Why is this statement a fact or an opinion?”

- pg. 5 – Read page five and ask students what important detail is found on this page—sweetpotatoes are harvested in August through October. Say, “**Harvest** means to pick the crop.” Tell the students to remember this important detail because they will use it later.
 - pg. 6 – Page six uses a special text feature. Point this out to the students and explain that text features are found in non-fiction books. Ask, “What is a non-fiction book?” Call on a student to explain what a non-fiction book is. Give the students an opportunity to turn and talk to their partner about the non-fiction text features seen on page six. Ask the students, “How are they helpful?”
 - pg. 7 – Ask students if they remember the information on this page (they learned it in the previous activity). Point to the parts of the plant and have the students identify the words associated with each part of the sweetpotato plant.
 - pg. 9 – After reading this page, ask the students about a fact they learned from page nine. Say, “Can you turn and talk to your partner about what sweetpotato farmers do in January?”
 - pg. 11 –In March, farmers spread whole “seed” sweetpotatoes on the ground. Ask the students, “Did you know that the sweetpotato can be used as a seed for the sweetpotato plants?”
 - pg. 15 – Bring students’ attention to the important detail on this page regarding field sprouts in May. Tell students that farmers start preparing their fields to **transplant** (move to another place) potatoes in April.
 - pg. 20 – In August, farmers start checking for insects that can harm the plants. Ask the students to remember what else happens in August. Have the students discuss with their partner. (From page 5: Sweetpotato harvest is August through October)
6. After the story has been finished, students will return to their seats. Ask students to think about all the things they have learned about sweetpotatoes. **Exit Ticket:** Name at least 2 interesting facts or new things you have learned about sweetpotatoes.
 7. **Extension Activity:** Emergent reader activity (independent/small group) –Students will independently read sweetpotato text *From Farm to School – Crops of North Carolina: Digging for Sweetpotatoes* (the book can be downloaded onto iPads or printed out on copy paper). For this activity, group students in K-1 reading above grade level and for 2nd grade average readers to read this text. Have students practice reading independently or in small groups to enhance learning opportunities to focus on vocabulary, word sounds, blending and other reading strategies.

Activity 3: Students will read a non-fiction text to understand the many uses of a sweetpotato.

1. Explain to students that there can be several uses of foods. For example, eggs can be eaten for breakfast in different ways: boiled, scrambled, or fried and they can also be used in baking items such as cakes, muffins, and cookies.
2. Share a picture of sweetpotatoes with students, which clearly show the vines and stems growing on top of the ground and the roots growing below the ground. Ask, “Did you know that long ago farmers believed the vines and stems of sweetpotatoes were a great source of nutrition for their

livestock compared to corn and grain? This practice is not used often today because of the refined ways of feeding our animals, but let's think for a moment all the ways we know sweetpotatoes can be used today both for humans and animals." Students may mention sweetpotato fries (other answers may include: a common lunchroom side dish, feeding to hogs on the ground, baiting during hunting season, sweetpotatoes at Thanksgiving, etc.).

3. Read *Tops & Bottoms* by Janet Stevens (a common children's book that tells the tale of a bear and a rabbit. The book demonstrates different vegetables and how parts are used – showing students the visual of vegetable tops and bottoms and in the case of sweetpotatoes vines and tubers).
4. Show students the images found in *Sweetpotato Tops & Bottoms Power Point* (see **Essential Files**).
5. Have students draw a diagram of a sweetpotato plant using the *Sweetpotato K-2 Project Rubric* (see **Essential Files**). Students should label their plant diagram for proof of knowledge pertaining to the sweetpotato plant.

Activity 4: Students will grow their own sweetpotato.

1. Ask the students, "Did you know that a sweetpotato can grow a new sweetpotato?" Ask the students for a show of hands for yes or no answers. Create a bar graph with student responses on chart paper. Explain that the students have made a scientific prediction or hypothesis for what will happen in our experiment.
2. Explain to the students that with all scientific experiments and observations they need tools. Say, "Some of the tools you will need during this observation includes (hold up and show students) a student size magnifying glass, inch/centimeter ruler, an observation journal, and a pencil that we will be using often (daily or weekly)."
3. Provide each group of students with a sweetpotato, plastic cup larger than the sweetpotato, and 5-6 toothpicks. Explain to students that they will be conducting observations of their sweetpotatoes and documenting their findings based on the changes they see.
4. Allow each student in the group to carefully stick toothpicks mid-way into the widest portion of the sweetpotato. The toothpicks should be equally spaced around the sweetpotato. Students will carefully put the sweetpotato into a plastic cup. Then, carefully pour water into the cup, allowing the water to touch just the bottom of the sweetpotato. Students will sit the sweetpotato in a sunny spot in the classroom that is level and safe from being knocked over. *Refer to the examples pictured below.*



Google images: no link

5. Students will conduct initial observations and make an educated guess on what will happen in 2 days and in 2 weeks. As the sweetpotato plant grows, students will measure the height of their sprouts in inches and centimeters. Students may also make observations and collect data by counting the number of leaves their sprouts have.

Note: In approximately 4 weeks sweetpotato sprouts will have reached about 8-10 inches tall and produce several leaves. At this point it is time for transplanting. The teacher/instructor will

Growing Sweetpotatoes

Materials

Sweetpotato, tooth picks, and Large Mouth Mason jar or plastic cup – depending on the size of the sweetpotato you may need something more substantial to hold it up.

Make sure to fill the jar or cup up as close to the top as possible, you can see that half of the sweetpotato is submerged in water. You do not have to add water daily, just when it starts to drop down below the sweetpotato add more so that it can get the hydration it needs. Also, if water starts to smell or mold you may change it for fresh water.

carefully remove the sprouts by giving them a twist or cutting them with knife/scissors. Allow each student to receive a sweetpotato sprout.

6. After the 4-week mark, allow students to graph their sweetpotato observation data using a bar graph. Then allow students to compile their data creating a class bar graph or chart. A great extension to this activity would be to have students show other ways they could share and show the data they collected, i.e. creating other types of graphs (pictographs, pie charts, tally charts, etc.).
7. Transplant the sprouts in a school garden or a raised garden bed. Sweetpotatoes need to be grown in well-drained, sandy, loamy soil. Prepare the soil by tilling and applying fertilizer (Miracle-Gro will be sufficient). Plant the sprouts 9 to 10 inches apart in the center of a ridge row at a depth of about 3 inches with at least 2 plant nodes (part of plant that will become stem/leaf) underground and 2 or more leaves above ground. Plants will need water immediately after transplanting. This is a great opportunity to integrate measurement into your lesson. Provide each student with a ruler and have them measure and mark the spot they will plant their sweetpotato sprout.

Picture of sweetpotato nodes



<http://www.mofga.org/Publications/MaineOrganicFarmerGardener/Spring2009/SweetPotatoes/tabid/1081/Default.aspx>

8. **Extension:** Challenge your students to take sweetpotato sprout(s) home and plant them. Have them observe their own plants growth as they did in class. Reserve time during class in several weeks to discuss the progress of their home sweetpotatoes. Encourage the students to eat their sweetpotatoes once they're ready for harvest at home. After caring for their sweetpotato have them write a paper about the important role of farmers and how important their job is in caring for the food we eat every day.

Activity 5: Students will use sequencing to understand the life cycle of a sweetpotato.

Sequencing: putting things in order from beginning to end, using terms such as “first,” “next,” “then,” and “last.”

1. Students should have a solid understanding of sweetpotatoes. Say, “Today we are going to tie it all together and learn the life cycle of a sweetpotato.”
2. Using all of the things students have learned during previous activities, students will discuss the process the sweetpotato plant goes through to grow more sweetpotatoes. Ask students, “What have we learned about our sweetpotatoes?” As the students are discussing facts and interesting details, write them on chart paper (this can be used as students complete their writing activity).
3. Show the student pictures of the life cycle of the sweetpotato. As the students see the images, they will begin to understand how sweetpotatoes are used to grow sprouts in order to grow more sweetpotatoes. Students will make note of the way sweetpotatoes grow. Sweetpotatoes grow under the ground and have green leaves and flowers above the ground. Around August, farmers begin to harvest their crop. They use tractors and plows to lift up the soil so the sweetpotatoes can be dug up. Sweetpotatoes are grown for human consumption and are very healthy for us to eat along with branching out into being placed into pet foods. Farmers also feed parts of the sweetpotato plant and sweetpotatoes to livestock on their farms. After sweetpotatoes are sold to markets and eaten, sweetpotatoes left in the field are disked back into the ground to provide nutrients back into the soil. The process goes full circle (life cycle).

Life Cycle of a Sweetpotato



Sweetpotatoes are used to grow new sweetpotatoes, but other sweetpotatoes are sold to markets for us to eat. They are put into wooden crates and left to cure in a special environment then they are washed, cleaned, and graded at the processing plant.



After the potatoes are prepared at the processing plant they are marketed and sold to grocery stores and restaurants for consumers to purchase.



4. Students will take all of this information and write a grade level appropriate sequence for the life

cycle of a sweetpotato using transition words such as first, next, then and last.

5. **Extension Activities:** Students can draw/illustrate the life cycle of a sweetpotato.

Higher order thinking question (Blooms Taxonomy & Real World Situations): If you worked in the sweetpotato processing plant, which potato would you choose and why? Think about what the consumer (people who eat the sweetpotatoes) likes to eat and how they will like for it to look. Imagine how hard a farmer has to work to ensure he/she produces a good quality product that consumers will buy and enjoy.



Sweetpotato Station Rotations

Center rotations and stations can be done during reading instruction or during an intervention time. Students should be grouped based on level of need in regards to ability of math and reading standards. New knowledge of sweetpotatoes will be utilized to teach core standards.

Reading Rotation Stations (see Essential Files)

- Sweetpotato sentences
- Sweetpotato writing
- Sweetpotato research paper

Math Rotation Stations

- **Measure the sweetpotato**
Gather several sweetpotatoes; you can reuse the sweetpotatoes you purchased for the student

motivator activity. Lay the sweetpotatoes in rows to show students the difference in sizes. For Kindergarten and first grade use unifex cubes or blocks to measure the length (non-standard units of measurement). For second grade, use inch rulers showing inches and centimeters (standard measurement).

- **Sweetpotato graphing**

On chart paper have different graphs drawn for students to pick from. They will look at data on a tally chart and create a graph showing the data. Data can be collected from whole group questions like: Who has ever had a sweetpotato? Do you like sweetpotatoes? Which sweetpotato do you think will be the sweetest: white, orange, or the purple sweetpotato?

- **Sweetpotato math problems** (see **Essential Files**)

Concept Elaboration and Evaluation

- **How does a farmer grow sweetpotatoes?**

When farmers grow sweetpotatoes, they do not actually plant seeds. Instead, they plant sprouts, or sweetpotato slips that are actually grown in a field or greenhouse. Farmers begin growing sweetpotato sprouts in mid-March and plants should be ready for transplanting in about 6-8 weeks. One method of planting is where farmers plant whole potatoes known as seed stock, and bury them between two layers of soil. They are watered daily or as needed. Some farmers will use this method in a small setting like a greenhouse, but others will use this method in large fields where they use tractors and other equipment to lay out sweetpotatoes before covering them with soil. The farmers usually cover the buried sweetpotatoes with plastic to protect them from the cold and frost. Soon sprouts will start to grow. Once the sprouts begin to grow the farmer cuts holes in the plastic so more oxygen can reach the plant. Field grown sprouts are ready to transplant in mid-May.

In April, farmers begin preparing the fields for transplanting sweetpotato sprouts. Farmers use tractors and equipment to plow the land and form raised beds for the sweetpotatoes. Workers ride on a piece of equipment called a **setter** to transplant (plant) sprouts into the planting field. Farmers carefully watch for insect and weather damage during this time. Farmers generally harvest their sweetpotatoes sometime in August. They will use a **flip plow** or **chain digger** to carefully dig the sweetpotatoes and flip them on top of the ground, where they will then be harvested “dug” by hand. Farmers then transport their sweetpotatoes to a shed where they will be “cured” and stored until sold. Curing is what North Carolina farmers do to enhance their sweet flavor and increase storage life. By curing sweetpotatoes this heals cuts and reduces decay and shrinkage. Curing also converts some of the starches to sugars; thereby, enhancing the flavor. Once an order is made the sweetpotatoes are cleaned, washed, dried and packed for shipping to restaurants, grocery stores, etc. Unusable roots left in the fields will be disked into the soil to place nutrients back into the soil.

- **Other than human consumption, how are sweetpotatoes used?**

Sweetpotatoes are well known for their health benefits from human consumption, but there are many other uses of sweetpotatoes. Farmers use sweetpotatoes as food stock for animals. They

have been successfully fed to hogs, cattle, horses and poultry.² Farmers also use the tops of the sweetpotato plant as a fertilizer. The tops of the sweetpotatoes decay on the ground. The decayed tops act as fertilizer for the soil. Tops and vines can also be used as food for livestock, especially for dairy cattle. In the fall, when the ground is dry, vines and tops can be harvested without injuring the roots.²

- **What are the plant parts of a sweetpotato plant?**

A sweetpotato plant has many plant parts. A sweetpotato vine has a stem, leaves, flowers, and roots like other plants. However, the part of the sweetpotato plant we eat is actually the plant's storage root, which grows underground. The parts of the sweetpotato vine grow above the ground. Each part of the sweetpotato plant has a purpose for producing delicious sweetpotatoes that we eat.

- **What is the life cycle of a sweetpotato?**

Sweetpotatoes are grown from sweetpotatoes! Sweetpotatoes are grown from sprouts to grow more sweetpotatoes. In August, farmers begin to harvest their crop. They use tractors and plows to lift up the soil so the sweetpotatoes can be dug up. After sweetpotatoes are sold to markets and eaten, the unusable roots are left in the fields to be disked back into the soil to replace lost nutrients. See the life cycle of a sweetpotato in **Activity 5**.

- **What can sweetpotatoes provide for the human body?**

Sweetpotatoes are a very healthy food, they are rich in Vitamin A (stimulates production of immune cells to fight of disease and infection) and Vitamin C. They only have roughly 100 calories, and are low in sodium, but do have some natural sugar. Due to their orange color, sweetpotatoes are also high in carotenoids (beta-carotene). They have many other vitamins too, including B5, B6, thiamin, niacin, and riboflavin. Health benefits include stabilizing blood sugar, containing antioxidants, boosting brain function, enhancing immunity, promoting vision health, and aid in weight loss.

Extension Activities

Recipe Writing: Students will write a recipe using sweetpotatoes as an ingredient. Students will share the recipe with the class. Some of the recipes can be cooked and tested in the classroom to show students what a recipe looks like from start to finish. This is a great time to integrate “How To” Writing. For example: How to Make a Sweetpotato Casserole, Step 1: Gather ingredients, Step 2: Mix together ... This would also be a great class project—to create a recipe book with lots of sweetpotato recipes.

Class Cooking Activity: Oh, my Sweetpotato Pie!

After learning about sweetpotatoes and their role in North Carolina, students can make their own sweetpotato pie filling.

Lesson Standards:

2.P.2 Understand properties of solids and liquids and the change they undergo.

2.P.2.1 Give examples of matter that change from a solid to a liquid and from a liquid to a solid by heating and cooling

2.P.2.2 Compare the amount (volume and weight) of water in a container before and after freezing.

Activity:

1. Students will get into groups of 3-4. Students will need measuring cups, 2 plastic bags, cooked sweetpotato, cinnamon, and a spatula.
2. Students will begin by digging out the inside of the sweetpotato and putting the inside of the sweetpotato in a measuring cup (sweetpotato is our solid), and then put into a plastic bag.
3. Students will pour ¼ cup sweetened, condensed milk (liquid) into the plastic bag with sweetpotato filling. Add a teaspoon of cinnamon.
4. Students will then place the plastic bag inside the second plastic bag for extra support. Pass the bag around the group allowing each student to mush the ingredients together. Student will notice that the solid and liquid begin to mix together and the color will begin to change slightly. When the solid and liquid have mixed well, it is ready to taste.

Suggested Companion Resources

- *From Farm to School – Crops of North Carolina: Digging for Sweetpotatoes* (Activity Book)
<https://ncsweetpotatoes.com/wp-content/uploads/2019/11/Revised-SP-act-guide-Hi-res.pdf>
- A Sweetpotato Tale (video)
<http://www.pbs.org/video/a-sweet-potato-tale-warnvs/>
- The NC Sweetpotato Goes Abroad
<http://www.pbs.org/video/nc-sweet-potato-goes-abroad-jzu0ks/>

Sources and Credits

1. <https://statesymbolsusa.org/symbol-official-item/north-carolina/state-food-agriculture-symbol/sweet-potato>
2. <https://archive.org/stream/sweetpotatocultu00pric#page/12/mode/2up>
3. <https://www.loc.gov/rr/scitech/mysteries/sweetpotato.html>
4. <https://ncsweetpotatoes.com/sweet-potatoes-101/how-to-grow-sweet-potatoes/>
5. <https://liveglean.com/>
6. <https://cipotato.org/research/sweet-potato/sweetpotato-one-word-or-two/>

Essential Files Sources and Credits

Sweetpotato Image

- <https://pixabay.com/en/sweet-potato-root-yam-food-veggie-29988/>

Fonts

- <https://www.dafont.com/theme.php?cat=105>

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