

SC Farm Bureau
Ag in the Classroom
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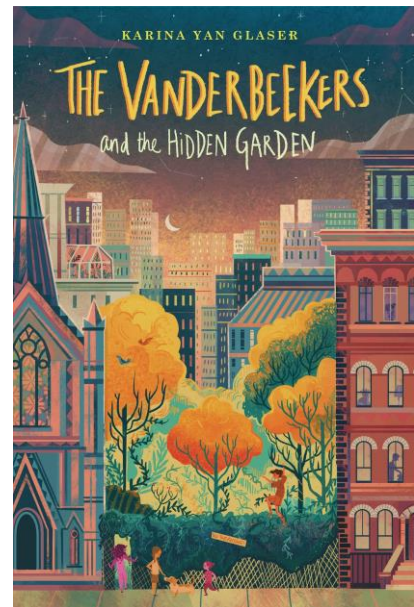


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The Vanderbeekers and the Hidden Garden

By: Karina Yan Glaser

When catastrophe strikes their beloved upstairs neighbors, Mr. Jeet and Miss Josie, the Vanderbeeker children set out to build the most magical healing garden in Harlem. The children face setbacks with a locked fence, and abundance of thistles and trash, a lack of funding for plants and dirt, and a shady building developer who threatens to sell the land. But the children persevere because their motive behind the garden is love and hope for Mr. Jeet and Miss Josie. ²



Did You Know? (Ag Facts) ²

1. There are nearly 25,000 farms in SC amounting to nearly 5 million acres in farmland.
2. Two thirds of the land in SC is covered with forests.
3. Between 2001 and 2016, 281,000 acres of agricultural land was developed or compromised.
4. Since 1992, SC has lost approximately 2,000 farms with cropland.

Discussion Questions

- How does development affect agriculture?
- Have you noticed changes in your community in regards to development?
- What can you do to bring awareness to this situation?

Grade Level(s): 5-8

Purpose: Students will understand that topsoil is a limited resource with economic value.

Vocabulary:

- **conservation tillage:** farming methods that reduce the intensity or frequency of tilling in order to maintain some ground cover throughout the year and disturb the soil as little as possible while still providing the conditions needed to grow a productive crop
- **contour planting:** tilling and planting crops on the contour, or at a right angle to the slope, which slows water flowing downhill and reduces erosion
- **cover crop:** a crop grown for the protection and enrichment of the soil
- **nonrenewable resource:** limited natural resource that cannot be replaced or reproduced within a generation and cannot be managed for renewal; examples include oil, soil, mineral resources (lead, iron, cobalt, zinc, etc.)
- **strip cropping:** planting in strips or bands of alternating crops that serve as barriers to erosion; crops that have fibrous roots hold the soil better than crops with tap roots, and taller crops act as wind buffers
- **sustainable agriculture:** an approach to agriculture that focuses on producing food while improving the economic viability of farms, protecting natural resources, and enhancing quality of life for farmers and society as a whole
- **value:** usefulness or importance of something; also, the amount of money that something is worth

Background Agricultural Connections: ³

Agriculture is an important part of the economy of the United States. In 2020, 19.7 million full- and part-time jobs were related to the agricultural and food sectors—10.3 percent of the total U.S. employment.¹ Agricultural exports are translated into billions of dollars for United States trade. On poor soil, it costs farmers more to produce good crops, and this cost is passed on to the consumer—you—in higher prices at the grocery store. Erosion reduces agricultural productivity and washes sediment into rivers, lakes, ocean gulfs and bays, affecting fisheries and recreation opportunities in these water bodies. Soil loss affects our country's economy and our lives.

The United States has more high-quality agricultural land than any other country in the world. Just over half of our land is used for agricultural production, and that production depends on good soil. It can take 100 to 500 years to make one inch of topsoil. From the perspective of a human lifetime, soil is a **nonrenewable resource**. Fertile topsoil produces the highest yields of food per acre, and farmers will work hard to protect their soil, but erosion can be complicated and expensive to address.

In the United States, cropland erosion decreased by more than 40% between 1982 and 2007. During this time, more and more farmers implemented practices like **strip cropping, contour planting, conservation tillage**, and planting **cover crops** to help mitigate wind and water erosion. Erosion has slowed over the past 30 years, but we are still losing millions of tons of topsoil each year at a rate much faster than the natural replenishment rate. Farmers don't always have the resources needed to implement soil conservation practices. For example, cover crops effectively reduce erosion, but the seed for the crop costs money, takes time to plant, and needs water to grow, and the cover crop doesn't directly generate any income for the farmer.

Soils produce our food, keeping us alive. How do we put a **value** on soil or land? Many would say it is simply invaluable, but farmers have to make economic decisions about the soil every day. They cannot spend more to protect the soil than they earn from selling their crops, or they will go out of business. Yet, if farmers don't protect the soil, many years of erosion could destroy the productivity of our valuable agricultural soils. The field of **sustainable agriculture** has grown out of problems like this. Agricultural scientists, policy makers, engineers, and many others are working to help farmers develop techniques that are economically viable, produce the food we need, and protect natural resources like soil and water over the long term.

Slicing Up Earth's Land Resources ³

Materials:

- Large apple
- Knife
- Cutting Board
- Earth's Soil Resources Pie Chart activity sheet, 1 per student

Procedures:

1. Give each student 1 copy of the Earth's Soil Resources Pie Chart activity sheet and ask them to fill it out while you perform the following demonstration:
 - a. Cut the apple into four equal wedges. Three of these quarters represent the oceans, which occupy 75% of Earth's surface. Set these aside.
 - b. The remaining quarter represents land area, which occupies 25% of Earth's surface. Take this quarter, and cut it in half, so you have two, one-eighth sections.
 - c. One of these sections represents deserts, swamps, mountains, and polar regions; this half of our land, or one-eighth (12.5%) of Earth's surface, is not suitable for people to live or grow crops on. Set this section aside.
 - d. The other eighth represents land where people can live. There are some places where people can live, but crops can't be grown. Slice this section lengthwise into four equal parts. Now you have four 1/32nd pieces of an apple, each representing 3.1% of Earth's surface.
 - e. The first section represents the areas of the world with rocky soils that are too poor for any type of food production. Set this section aside.
 - f. The next two sections represent land that is too wet or too hot for food production. Set these sections aside also.
 - g. The fourth section represents the area of the world that is most suitable for development and agricultural cultivation. The best lands for agriculture are often desirable places to build homes and towns as well.
 - h. Carefully remove the peel of the last 1/32nd section. This small bit of peel represents all the soil of our earth upon which humans depend for food production.

Cost Versus Value ³

Procedures:

1. Discuss the economic, environmental, and societal value of soil. Then demonstrate some scenarios involving the dollar valuation of soil. Use the following examples or develop your own.

2. Say you have 1 acre of land and 7 inches of topsoil. If every inch is worth \$10 (round numbers simplify the math), your topsoil would be worth \$70.
3. Suppose you lose $\frac{1}{2}$ inch of topsoil each year to erosion. How much money would you be losing each year? (*\$5.00 of topsoil from one acre*) What is your topsoil now worth? (*\$65.00*) At your current rate of topsoil loss, how many years will it take to lose all seven inches? (*14 years*)
4. Discuss other losses that would occur (crops will be less productive, your income will go down, you will feed fewer people with the crops grown on your acre, sediment will wash into lakes and rivers downstream). How much would you be willing to pay to prevent erosion of your topsoil?
5. Discuss the following questions:
 - a. Since soils provide our food, how can we place a value on them?
 - b. Who pays for soil conservation?
 - c. Who benefits from soil conservation?
 - d. What is an acre of farmland worth?
 - e. What is an acre of city worth?

Extension Activities: ⁴

- *The Magical Healing Garden*
 - In small groups, ask students to review the garden plot on page 226, and then to research plants and flowers that would flourish in the Harlem climate. Each group should make a list of plants and flowers and then determine where each would be planted in the garden. Each group can then illustrate how their garden would look in bloom and write a paragraph or poem describing the garden. The illustrations can be displayed in the classroom or in the hallway.
- *A Neighborhood Community*
 - Many of the neighbors in the community wrote quotes about gardens and flowers and attached them to the fence around the garden. Ask students to research quotes about communities and neighbors that would fit in the Harlem community where the Vanderbeekers live. Students should select a quote and write a paragraph explaining why they chose that particular quote. Students should use evidence from the text to provide support. The quotes can be shared with the class.
- *Mr. Jeet and Miss Josie*
 - When Mr. Jeet has his stroke and is taken to the hospital, Miss Josie refuses to leave his side. Fortunately, Mrs. Vanderbeeker willingly helps Miss Josie by bringing her clothes; the children water her plants; and Laney brings Paganini to cheer Mr. Jeet up. In small groups, ask students to plan a volunteer program for elderly people in their community or in the local hospital that need help. Students should make a list of services they could offer and design a flyer they could post at the hospital, community center, library, or other public place.

Suggested Companion Resources:

- [Nutrients for Life eLessons](#)
- [SOIL Reader](#)
- [Planet Zorcon](#)
- [Apple Land Use Model](#)
- [Dust Bowl: CBS 1955 Documentary](#)
- [Dust Bowl: Grantsville, Utah](#)

- [FDR's Fireside Chat: Dust Bowl](#)
- [Living Soil Film](#)
- [Preserving Heirloom Crops with Wozupi Farms](#)
- [Soil Science Videos](#)
- [Soil, Not Dirt](#)
- [School Gardens: A Guide for Gardening and Plant Science](#)
- [Dirt-to-Dinner: Food Matters](#)
- [Soil Center](#)
- [Soil Health Education Resources](#)
- [Soil Life](#)
- [Soil Science Society of America](#)
- [Unlock the Secrets in the Soil](#)
- [Web Soil Survey](#)

Sources/Credits:

1. Yan Glaser, Karina. *The Vanderbeekers and the Hidden Garden*. Clarion Books, 2018.
2. NC Ag in the Classroom
3. Utah Ag in the Classroom
4. Karina Yan Glaser resources/educator's guide

Suggested SC Standards Met:

English/Language Arts:

- 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.
- 6.I.2.1 Transact with text in order to formulate logical questions based on evidence, generate explanations, propose and present conclusions, and consider multiple perspectives
- 6.RL.5.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- 6.RL.6.1 Determine a theme of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments
- 6.RL.8.1 Describe how a plot in a narrative or drama unfolds and how characters respond or change as the plot moves toward a resolution; determine the impact of contextual influences on setting, plot and characters.
- 7.I.2.1 Formulate logical questions based on evidence, generate explanations, propose and present original conclusions, and consider multiple perspectives.
- 7.RL.5.1 Cite multiple examples of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text
- 7.RL.8.1 Analyze how setting shapes the characters and/or plot and how particular elements of a narrative or drama interact; determine the impact of contextual influences on setting, plot, and characters.
- 8.RL.2.1 Formulate logical questions based on evidence, generate explanations, propose and present original conclusions, and consider multiple perspectives.
- 8.RL.5.1 Cite the evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- 8.RL.8.1 Analyze how dialogue and/or incidents propel the action, reveal aspects of a character, or provoke a decision; determine the impact of contextual influences on setting, plot and characters.
- 8.RL.11.1 Analyze how the author's development of perspectives of the characters and the reader create suspense or humor.

Science (2021 standards):

- 5-ESS3-1. Evaluate potential solutions to problems that individual communities face in protecting the Earth's resources and environment.

- 7-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- 7-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Earth's Soil Resources Pie Chart

