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Farmer Will Allen and the Growing Table

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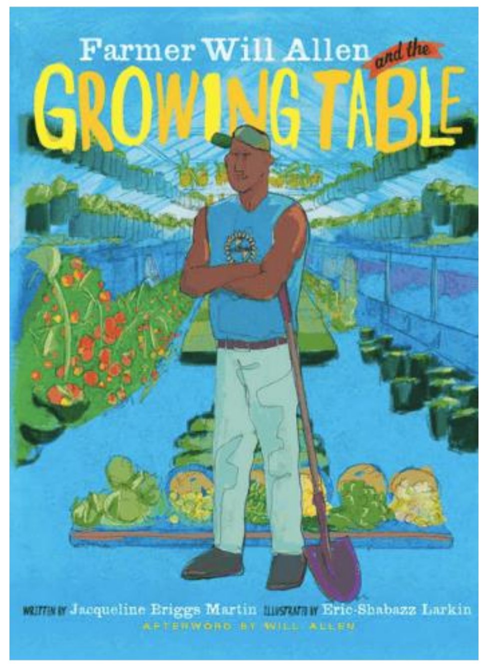
Will Allen is no ordinary farmer. A former basketball star, he's as tall as his truck, and he can hold a cabbage--or a basketball--in one hand. But what is most special about Farmer Will is that he can see what others can't see. When he looked at an abandoned city lot in Milwaukee he saw a huge table, big enough to feed the whole world. No space, no problem. Poor soil, there's a solution. Need help, found it. Farmer Will is a genius in solving problems.[1]



Did You Know? (Ag Facts)

- In one acre of land, there can be more than a million earthworms found.
- The average size of a farm in South Carolina is 197 acres.
- Farm and ranch families make up less than 2% of the U.S. population.
- If all the agricultural land in New York State were devoted to feeding New York City's population, there would be only enough food to feed half the city—with nothing left for the rest of the state.

Discussion Questions

- Have you ever heard of a “food desert”? What do you think the term means?
- Do you think Will’s goal is reasonable? Why or why not?
- How did Will solve the problem of not having enough space?

Grade Level(s): 3-5

Purpose: Students will review plant needs, determine if soil is always necessary for growth, and quantify measurements of perimeter and area.

Vocabulary:

- **agronomist:** a scientist who studies soil management and crop production
- **conserve:** to prevent waste or loss of; to use or manage wisely
- **fertilizer:** any material of natural or synthetic origin that is applied to soils or plant tissues to supply one or more nutrients essential to plant growth
- **growing medium:** a substance through which plant roots grow
- **hydroponics:** the science of growing plants without soil
- **non-arable:** not suitable for the growing of crops
- **nutrient:** a substance that provides nourishment essential for growth and the maintenance of life
- **yield:** full amount of an agricultural product
- **carbon footprint:** a measure of the amount of carbon dioxide released into the atmosphere by a single endeavor or by a company, household, or individual through day-to-day activities over a given period
- **economy:** a way to make a living; how people produce, sell, and buy whole goods and services
- **food miles:** the distance food has traveled from where it is grown to where it is eaten
- **fossil fuel:** a natural fuel such as coal or gas, formed in the geological past from the remains of living organisms
- **local food:** the direct or intermediated marketing of food to consumers that is produced and distributed in a limited geographic area
- **locavore:** a person whose diet consists only or principally of locally grown or produced food

Background Agricultural Connections: [2]

The United States Department of Agriculture (USDA) defines **local food** as the direct or intermediated marketing of food to consumers that is produced and distributed in a limited geographic area. Local food is commonly considered to be food grown within 100 miles of its point of sale or consumption. A **locavore** is a person whose diet consists only or principally of locally grown or produced food. Buying food from local farmers and in-state businesses is believed to be good for communities, the **economy**, and the environment. Purchasing locally grown food lowers the consumer's **carbon footprint**, ensures freshness, and benefits the local economy.

Most food in the United States is shipped an average of 1500 miles before being sold. These distances substantially increase when considering food imported from other countries. Reducing **food miles** lessens the environmental impact of food by cutting back on air pollution and **fossil fuel** consumption.

Typically, produce in the US is picked 4-7 days before being placed on supermarket shelves. Locally sold produce can be harvested at its peak ripeness and reaches the consumer faster and at a fresher stage. In addition, because local produce is fresh, there is less waste. When produce is shipped long distances, the amount of food lost to spoilage increases.

When consumers buy local, more of their money stays in their community. The choice to buy local food affects not only the farmer that grows the food, but also the trucking company that ships the products, the store that sells the product, and the state and city governments that operate on taxes from the businesses you support. Every dollar spent to purchase locally produced products adds four times more to the local economy than a dollar spent at a national chain retailer.

Local food can be found at farmers' markets, restaurants, community supported agricultural programs (CSAs), food co-ops, food hubs, food stores, and online. Due to consumer demand, more and more grocery stores and restaurants are highlighting locally grown food.

Do Plants Need Soil? [2]

Materials:

- How Does it Grow? Hydroponic Spinach Video

Procedures:

1. Have the students make a list of what plants need to grow. Write every requirement the students come up with on the board, regardless of whether or not it is correct .
2. Ask the students, "Do plants need soil?"
3. Show the class the How Does it Grow? Hydroponic Spinach video.
4. Refer back to the question, "Do plants need soil?" Discuss the hydroponic system from the video as evidence that plants can be grown without soil. Define hydroponics as the science of growing plants without soil.
5. Refer back to the students' list of plant needs. Circle (or add and circle) the four main growth requirements—air, light, water, and nutrients.

How Big Is An Acre? [3]

Materials:

- 12” ruler
- 12” x 12” construction paper (at least one square per student)

Procedures:

1. As a class, brainstorm the units we use to measure various things. Examples: an eraser – centimeter; length of a pencil – inch; height of a door – yards; etc.
2. Ask the children how we would measure the amount of space or surface that a large object would cover (the yards of our houses, the field a farmer would plant a crop on, the land our school sits on, etc.) *Direct students to think about an acre, which is approximately 43,000 square feet.
3. Discuss measuring area and inform the students that we often use square feet to measure

area. Think about Farmer Will Allen and the limited space he had; he had to be a precise planner with his space. Large-scale farmers must plan well, too. Conventional farmers use many acres to plant their crops. For example, the average farm size in South Carolina is approximately 197 acres.

4. Show students what a square foot looks like by drawing a square on the board that measures 1 foot on all four sides.
5. Tell the children that today they are going to be "planting a garden" – or planning for a garden space.
6. Give each student several 12" x 12" pieces of construction paper. Explain each piece of paper is a square foot. It measures 1 foot x 1 foot. The area of one piece of paper is one square foot.
7. Clear a space in the classroom or go to a room such as the cafeteria where students will be able to lay all of the squares on the floor and view them.
8. Ask the students to place each square on the floor one at a time to create their garden. The field can be any shape but each square must touch at least one side of another square.
9. When all the squares are laid down, tell students that you now want to construct a fence around your garden. What do you need to know about the garden to know how many fencing supplies to purchase? a. To answer this question, students need to determine the perimeter of their garden by counting the outside edges. Bring in circulars (sales papers) from stores that sell landscaping materials, ask them how much the fencing supplies would cost. Is this the most cost effective shape for the garden? Point out that you will save money by having the smallest possible perimeter. b. Next, find the area by counting the squares.
10. Collect the squares and have the students create a new garden (different shape). Again calculate the area and perimeter of the garden. *This will show students that while the perimeter may change, area does not change simply because the shape changes.

What Should I Grow In My Garden? [4]

Materials:

- Seed Packet Information

Procedures:

1. Ask students to make a list of environmental factors they would need to consider if they wanted to plant a garden outside. (*soil, water, temperature, etc.*)
2. Hold a class discussion in which students identify categories of information they can find on seed packets. Write the categories on the board or chart paper. Categories may include:
    a. Name of the seed or plant
    b. Description of how the vegetable is used (prepared in dishes we eat)
    c. How deep to plant the seeds
    d. Type of soil in which the plant grows best
    e. How far apart to space the seeds when planting
    f. How far apart the plants should be (thinning space)
    g. How long it takes for the seeds to sprout

h. How tall the plants get
i. How long it takes until the plant is ready for harvest
j. The type of weather the plant needs (temperature, sunlight)
k. When to plant the seeds

3. Organize students into groups of two. Give each group a different page from *Seed Packet Information.* Have each group find two pieces of information on their handouts that are specific to their seeds and ask them to share that information with the class. Ask the students why this information is important for growing the plants in a garden. (*Plants have different needs. Knowing this information can help make a garden more successful.*)
4. Conclude the activity by asking students if the information on the seed packets makes them think of anything else they would need to know in order to plant these seeds in a garden. Have them add their ideas to the list they started in procedure 1. (*how much space they have, whether or not the space gets full sun, what type of soil is in the space, what insects live in that area, date of last frost, etc.*)

Extension Activities:

- Take students outside with the 12" x 12" pieces of construction paper to find square footage and/or perimeter of common objects such as a sidewalk, door, window, a picnic tabletop, a seesaw, or a parking space.
- Is there something your class would like to see happen in the world that would make it a better place? Have students research a topic like recycling or community gardening or doing something about cafeteria waste! After they research the facts, have them write a persuasive piece that provides facts and well-thought-out reasons to support their opinions.

Suggested Companion Resources:

- Mapping Meals Activity
- Two Truths and a Lie
- Grow! Raise! Catch!
- How Did That Get in My Lunchbox?
- How to Make an Apple Pie and See the World
- On the Farm, at the Market
- To Market, To Market
- Who Grew My Soup?
- Pizza Time Bulletin Board
- Eat Happy Project video series
- Planet Food Online Game
- My American Farm

Sources/Credits:

1. Martin, Jacqueline Briggs. *Farmer Will Allen and the Growing Table*, Readers to Eaters, 2013.
2. National Center for Agricultural Literacy
3. Virginia Ag in the Classroom
4. Nutrients for Life Foundation

Suggested SC Standards Met:

English/Language Arts:

- 3.RI.5.1 Ask and answer literal and inferential questions to determine meaning; refer explicitly to the text to support inferences and conclusions.
- 3.RI.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.
- 4.RI.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.RI.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.
- 5.RI.5.1 Quote accurately from a text to analyze meaning in and beyond the text.
- 5.RI.12.3 Read and respond according to task and purpose to become selfdirected, critical readers and thinkers.

Math:

- 3.MDA.5 Understand the concept of area measurement
- 3.MDA.6 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
- 4.MDA.3 Apply the area and perimeter formulas for rectangles.
- 5.MDA.4 Differentiate among perimeter, area and volume and identify which application is appropriate for a given situation.

Science:

- 3.S.1A.7 Construct scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 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.S.1A.7 Construct scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 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.S.1A.7 Construct scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.

Name ______________________

MASTER 4.4, A

SEED PACKET INFORMATION

CORN—EXTRA SWEET	
Corn is easy to grow from seed. Ears of this corn are 9 inches long and very sweet.	**SEED DEPTH** 2 inches (5 centimeters)
PLANTING Plant seeds after last frost and when soil is warm. Plants need a sunny location. Plants will grow about 5 feet tall. Not recommended to start seeds indoors.	**SEED SPACE** 6 inches (15 centimeters) **SPROUTS IN** 7-14 days **PLANT SPACE** 12 inches (30 centimeters)
HARVEST Ears are ready to pick about 18 days after silks appear. Snap the ears off the stalk with a quick twist.	**ROW SPACE** 36 inches (91 centimeters) **READY TO HARVEST IN** 70 days

Name ______________________

MASTER 4.4, B

SEED PACKET INFORMATION

WATERMELON—CRIMSON SWEET	
These sweet watermelons can weigh up to 25 pounds. They have a light green rind with dark green stripes. The fruit inside is dark red and very sweet. Watermelons make a great low-calorie snack or dessert.	**SEED DEPTH** ½ -1 inch (1-3 centimeters)
PLANTING Plant seeds in deep, well-worked soil in a sunny place after all chance of frost is over. The seeds may be planted indoors 3-4 weeks before planting outside. The seedlings need to be spaced well because the vines can be up to 8 feet long. Watermelon plants do not grow well in containers.	**SEED SPACE** 2-3 inches (5-8 centimeters) **SPROUTS IN** 4-8 days **PLANT SPACE** 6-8 feet (2-2.5 meters)
HARVEST Watermelons are ready when they twist easily off the stem and the spot where they rest on the ground is yellow.	**ROW SPACE** 48 inches (1.2 meters) **READY TO HARVEST IN** 80 days

Name ____________________

MASTER 4.4, C

SEED PACKET INFORMATION

CARROTS—LITTLE FINGER	
This variety of extra-sweet carrot grows about 3 inches long. Great for serving whole.	**SEED DEPTH** ½ inch (1 centimeter)
PLANTING Plant seeds in well-worked soil after last frost in the spring. Keep seeds evenly moist. Starting seeds inside is not recommended.	**SEED SPACE** ½ inch (1 centimeter) **SPROUTS IN** 14-21 days **PLANT SPACE** 1 inch (3 centimeters)
HARVEST To make harvesting easier, water the soil before pulling carrots. Twist the tops while pulling up the roots.	**ROW SPACE** 12 inches (30 centimeters) **READY TO HARVEST IN** 65 days

Name ____________________

MASTER 4.4, D

SEED PACKET INFORMATION

TOMATO	
Tomatoes can be used in many recipes, including soups, sauces, stews, and ketchup.	**SEED DEPTH** ¼ inch (6 millimeters)
PLANTING Tomato seeds usually are planted indoors and transplanted to the garden after the last spring frost and when the soil temperature is at least 60 degrees. Do not plant tomatoes in the same spot two years in a row.	**SEED SPACE** 1 per pot **SPROUTS IN** 7-10 days **PLANT SPACE** 18 inches (46 centimeters)
HARVEST Pick tomatoes when they are as ripe as possible. They should be bright red and firm. The leaves of the tomato plant are poisonous and should not be eaten.	**ROW SPACE** 36 inches (91 centimeters) **READY TO HARVEST IN** 72 days

Name ________________________

MASTER 4.4, E

SEED PACKET INFORMATION

BEET—DARK RED	
The roots are sweet and nutritious. The leafy greens can be used in salads or steamed.	**SEED DEPTH** ½ inch (1 centimeter)
PLANTING Plant seeds in well-worked soil after last frost in the spring. Plants grow best in full sun. Beet seeds are actually a fruit with 1-5 seeds inside. Thinning the seedlings is very important. Plant beets in early spring and in the fall. Beets do not do as well in the hottest part of the summer.	**SEED SPACE** 1 inch (3 centimeters) **SPROUTS IN** 14-21 days **PLANT SPACE** 12 inches (30 centimeters)
HARVEST Pick the greens when they are 4-6 inches tall and the roots are less than 2 inches in diameter.	**ROW SPACE** 12 inches (30 centimeters) **READY TO HARVEST IN** 59 days

Name ________________________

MASTER 4.4, F

SEED PACKET INFORMATION

CILANTRO (CORIANDER)	
The plant is called cilantro but the seeds are called coriander. The leaves are used in many dishes, especially Asian and Latin American recipes. The leaves are best when fresh. The seeds can be used in many recipes and can even be sugar-coated and eaten as candy.	**SEED DEPTH** ¼ inch(6 millimeters)
PLANTING Plant seeds outdoors in full sun after last chance of frost. Keep soil evenly moist. Starting seeds indoors is not recommended because plants do not transplant well. Seeds need darkness to sprout.	**SEED SPACE** 1 inch (3 centimeters) **SPROUTS IN** 10-20 days **PLANT SPACE** 9 inches (23 centimeters)
HARVEST The leaves of cilantro can be harvested anytime. The seeds should be harvested after they begin to turn brown.	**ROW SPACE** 24 inches (61 centimeters) **READY TO HARVEST IN** 60-90

Name ____________________

MASTER 4.4, G

SEED PACKET INFORMATION

SPINACH	
The dark green leaves of spinach are tender. Spinach is high in iron and vitamins A and C.	**SEED DEPTH** ½ inch (13 millimeters)
PLANTING Spinach grows best in the spring or fall when the weather is cooler. Choose a location with rich moist soil. To have spinach ready for harvest all the time, plant more seeds every 10 days.	**SEED SPACE** 1 inch (3 centimeters) **SPROUTS IN** 5-10 days **PLANT SPACE** 5 inches (13 millimeters)
HARVEST Harvest by pulling the entire plant or by cutting individual leaves as needed.	**ROW SPACE** 12 inches (30 centimeters) **READY TO HARVEST IN** 42 days

Name ____________________

MASTER 4.4, H

SEED PACKET INFORMATION

BROCCOLI	
These plants produce lots of broccoli throughout the season. Broccoli can be eaten raw or cooked.	**SEED DEPTH** ¼ inch (6 millimeters)
PLANTING Start seeds indoors. After the last frost and when seedlings are about 2 inches tall, transplant outdoors. Plant seedlings at least 12 inches apart. Plants grow best in full sun.	**SEED SPACE** 1 inch (3 centimeters) **SPROUTS IN** 10-21 days **PLANT SPACE** 12 inches (30 centimeters)
HARVEST Pick broccoli heads that have tight, firm buds. Cut the center head with 6 inches of stalk. Other smaller heads can also be harvested.	**ROW SPACE** 24 inches (61 centimeters) **READY TO HARVEST IN** 60-90 days

Name ______________________

MASTER 4.4, I
SEED PACKET INFORMATION

GREEN BEANS—BLUE LAKE	
These plants produce lots of beans over al long season. Beans have excellent flavor either fresh or frozen.	**SEED DEPTH** 2 inches (5 centimeters)
PLANTING Plant seeds outside after last frost and when temperatures are warm. Plant seeds in an area that gets full sun. Plants will grow about 20 inches tall.	**SEED SPACE** 3 inches (8 centimeters) **SPROUTS IN** 7-14 days **PLANT SPACE** 6 inches (15 centimeters)
HARVEST Beans are ready to pick when the pod breaks in half cleanly. This is when seeds have just begun to form and the pods are 4 to 8 inches long. Hold the stem with one hand and pull the pod off with the other hand to avoid breaking the plant's branches.	**ROW SPACE** 36 inches (91 centimeters) **READY TO HARVEST IN** 58 days

Name ______________________

MASTER 4.4, J
SEED PACKET INFORMATION

CABBAGE	
Cabbage heads can grow very large—up to 20 pounds. Cabbage can be eaten raw or cooked. After harvesting, cabbage can be stored for several months.	**SEED DEPTH** ¼ inch (6 millimeters)
PLANTING Plant outside in early spring or in late summer. If starting seeds indoors, plant seeds 4-6 weeks before transplanting outside. Plants grow best in full sun.	**SEED SPACE** 8 inches (20 centimeters) **SPROUTS IN** 10-21 days **PLANT SPACE** 16 inches (41 centimeters)
HARVEST Harvest cabbage when heads become firm. Cut stems at soil level and remove outer leaves. Smaller heads will grow after the first head is picked.	**ROW SPACE** 24 inches (61 centimeters) **READY TO HARVEST IN** 105 days

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