SC Farm Bureau
Ag in the Classroom
Post Office Box 754
Columbia, SC 29202

803.936.4237
SC Ag in the Classroom
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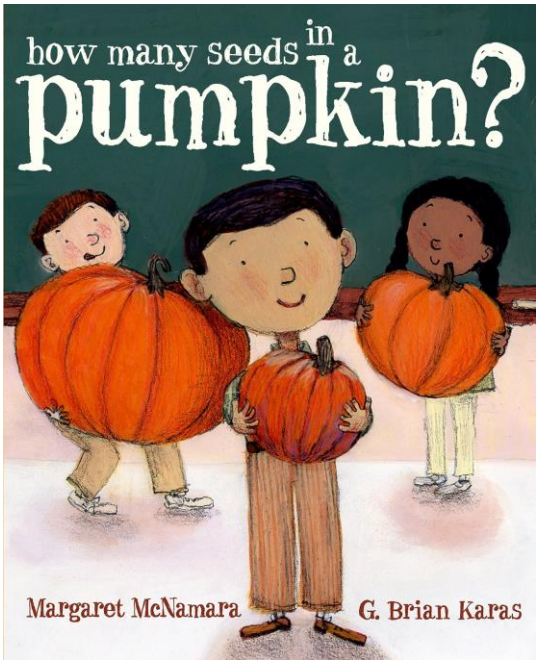
October 2019 Book of the Month

How Many Seeds in a Pumpkin?

By: Margaret McNamara



Mr. Tiffin decided to challenge his class with a pumpkin activity. He provided three pumpkins–one small, one medium-sized, and one large. He asked the class to predict which pumpkin had the most seeds. The class was very creative with their answers, and some of the students said that pumpkins could have millions of seeds! Mr. Tiffin allowed the students to break into groups to count the seeds. Each group was just as creative counting the seeds as they were predicting the number of seeds. Which pumpkin had the most? The answer might surprise you! [1] [2]

Did You Know? (Ag Facts) [2]

- It takes about four months for a pumpkin to grow full size.
- Pumpkin seeds are a great source of Vitamin A.
- Pumpkins are a member of the gourd family which includes honeydew melons, cucumbers, watermelons, and zucchini.

Discussion Questions

- Which pumpkin do you think holds the most seeds? Why?
- What did you learn about pumpkins from the story?
- Have you ever been to a pumpkin patch? What did it look like? Did you meet a farmer?

Grade Level(s): 2-5

Purpose: Students will use pumpkins to estimate height, weight, and diameter. Students will also use multiplication strategies to estimate how many seeds are in a pumpkin. Finally, students will discuss the life cycle of a pumpkin and identify how pumpkins are processed.

Vocabulary:

- **pumpkin:** a large rounded orange-yellow fruit with a thick rind, edible flesh, and many seeds
- **pulp:** the soft, squishy parts inside a fruit vegetable
- **stem:** the part of a plant that a fruit, vegetable, or flower grows out of

Background Agricultural Connections [3]

Pumpkins are an original American (New World) food product. Pumpkins have been cultivated for at least 9,000 years in North and South America. They are part of the family of vining plants called Cucurbitaceae that includes cucumbers, squash, gourds, melons, and others. Pumpkins were a staple in the diet of Native American tribes who raised pumpkins as one of three main crops—maize (corn), beans, and squash. They baked or boiled the pumpkin flesh, toasted the seeds for tasty snacks, and ground the seeds into flour or meal for making bread and gruel. They also dried and saved seeds to use for planting the next year's crop.

Pumpkin plants have separate male and female flowers. Pumpkins develop from a fertilized female blossom. You can identify the female blossoms by a bulge in the stem behind it. The male flowers provide the pollen. Blossoms can be eaten fried, raw in salads, or as a component of soups.

The size and quality of a pumpkin is influenced by many factors, including water, temperature, insects, disease, soil type and fertility, pumpkin variety, and weed competition. Before planting pumpkins, it is helpful to conduct a soil test on the patch where the pumpkin seeds will be planted. A soil test will determine the type of soil and what nutrients are present in this soil. Then the planter will know what type of nutrients (fertilizers) to add to the soil.

After conducting the soil test and adding the necessary nutrients, pumpkin seeds may be planted when the ground temperature is 60–65˚F and the last frost has passed (usually May or June). The seeds should be planted five to eight feet apart, and the rows should be six to eight feet apart. The plants need to be pollinated by bees or by hand about eight to ten weeks after planting.

From planting until harvesting the pumpkins need to receive an adequate amount of water as well as hoeing or hand weeding to minimize competition from weeds. Pumpkins can be harvested after the shell is completely hardened. It usually takes 90–110 days for pumpkin plants to grow from seedlings and produce fully mature pumpkins. Harvested pumpkins should be stored in a cool, dry place to keep from rotting.

Pumpkin Predictions [2] [3]

Materials:

- *How Many Seeds in a Pumpkin* by Margaret McNamara
- Pumpkins, 1 per group (tops precut)
- String, rulers, and scale (for weighing pumpkins; a bathroom scale will work)
- Newspaper

Procedures:

1. Read *How Many Seeds in a Pumpkin?* By Margaret McNamara. (Use discussion questions on first sheet of this document). Reiterate how to estimate how many seeds are in a pumpkin by looking at each row on the outside of the pumpkin.
2. Divide the class into groups of four. Provide each group with a pumpkin (do your best to get pumpkins that are quite different from one another).
3. Ask the groups to estimate the height, diameter, and weight of their pumpkin.
4. Ask students to guess which group has the largest pumpkin. Which pumpkin weighs the most? Do they think the largest pumpkin will weigh the most? Will the smallest pumpkin weigh the least? Which two pumpkins are the closest in size? Which two pumpkins are the closest in weight?
5. Next, provide each group with a ruler, some string (for measuring the diameter), and access to a scale (a bathroom scale will work). Ask each group to weigh and measure their pumpkin.
6. Were their predictions correct? Have groups discuss results with class as a whole.
7. Review how multiplication can be modeled for items that come in groups. Instruct students that their task is to find a way to use this multiplication model to estimate how many seeds are in their pumpkins Stress that you do NOT want an exact count.
8. In pairs, students should develop a plan for estimating how many seeds are in their pumpkin. Give students approximately 10 minutes for this part of the task. Prompt the students by asking, “How can I use the knowledge that each line on a pumpkin represents a row of seeds for estimating?
9. Once students have provided you with a plan, instruct them to take the top off of their pumpkin and place plenty of newspaper underneath to collect the mess.
10. As the students work, circulate the room to provide assistance and to ask the following questions to probe student thinking:
    a. What is a more efficient strategy than counting each seed?
    b. Why did you decide to count one row of seeds, and then count the number of lines on the outside? (To multiply the number of seeds in one row by the number of rows.)
    c. Take one handful and count how many seeds are in it. Without counting another seed, how can you use this information to help you estimate how many seeds you have? (Count the number of handfuls and multiply.)
    d. If students use this strategy, ask, “What would happen if you took some handfuls and then I took some handfuls? How does the size of our hand change the accuracy of our count?
    e. Think about the ways we know to model multiplication. We know it’s okay to not have an exact number. So how can you use one of these models to help you estimate how many seeds you have more quickly?

f. Can you explain how this is related to a standard mathematical operation? In other words, how does multiplication compare to addition, subtraction, etc.?
g. Will it be a completely accurate count of seeds? (No.) Is that still okay for our task?

11. After work time and cleanup, students will return to their seats to reflect on the effectiveness of their strategy for estimating the number of seeds in their pumpkin. Have them answer the following questions:
    a. What strategy did my partners and I use to estimate the number of seeds in our pumpkin?
    b. How did multiplication help us with this task?
    c. Was our strategy efficient? If not, what could be improved?
    d. What am I still confused about?

Pumpkin Planters [4]

Materials:

- Mini pumpkins, 1 per student or larger pumpkins, 1 per group (with the tops of the pumpkin removed)
- Potting soil
- Garden trowels or spoons
- *Pumpkin Science Journal*

Procedures:

1. Provide each student with a mini pumpkin or place students in groups with one larger pumpkin per group. Tell the students that you are curious to know if a pumpkin can grow inside of a pumpkin. Conduct a class poll to determine how many students predict yes and how many predict no. Invite students from both sides to share why they answered yes or no.
2. Ask the students, "What is needed to grow a pumpkin?" *(a pumpkin seed, light, the proper temperature, air, and water)* "Where do pumpkin seeds come from?" *(a pumpkin)*
3. Have the students use garden trowels or spoons to fill their pumpkins with potting soil. Water the soil and place the pumpkins in a sunny spot. Ask the students if their pumpkin seeds have what is needed to sprout and grow into a pumpkin plant.
4. Each day, have the students observe their pumpkin plants and record observations in their *Pumpkin Science Journals*.

Pumpkin Processing [3]

Materials:

- Pumpkin Pie in a Bag materials (see attached sheet)
- *Libby's 100% Pure Pumpkin From Farm to Can* video

Procedures:

1. Brainstorm with the class all of the uses for pumpkins. In addition to carving for Halloween, pumpkins are also processed into various food products such as pumpkin pie, pumpkin cheesecake, and more. In fact, the majority of pumpkins grown in the United States are processed into pumpkin puree that is typically canned.
2. Explain to students the difference between a whole, raw food product (like a pumpkin) and a processed food product, such as pumpkin pie or any other food product made from pumpkin. Use the following diagram:

3. Show the video clip *Libby's 100% Pure Pumpkin From Farm to Can*. This video shows the pumpkin in a farmer's field, planting, harvest, and processing.
4. Use the instructions found in the attached file *Pumpkin Pie in a Bag* to make pumpkin "pies" for your students.

Suggested Companion Resources

- The Great Pumpkin (Activity)
- From Seed to Pumpkin (Book)
- In Search of the Perfect Pumpkin (Book)
- Life Cycles: Pumpkins (Book)
- Pumpkin Circle: The Story of a Garden (Book)
- Pumpkin Jack (Book)
- Pumpkin Pumpkin (Book)
- Pumpkins (Book)
- Rotten Pumpkin: A Rotten Tale in 15 Voices (Book)
- Seed, Sprout, Pumpkin, Pie (Book)
- The Life Cycle of a Pumpkin (Book)
- The Pumpkin Book (Book)

- All About the Pumpkin Video (Multimedia)
- Pumpkin: How Does it Grow? (Multimedia)
- Pumpkin Reader (Booklets & Readers)

Sources/Credits

1. McNamara, Margaret. *How Many Seeds in a Pumpkin?* Schwartz & Wade, 2007.
2. NC Farm Bureau Ag in the Classroom
3. Utah Ag in the Classroom
4. National Center for Ag Literacy

Suggested SC Standards Met:

English/Language Arts:

- 2.RL.5.1 Ask and answer literal and inferential questions to demonstrate understanding of a text; use specific details to make inferences and draw conclusions in texts heard or read.
- 2.RL.5.2 Make predictions before and during reading; confirm or modify thinking.
- 2.RL.8 Analyze characters, settings, events, and ideas as they develop and interact within a particular context.
- 3.RL.5.1 Ask and answer literal and inferential questions to determine meaning; refer explicitly to the text to support inferences and conclusions.
- 3.RL.8 Analyze characters, settings, events, and ideas as they develop and interact within a particular context.
- 4.RL.5.1 Ask and answer inferential questions to analyze meaning beyond the text; refer to details and examples within a text to support inferences and conclusions.
- 4.RL.6.1 Determine the development of a theme within a text; summarize using key details.
- 4.RL.8 Analyze characters, settings, events, and ideas as they develop and interact within a particular context.
- 5.RL.5.1 Quote accurately to analyze the meaning of and beyond the text to support inferences and conclusions.
- 5.RL.6.1 Determine and analyze the development of a theme within a text; summarize using key details.
- 5.RL.8 Analyze characters, settings, events, and ideas as they develop and interact within a particular context.

Science:

- 3.L.5: The student will demonstrate an understanding of how the characteristics and changes in environments and habitats affect the diversity of organisms.
- 4.L.5: The student will demonstrate an understanding of how the structural characteristics and traits of plants and animals allow them to survive, grow, and reproduce.
- 5.L.4: The student will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems.

Social Studies (2020):

- 3.4.2.HS Investigate the economic and land use characteristics of places and regions around the world.

- 5.5.CX Contextualize the changes in rural communities in South Carolina within national and global industries.

Math:

- 2.NSBT.1 Understand place value through 999
- 2.NSBT.7 Add and subtract through 999 using concrete models, drawings, and symbols which convey strategies connected to place value understanding.
- 2.ATO.4 Use repeated addition to find the total number of objects arranged in a rectangular array with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
- 2.MDA.1 Select and use appropriate tools (e.g., rulers, yardsticks, meter sticks, measuring tapes) to measure the length of an object.
- 2.MDA.3 Estimate and measure length/distance in customary units (i.e., inch, foot, yard) and metric units (i.e., centimeter, meter).
- 3.NSBT.2 Add and subtract whole numbers fluently to 1,000 using knowledge of place value and properties of operations
- 3.ATO.1 Use concrete objects, drawings and symbols to represent multiplication facts of two single-digit whole numbers and explain the relationship between the factors (i.e., 0 – 10) and the product.
- 3.ATO.3 Solve real-world problems involving equal groups, area/array, and number line models using basic multiplication and related division facts. Represent the problem situation using an equation with a symbol for the unknown.
- 4.NSBT.4 Fluently add and subtract multi-digit whole numbers using strategies to include a standard algorithm.
- 4.ATO.2 Solve real-world problems using multiplication (product unknown) and division (group size unknown, number of groups unknown).
- 4.MDA.2 Solve real-world problems involving distance/length, intervals of time within 12 hours, liquid volume, mass, and money using the four operations.
- 5.NSBT.5 Fluently multiply multi-digit whole numbers using strategies to include a standard algorithm.

Pumpkin Pie In A Bag

Making Pumpkin Pie in the Classroom

Materials

Pumpkin Pie In A Bag

- ❑ 1 gallon-size Ziploc bag
- ❑ 2 2/3 cups cold milk
- ❑ 2 packages (4 serving size) instant vanilla pudding mix
- ❑ 1 can (15 ounces) solid pack pumpkin puree
- ❑ 1 teaspoon ground cinnamon
- ❑ 1/2 teaspoon ground ginger
- ❑ Graham cracker crumbs
- ❑ 30 small cups
- ❑ 1 can whipped topping
- ❑ 30 spoons

Oven-baked Pumpkin Pie

- ❑ 3/4 cup granulated sugar
- ❑ 1 teaspoon ground cinnamon
- ❑ 1/2 teaspoon salt
- ❑ 1/2 teaspoon ground ginger
- ❑ 1/4 teaspoon ground cloves
- ❑ 2 large eggs
- ❑ 1 can (15 oz.) pumpkin puree
- ❑ 1 can (12 fl. oz.) evaporated milk
- ❑ 1 unbaked 9-inch (4-cup volume) deep-dish pie shell
- ❑ Whipped cream (optional)

Background

Pumpkins, a squash native to North America, are very popular during Halloween and Thanksgiving. Pumpkins are high in vitamin A and most parts of the pumpkin are edible, including the flesh, the seeds, the leaves, and even the flowers. However we most commonly enjoy the pumpkin flesh cooked and pureed, combine with spices, and made into delicious desserts.

Procedures: No-bake Pumpkin Pie In A Bag

1. In a one-gallon (heavy duty) plastic Ziploc bag, combine the milk and instant pudding mix.
2. Close the bag and knead it with your fingers until the ingredients are completely blended—usually around one minute.
3. Add the pumpkin, cinnamon, and ginger and then reseal the bag.
4. Squeeze and knead the bag with your hands until the mixture is completely blended—usually around two minutes.
5. Place 1/2 tablespoon graham cracker crumbs in the bottom of each of the cups.
6. Cut the corner of the Ziploc bag and squeeze the pie filling into the cups.
7. Garnish with whipped topping and enjoy!

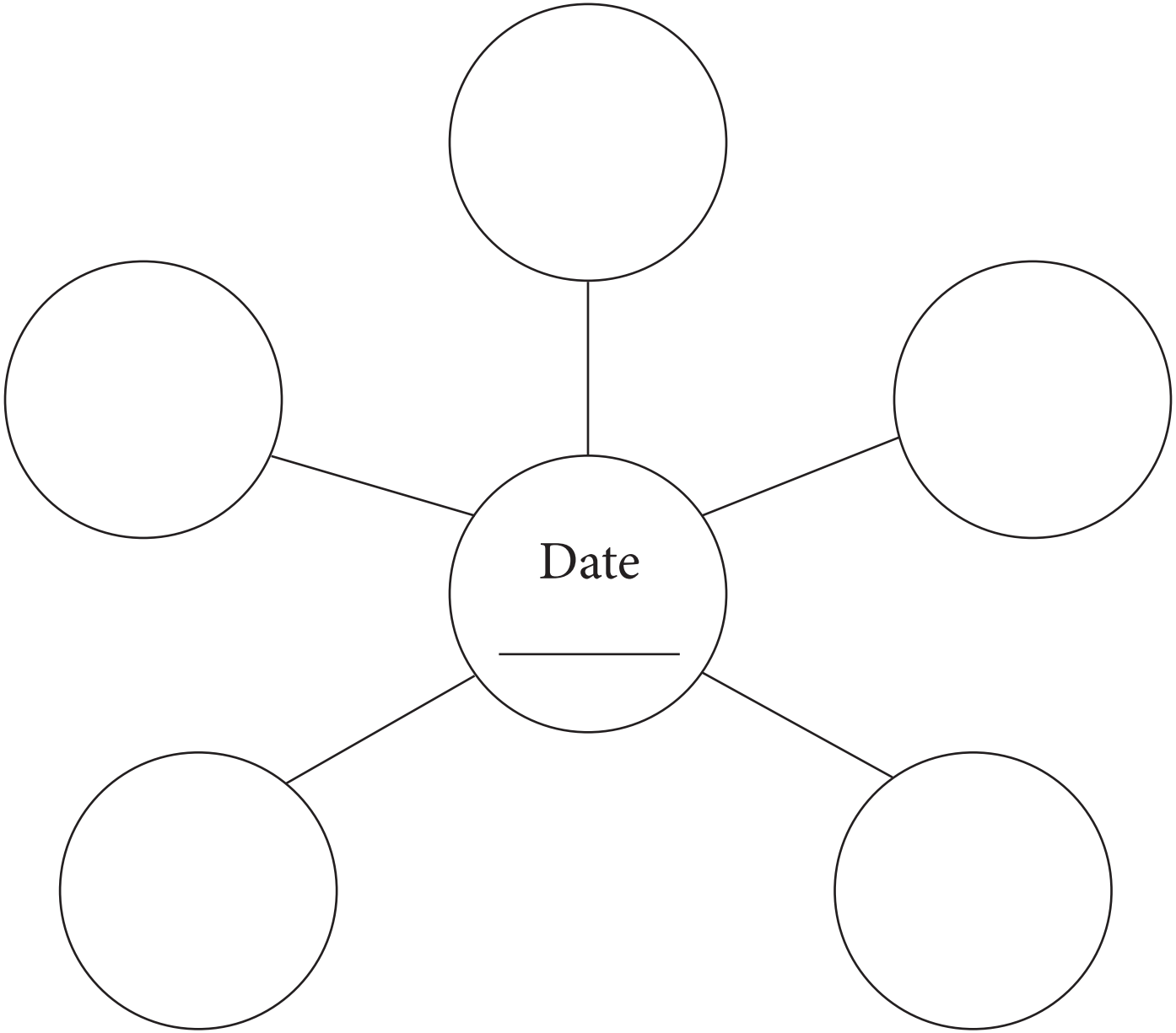
Consider whipping up an oven-baked pumpkin pie using the recipe below and having a taste test between the two types of "pie".

Procedures: Oven-baked Pumpkin Pie

1. Preheat oven to 425°F.
2. Mix together sugar, cinnamon, salt, ginger and cloves in small bowl.
3. Beat eggs in large bowl.
4. Stir in pumpkin and sugar-spice mixture.
5. Gradually stir in evaporated milk
6. Pour mixture into pie shell.
7. Bake in preheated oven for 15 minutes.
8. Reduce temperature to 350° F; bake for 40 to 50 minutes or until knife inserted near center comes out clean.
9. Cool on wire rack for 2 hours.
10. Serve immediately or refrigerate. Top with whipped cream before serving.

Adapted from New Mexico AITC by Utah AITC. Real pumpkin pie recipe from http://www.verybestbaking.com.

Decomposing Pumpkin Observations



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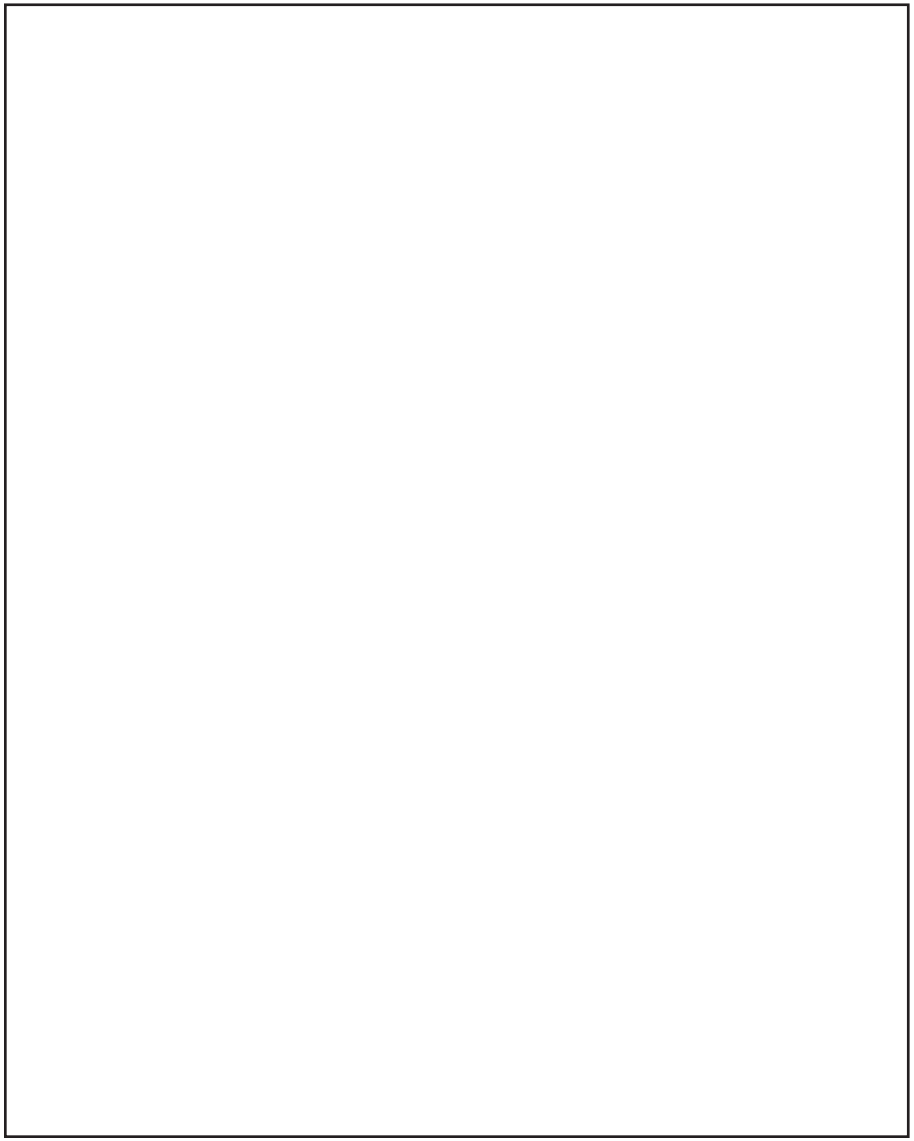
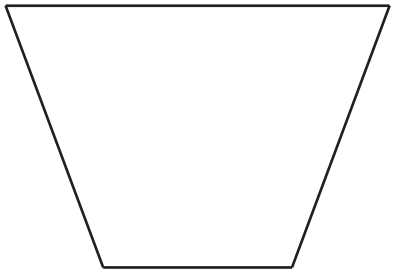
Draw a picture of the pumpkin.



Describe the pumpkin.

Pumpkin Plant Growth Chart



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Height _____

Observations _____

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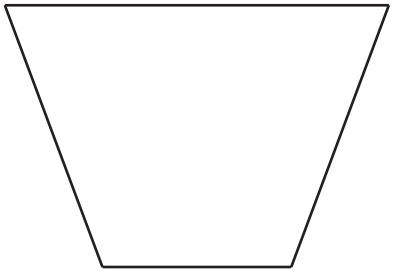

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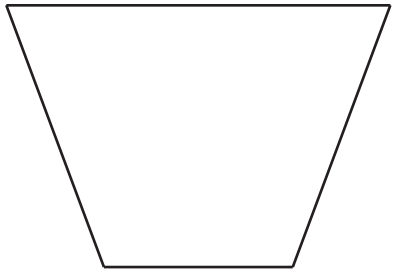

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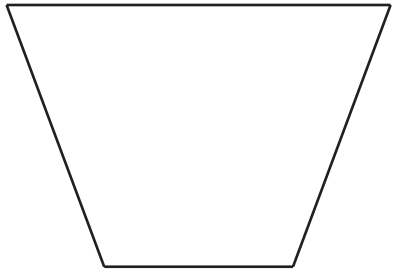

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We have a variety of activities for you and your family/friends to participate in-bounce house and/or live music, pick-your-own pumpkins, and more! You won't want to miss out, trust us! Take a **wagon ride** around the farm to the large pick-your-own pumpkin patch and corn box for **$5/person**. The cost includes a $2 off coupon towards the purchase of the pumpkin you pick from the designated patch. Example: Family of four pays $20 but gets $8 off the cost of their pumpkin. **Wagon ride is free for ages 2 and under!

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Sundays: 2PM - 7PM
Bring your own flashlight

382 Olde Farm Road, Lexington, SC 29072

We would Not be able to purchase this book without the help of the listed farms above. Please consider visiting their corn mazes and pumpkin patches this fall!