

A Teaching Guide for *In the Garden* with Dr. Carver

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Teacher's guide written by Susan Grigsby



Pre-reading

VOCABULARY WORDS

Listed below are some vocabulary words that your students may not be familiar with. Pronounce each word for the students and use it in a sentence. Ask them to try and infer the meaning from the context in the story or from the illustrations. Act out, as a group, the verbs and the actions the nouns might take. From pages 22 and 24, several delicious words are defined, all of which pertain to fertile soil.

Page 3: mule

Page 10: basking

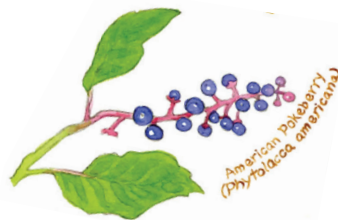
Page 11: transplant

Page 21: nutritious

Page 22: 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)

Page 24: humus (the organic component of soil that comes from decaying plants),
spaded and hoed, plots

Page 31: burr, tendril, darting



DISCUSSION

Dr. Carver worked to help people improve the Southern soil and maximize their crop yields. Using Venn Diagrams, discuss with the students the questions below and compare similarities and differences. One diagram might focus on the needs of plants and people and the other on the sources that fulfill those needs.

1. What do plants need to be healthy? What do people need to be healthy? Which needs are shared and which are different?
2. 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?
3. What do you think that Dr. Carver meant when he said that we should listen to the plants to find out what they need?
4. How did Sally know what the rosebush needed? What clues did she observe to figure this out?
5. What are some ways that you might know if a plant needed one of the things that we listed in our diagram? What could you do to help?

National Science Education Standards: C3 Organisms and Environments
Bloom's Taxonomy: Critical Thinking Questioning Strategies

ACTIVITIES

DANDELIONS AND SEED DISPERSAL CONNECTIONS

Background Information:

An excellent site for elementary plant science is The Missouri Botanical Garden's Biology of Plants

Website: <http://www.mbgnet.net/bioplants/main.html>

Included on that site is a section on seed dispersal where students can watch the life cycle of the dandelion and see a picture of a burr: <http://www.mbgnet.net/bioplants/seed.html>

SEED SEARCH

Explore: Go outside on a seed hunt. How many different seeds can you find? Can you identify how they travel? What plants did they come from? Try planting some in containers in the classroom.

DANDELION DANCE

Creative Movement: Have students act out the life cycle of the dandelion as a narrator leads them through the changes over time and with weather.

National Science Education Standards: C1 the Characteristics of Organisms; C2 Life Cycles of Organisms

PLANT A POEM ON PAPER

The name 'dandelion' comes from a derivation of the French for *tooth of the lion* - *dent de lion*. What other tooth-related words have 'dent' in them?

Look at the jagged leaves of the dandelion. What other names could you invent for this plant by comparing the appearance of its leaves, flower, or seed head to something else?

Review the use of comparisons made with metaphors and similes.

Brainstorm a list of descriptions for the dandelion and write a group poem.

Then ask students to write their own poem about a plant.

Here are a few dandelion metaphors to get you started:

A blazing sun shining in the yard

A pack of lions invading the garden

A globe of snow, fragile and still

A wind storm of stars / swirling in the air

Language Arts: Use of metaphor and simile; Writing Poetry



OBSERVING THE NATURAL WORLD

The quotation, “NATURE IS OUR GREATEST EDUCATOR”, appears in *Suggestions for Progressive and Correlative Nature Study*, written by Dr. Carver in 1902. The following activities are rooted in Dr. Carver’s suggestions for teachers from over 100 years ago.

STOP, LOOK, LISTEN

Go outside to the school yard or a park. Have each student find a place to sit and ask them to stay there quietly for twenty minutes, observing the plot of earth before them. Provide regular or colored pencils and ask them to sketch the different things they see in their spot. Ask them to note in writing the sounds they hear and the activities and scents that they observe.

Another day, focus on one subject such as leaves, stems, or flowers. Ask them to draw as many different kinds as they can find.

TO ATTACH TO SOMETHING A NAME, IS TO MAKE IT YOUR OWN

After the observation activities are completed, have the students use identification guides to label what they drew. Look at the similarities and differences between different plants. See the *Making a Garden with Reused Treasures* Activity for ideas on labeling your school yard plants.



THE NATURAL WEB

Dr. Carver said that everything in nature is connected. Focus on a local natural habitat and native creatures, including those that are nocturnal.

1. Brainstorm with the students a list of plants, creatures, and other elements of their natural habitat such as trees, grasslands, and ponds.
2. Divide the list among your students and ask each to answer research questions about their topic and to draw it. Your state department of conservation might provide reference materials.
3. Using a large wall, hang the students’ work and add soil, sun and people. Connect the pages with yarn, creating the strings of the web. What do they think should go at the center of the web? Is everything connected? Are people a part of this web? Which lines are food chains? What happens if one link is removed? Alternative web idea: Let the students stand with their picture and form a web with yarn.

National Science Education Standards: C1 the Characteristics of Organisms; C3 Organisms and Environments; F4 Changes in Environments



VEGETABLE GARDEN MATH

In *Nature Study and Gardening for Rural Schools* (1910), Dr. Carver encouraged teachers to use gardening as a means to teach math concepts.

Create your own sample story problems with your class based on gardening situations similar to those noted below, utilizing the math skills you wish to assess.

Then ask your students to create their own story problems with answer keys, to share with their classmates. If you are able to build a school garden, let the story problems serve as practice for planning out the school garden.

Even if you can't plant a school garden, have vegetable seed packets available for the students to read and apply the planting instructions.

BUSH BEAN PROFITS

A packet of bush bean seeds cost \$2.95. You have to spend an additional \$16.00 on tools and fertilizer. If you can grow 100 plants from this packet and each plant produces one pound of beans, how many pounds will you harvest? If the beans sell for \$1.00 a pound, what will be your profit?

PLANTING TIME

Your seed packet will tell you the length of time from planting until harvest. Identify the estimated date for the last spring frost in your region (which tells you when it's safe to plant). If your bush beans take 58 days from planting to harvest, on what date will they be ready to pick?

PLANNING A GARDEN

Using paper (plain or graph paper) and colored pencils, lay out a rectangular garden plot x feet by y feet. Identify a scale for the students to use such as 1-inch equals 1-foot. Allow two-foot borders around the garden. The seed packets will tell you how far apart to plant both the seeds and the rows. How many different plants will you grow? How many of each vegetable will you plant in this garden plot? Make a color key showing the different vegetables you will plant. Identify the scale you've used.

Common Core State Standards/Mathematics: Describing situations and solving problems with the four operations; Length measurement; Time and money; Shapes.

Common Core State Standards/ Literacy in Science: Synthesize and apply information presented in diverse ways.

IMPROVING THE SOIL

Dr. Carver encouraged farmers to feed their soil by two methods that avoided the expense of using commercial fertilizers. One was the planting of legumes, such as peanuts and cowpeas, which not only provided people with an excellent protein, but also released nitrogen into the soil as their roots decayed. The other method he advocated was the use of compost.

Here is a nice slide show for students with good information and instructions on composting:

<http://aggie-horticulture.tamu.edu/kindergarden/kidscompost/kid1.html>

EXPERIMENT WITH COMPOST RECIPES

After researching compost, provide students with recycled planters (yogurt containers, etc.) with a drainage hole poked at the bottom. Let them experiment with different compost and soil mixtures, applying the concepts of balancing brown (for carbon) and green (for nitrogen) ingredients. Encourage the students to seek out a variety of possible ingredients including vegetable and fruit waste, leaf mulch, and coffee grounds. For comparative purposes, include a planting of school yard soil without any compost added. Ask them to measure and record their ingredients.

Next, have them plant a seed in each of their containers. All seeds should be taken from the same seed packet and planted at the same depth. Let them also measure out and record the water they give the plant. As soon as a seed begins to appear, have them start to record measurements of plant growth and dates and to record their information on a table or graph. When the project is completed, ask them to report their findings orally, visually, and/or in a written report.

National Science Education Standards: Science as Inquiry, A1 & A2; D1 Properties of Earth Materials.

HEALTHY EATING

A good garden is one of the best family physicians, Dr. Carver said in the 1943 biography “George Washington Carver” by Rackham Holt.

GETTING TO KNOW FRESH FRUITS AND VEGETABLES

Encourage your students to plant a few vegetables in a small spot of land at their homes or to make a container garden to set in a sunny spot.

Introduce them to fruits and vegetables and discuss why we try to eat from the different color groups. Have a fruit and vegetable party where one of every kind you can find is displayed whole, then sliced for tasting.

National Science Education Standards: F2 Personal Health



FRUIT AND VEGETABLE RIDDLE POEMS

After students have explored the tastes, names, textures, coverings, seeds, and shapes of fruits and vegetable, write riddle poems. Ask them to include at least one active verb, one comparison, and one color clue. Rhyming should be optional. Write one or two group poems first, to model. Using a paper square and glue, they can create a flap to hide their answer. Let each child read their riddle to the class and call on classmates for the answer. Here's an example:

What Am I?

Alone, I look like a crescent moon
hanging golden in the night.

But beneath my peel

hides a treat, sweet and cloud white.

(a banana)

COOKING WITH DR. CARVER

Dr. Carver published 105 recipes using peanuts! He also developed recipes for many other foods. In the Tuskegee link below, you will find a few of his recipes including the mock chicken made from peanuts recipe that is mentioned in "In the Garden with Dr. Carver."

<http://www.nps.gov/history/museum/exhibits/tuskegee/gwcresearch.htm>

Here is a link from the University of Maine with wild-green salad instructions, including recipes for dandelion greens: <http://www.umext.maine.edu/onlinepubs/htmpubs/4060.htm>

MAKING A GARDEN WITH REUSED TREASURES

Nothing should be wasted, Dr. Carver said.

CONTAINER GARDENS

Many items that get sent to the trash dump could be used for container gardens. Provide suggestions to your students and ask them to collect some treasures.

If you can't punch or drill a drainage hole in the bottom of a container, line the bottom with gravel or broken shards of crockery. Placing a cotton fabric scrap or a reused plastic bag inside of containers like wicker baskets will prevent the soil from rapidly washing out. A reused plastic bag can also be used to line a metal container to slow down rust (poke the drainage hole through the container and the plastic liner).

Possibilities include: old leather boots and shoes; toy dump trucks, train cars, and doll buggies; old wagons; plastic containers ranging from small yogurt cups to large barrels; clean buckets and coffee cans; pots and pans; even purses. Anything with a handle can become a hanging planter. (Help the students to decide which containers should be used for edibles and which for flowers. As a general rule, if you wouldn't put your mouth on it, don't plant food in it.)

GARDEN LABELS

Create labels for plants you've identified in the school yard and for your container gardens. Review plant needs and include on the labels for your container garden symbols indicating sun and water needs. Permanent Markers can be used to write on all sorts of reused treasures. Thinner plastic containers, lids, and cups can be cut into durable labels.

SOCIAL STUDIES CONNECTIONS

The two websites noted below provide excellent information and archived photos about Dr. Carver and his life's work as an inventor, researcher, and humanitarian.

<http://www.nps.gov/history/museum/exhibits/tuskegee/index.htm>

<http://www.fieldmuseum.org/carver/>

CREATE A CLASSROOM MUSEUM

Research with your students the many contributions that Dr. Carver made. Ask each student to create a display, perhaps illustrating or making an artifact that demonstrates one of his contributions.

Consider expanding your museum to include other American inventors.

CHANGING TIMES

Dr. Carver was born into slavery and, from the primary level up through his graduate studies, had to persevere to find schools that would admit him.

Explore with your students the changes that occurred in the North and South after the time of his birth. Place this into context for your students with the founding and development of the Tuskegee Institute. (See <http://www.nps.gov/archive/bowa/tuskin.html> for more information on this subject.)

Explore with your students the causes behind the situation that Dr. Carver met when he arrived in the South – that of the soil being depleted by years of cotton growth and the farmers struggling to survive on meager wages from poor cotton crops.

*National Science Education Standards: E2 Understanding About Science and Technology; G History and Nature of Science
National Center for History in the Schools: 8A Understanding the development of technological innovations, the major scientists and inventors associated with them and their social and economic effects; 4A Understanding historic figures who have exemplified values and principles of American democracy.*

