



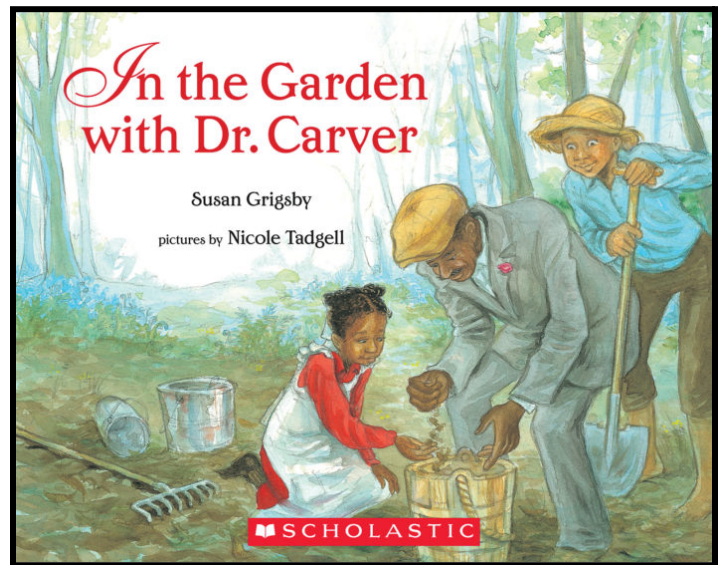
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Ag in the Classroom
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February 2023 Monthly Book In the Garden with Dr. Carver By Susan Grigsby Grade Levels: K-4

Book Summary

Sally is a young girl living in rural Alabama in the early 1900s, a time when people were struggling to grow food in soil that had been depleted by years of cotton production. One day, Dr. George Washington Carver shows up to help. He teaches them how to restore the soil nutrients. He even prepares a delicious lunch made of plants, including "chicken" made from peanuts. Susan Grigsby's warm story shines new light on an African American scientist who was ahead of his time.



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SCAN ME



Did you know? (Ag Facts)

- George Washington Carver was born into slavery in the 1860's in Missouri. People around him called George "the plant doctor" because he knew how to nurse sick plants back to life. When he was about 13, he left to attend school and worked hard to get his education. In 1894 he became the first Black person to graduate from Iowa State College, where he studied botany and fungal diseases, and later earned a master's degree in agriculture. There, Carver's research with peanuts, sweet potatoes, and soybeans flourished. He made agricultural advancements to help improve the lives of poor Black farmers like himself. With the help of his mobile classroom, the Jesup Wagon, he brought his lessons to former enslaved farmworkers and used showmanship to educate and entertain people about agriculture.¹
- Four of the top 10 candy bars manufactured in the USA contain peanuts or peanut butter.²
- Peanuts are one of the star ingredients in a Snickers bar and each bar contains about 16 peanuts. About 100 tons of peanuts go into making the 15 million Snickers bars that are produced by Mars, Inc. every day.²
- Peanut butter/peanut paste is the leading use of peanuts produced in the U.S. (1/2); followed by snack nuts and in-shells (1/4); and, candy and confections (1/4).²
- George Washington Carver is credited for inventing peanut butter. Although he didn't actually invent peanut butter, he did make it popular. He also invented over 300 uses for peanuts.⁴

Book Discussion Questions

- What do plants need to be healthy? What do people need to be healthy? Which needs are shared and which are different?⁶
- Where do plants and people get the things they need? What happens if they can't get those things? What might cause one of these things to not be available?⁶
- What do you think that Dr. Carver meant when he said that we should listen to the plants to find out what they need?⁶
- How did Sally know what the rosebush needed? What clues did she observe to figure this out?⁶

Background Agricultural Connections:

The History of the Peanut

- The peanut plant probably originated in Brazil or Peru, although no fossil records exist to prove this. Peanuts were grown as far north as Mexico by the time the Spanish began their exploration of the New World. The explorers took peanuts back to Spain, where they are still grown today. From Spain, traders and explorers took peanuts to Africa and Asia. Africans were the first people to introduce peanuts to North America. Eventually, peanuts were planted throughout the southern United States. Today, peanuts are one of America's favorite foods.²

The “Father of the Peanut”

- George Washington Carver began his research into peanuts in 1903 at Tuskegee Institute in Alabama. The talented botanist recognized the value of peanuts as a cash crop. He proposed to farmers that peanuts be planted as a rotational crop in their fields. Many farmers found this procedure especially valuable in the southeastern cotton growing areas when insects, called boll weevils, threatened the cotton crops. By listening to the great scientist, peanut production flourished. States growing peanuts today include Georgia, Texas, Alabama, North Carolina, Oklahoma, Virginia, Florida, South Carolina, and New Mexico. Georgia grows more peanuts than any other state. Carver was able to discover over 300 uses for the peanut, including shaving cream, leather dye, coffee, ink, and shoe polish.²

How the peanut plant grows

- Unlike other nuts, peanuts do not grow on trees. The peanut is unusual because it grows on a plant that flowers above the ground, but the actual fruits (the peanuts) grow underground. A farmer usually plants his peanuts in April or May. Once planted, peanut seeds grow into a green plant with oval-shaped leaves that reaches about 18 inches in height. From planting to harvesting, the growing cycle of a peanut takes four to five months.²

Where do Peanuts Grow?

- Eleven states produce almost all of the US peanut crop. Georgia grows nearly half of all US peanuts, followed by Florida, Alabama, Texas, North Carolina, South Carolina, Mississippi, Virginia, Oklahoma, Arkansas, and New Mexico. The peanut-producing states are grouped into three regions. The Southeast region produces the most peanuts and includes Alabama, Georgia, Florida, and Mississippi. Second in production is the Virginia-Carolina region, which includes North Carolina, South Carolina, and Virginia. Third is the Southwest region, which includes Texas, Oklahoma, New Mexico, and Arkansas. In 2013, 72% of all the peanuts grown in the United States were grown in the Southeast region, 15% were grown in the Virginia-Carolina region, and the remaining 13% were grown in the Southwest region.²

Food for Thought

- Dr. John Harvey Kellogg applied for the first patent for peanut butter in 1895. The world was introduced to peanut butter at the Universal Exposition in 1904 in St. Louis. The peanut treat sold for about six cents per pint. Both peanuts and peanut butter are protein powerhouses, providing 12 percent of the recommended daily allowance per serving. About one ounce of peanuts or two tablespoons of peanut butter equal one serving. Peanuts are also a good source of fiber. Fiber reduces the risk of some kinds of cancer and helps the digestive system eliminate waste from the body. In addition, peanuts contain mostly unsaturated fat, which is known as the “good fat.”²

Peanut Allergies

- The occurrence of peanut allergies in the United States has grown significantly. Some peanut allergies are very serious health concerns. Prior to completing any of these activities, be aware of any allergies in your classroom or school and what measures should be taken to avoid allergic reactions.²
- Access more fun facts about peanuts at the National Peanut Board website.

Gardens in South Carolina

- South Carolina is home to many unique gardens, located all over the state. From the beautiful [South Carolina Botanical Garden](#) on the grounds of Clemson University to the majestic [Swan Lake Iris Gardens](#) in Sumter to the famously gorgeous [Brookgreen Gardens](#) in Murrells Inlet, discover why these South Carolina gardens are a must-see for anyone visiting the Palmetto State.⁹
- The animals held at the Riverbanks Zoo is not the only draw—their onsite botanical garden makes just as strong an impression. Included in zoo admission is a chance to wander the lush gardens and see what's growing. From the children's garden to the Asian garden to other sections with various themes, visitors will soon see why this botanical garden was named one of the top 20 Best Public Gardens in America on HGTV.¹⁰

Agricultural Vocabulary⁶

- mule - the offspring of a donkey and a horse⁷
- basking - lie exposed to warmth and light, typically from the sun, for relaxation and pleasure.⁸
- transplant - move or transfer (something) to another place or situation⁸
- nutritious- nourishing; efficient as food.⁸
- loam - a fertile soil of clay, sand, and decomposed (rotting) plant matter
- mulch - decaying leaves, bark, or compost
- muck - fertile waste matter, such as the muddy slime in a swamp or manure
- compost - decayed organic matter used as plant fertilizer
- fertilizer - a substance added to soil to increase fertility
- nutrients - substances that provide essential nourishment
- Humus - the organic component of soil that comes from decaying plants, spaded and hoed, plots

Activities:

1. What does a plant need to grow? (Experiment)

- **Materials:** (set up for if you are doing it whole class - modify if needed to prepare to do this with each individual student or in groups)
 - 5oz-9oz clear plastic cups
 - 4 buckets (optional - just to contain the mess that could potentially be made)
 - 1 bag of soil (could need more if you want to give each kid a cup with seeds)
 - Wisconsin fast seeds or any type of grass seed (grows fast)
 - Ruler
 - Scale (optional) - to take this one step further and make a connection to where they get matter from
- **Set Up:**
 - Area with lots of sunlight
 - Area with NO sunlight
 - An area away from a window but still gets some sunlight

- First ask students, “What do you think plants need to grow?” Spend a few minutes writing down initial thoughts and maybe chart their thinking on a piece of paper.
- Then set up the experiment together. Set up one plant that is going to receive the best soil, sunlight, water throughout the experiment. Set up another plant in a closet or school workroom/cabinet that will not get much sunlight (careful about UV or LED lights - that helps some plants grow) but will get water. Set up another plant that will receive sunlight but no water. Set up another plant that will receive some sunlight and be over watered. If you do one with LED light you will need to make sure the light stays on the plant for 24 hours straight without turning off.
- The students will make predictions of which plant will grow the most and which plant will grow the least and why.
- Students will check on the plants each day and record observations. You can measure the plants with a ruler once they start growing. (record observations in the chart provided on the next page or create one on anchor chart paper with your class.

	Soil, Sunlight, Water	No Sunlight, but yes to water	Too much water, some sunlight	LED light - no soil	Plenty of sunlight - less water
Day 1					
Day 2					
Day 3					
Day 4					
Day 5					
Day 6					
Day 7					
Day 8					
Day 9					
Day 10					

2. [Paint's Family Tree](#)

- **Materials:**

- [Paint's Family Tree Skit](#) dialogue, 1 per student

- [Trait Summary](#) activity sheet, 1 per student
- [Paint's Family Tree](#) activity sheet, 1 per pair of students
- [Paint's Family Tree Master](#) for display (it may be helpful to color this)
- [Family Tree Horse](#) activity sheet, 1 per student
- 1 large sheet of butcher or chart paper
- Glue, glue sticks, or tape
- Colored pencils for each team of students
- **Engage**
 - Show students the Illustrations of Working Horses, and ask them to describe the type of work each horse is doing.
 - As a class, brainstorm what characteristics would make a horse good at each type of work, and write them on the board. For example, a horse that helps herd cows needs to be agile and good at working with people, cows, dogs, and other horses; a racehorse needs to be fast and have good stamina; and a draft horse needs to be strong, willing to work, and easy to handle.
 - Explain to students that over time, people have selectively bred horses for specialized traits that make them suited for certain kinds of work. In order to breed horses to meet specific objectives, it is important to understand how traits are passed from parents to offspring, and that is what will be explored in this lesson.
- **Explore and Explain**

Trait	Paint	Mother	Father	Paternal Father (father's father)	Paternal Mother (father's mother)	Maternal Father (mother's father)	Maternal Mother (mother's mother)
Name	Paint	Fancy Lady	Blazing Away	Daredevil	Pretty Gal	High Stepper	Spotted Beauty
Body Color	black with white patches	black	light red (sorrel)	sorrel	dark red	sorrel	black with white patches
Face Color	white with black ears	black	white stripe (blaze)				white
Leg Color	white	white	sorrel	white socks on hind legs	black with white socks	white socks	white
Tail Color	white with black tip	white with black tip	sorrel		black		black
Mane Color	white with black forelock	black	sorrel		black		black
Eye Color	blue	brown	brown	brown	brown	brown	probably blue (a white head and blue eyes are fairly common)
Temperament	well mannered, and lively	gentle	calm	wild	gentle	gentle	gentle

- Choose four students (two girls and two boys) to play the roles in the skit, [Paint's Family Tree](#). Have them read and act out the skit.
- Give each student a copy of the skit and a [Trait Summary](#) activity sheet. Allow students to read the skit and fill out the activity sheet individually.
- After students have completed the Trait Summary, break them up into pairs.
- Give each pair of students a copy of the Paint's Family Tree activity sheet. Have them color this sheet according to how they filled out the information on the Trait Summary activity sheet. They should also label each horse with its name and relationship to Paint (see Paint's Family Tree Master). Doing this in pairs will help students to correct any mistakes they may have made on the Trait Summary activity sheet.
- Next, divide the students into seven groups, and give each group a Family Tree Horse activity sheet. Assign each group a different member of Paint's family. The group must come to a consensus on how to color their family member using their previously colored family trees. They may need to refer back to the skit for verification.
- When each group is finished, review with them the Paint's Family Tree Master. Students may have put socks and spots in different places; that's okay. (When horses are registered in the "real world," the spots and socks are noted while looking at the horse so that the markings are accurate. This illustration then becomes part of the horse's registration). Have the groups make corrections to their horses' colors and markings only if they are obviously wrong; if not, proceed to the next step.
- Post the large sheet of butcher or chart paper in an accessible location. Have each group place their horse on the paper in the appropriate location to form a family tree. Ask the group to describe their horse's traits. Have students draw lines between the horses to show lines of descent between generations.
- As a class, discuss the similarities and differences in traits among the family members and how each trait might have been inherited. Point out to students that traits are inherited from both parents. However, these traits are not always expressed in every generation (such as the blue eyes that Paint and his maternal grandmother have). Consider using the following questions to further the discussion:
 - What traits were unique to Paint?
 - Can you name other inherited traits that may not be visible?
 - From which relatives did Paint get the black on his tail and mane? His white face? His temperament?

- If another animal (pig, chicken, cow, etc.) were chosen, would you be able to determine from which parent its traits may have been inherited? How would you do it?
 - Imagine that Kuan's family ranch wants to start giving tours using horse-drawn wagons. What characteristics would make their horses suited to this kind of work? What could they do to make sure that the next generation of horses is well suited to pulling wagons?
- **Elaborate**
 - Invite a horse breeder to come to your class as a guest speaker.
 - Further explore the use of draft horses by showing students the video [Introduction to Draft Animal Power](#) from the Cornell Small Farms Program.
- **Evaluate**
 - After conducting these activities, review and summarize the following key concepts:
 - Traits are passed from parents to offspring.
 - Ranchers and farmers use knowledge of inherited traits to breed animals like horses to meet specific objectives.

Sources

1. <http://www.livescience.com/50714-horse-facts.html>
2. <http://www.ansi.okstate.edu/breeds/horses/>

Acknowledgements: This lesson was adapted with permission from California Agriculture in the Classroom's unit [Where'd You Get Those Genes](#) for Grades 5-7.

3. Who was George Washington Carver?

- Have students do some research on George Washington Carver
 - To differentiate you can have younger grades try to give him character traits, or labels to him (Plant Scientist, Honest, Learner, Wise) and older grades can try writing a summary paragraph of why he is important.
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4. Hydroponic Planting Connection

- Use the following website to have a discussion about hydroponic planting with your students: <https://kidsgardening.org/resources/gardening-basics-hydroponics/>³

5. Growth Mindset - Morning Meeting Activity

- Prove that George Washington Carver had a growth mindset and was optimistic even when life was hard.
- Students could work in small groups to do this activity or you could work together with your whole class.
- Watch the following videos about him and see if the class can come up with reasons/evidence to support that he had a growth mindset.

- [▶ The Story of George Washington Carver | Amazing Scientists | SciShow Kids](#)
- [▶ George Washington Carver: An Uncommon Life](#)
- [▶ Who Was George Washington Carver? | The Who Was? Show | Netflix Afte...](#)
- [▶ George Washington Carver for Kids | Learn all about his incredible life and ...](#)
- [▶ Who was George Washington Carver - Facts for Kids](#)
- Challenge: Apply what you have learned about George Washington Carver to your own life.

6. Overcoming a Challenge Discussion:

- Discuss with students the challenges that George Washington Carver faced. How did he overcome them? How did he succeed? How do you think he felt when he was going through tough experiences? Invite students to share personal experiences about when they faced challenges. What steps did they take to overcome their obstacles? Then break students up into groups and have them write and perform skits about overcoming obstacles and determination.⁵

Extension Activities:

- [Apple Science: Comparing Apples and Onions](#)
- [Nuts About Peanuts](#)
- [Apple Science: Comparing Apples and Onions](#)
- [FoodMASTER: Meat, Poultry, and Fish](#)
- [Rock, Paper, Scissors: Dominant and Recessive Traits](#)
- [Cracking Open the Story of Nuts](#)
- [Luscious Leaves](#)
- [George Washington Carver Craft](#)
- [▶ The Secret Garden of George Washington Carver read aloud](#)
- [▶ Kids Book Read Aloud: A Weed is a Flower - The Life of George Washington Carv...](#)
- [▶ In the Garden with Dr. Carver | Black History for Kids | George Washington Carver ...](#)
- <https://www.albertwhitman.com/wp-content/uploads/2010/09/In-the-Garden-with-Dr.-Carver-Teaching-Guide.pdf>

Sources:

1. <https://kids.nationalgeographic.com/history/article/george-washington-carver>
2. <https://agclassroom.org/matrix/lesson/266/> (Debra Spielmaker)
3. <https://kidsgardening.org/resources/gardening-basics-hydroponics/>
4. <https://www.kidsplayandcreate.com/george-washington-carver-facts-for-kids-who-invented-peanut-butter/>
5. <https://educators.brainpop.com/lesson-plan/george-washington-carver-classroom-and-family-activities/>

6. <https://www.albertwhitman.com/wp-content/uploads/2010/09/In-the-Garden-with-Dr.-Carver-Teaching-Guide.pdf>
7. https://www.google.com/search?q=definition+of+a+mule&rlz=1C5GCEM_enUS983US983&og=definition+of+a+mule&aqs=chrome..69i57j69i60l2j69i64j69i65l2j69i61j69i60.3439j0j7&sourceid=chrome&ie=UTF-8&safe=active&ssui=on
8. Google Definitions
9. <https://discoversouthcarolina.com/articles/scenic-gardens-of-south-carolina>
10. <https://bestthingssc.com/botanical-gardens/>

State Standards

Kindergarten

- K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.
- K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
- 2.2 With guidance and support, participate in shared research exploring a variety of texts; express opinions and talk about findings.

First Grade

- 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- 2.2 Participate in shared research exploring a variety of texts; express opinions and talk about findings. 2.2 Participate in shared research; record observations, new learning, opinions and articulate findings.

Second Grade

- 2-LS2-1. Plan and conduct an investigation to determine what plants need to grow.
- 2.2 Participate in shared research; record observations, new learning, opinions and articulate findings.

Grade Three

- Standard 1: Write arguments to support claims with clear reasons and relevant evidence.

Grade Four

- Standard 1: Write arguments to support claims with clear reasons and relevant evidence.

5th Grade

- Support an argument with evidence that plants obtain materials they need for growth mainly from air and water. (5-LS1-1)
- Standard 1: Write arguments to support claims with clear reasons and relevant evidence.