Harvest of the Month

Network for a Healthy California

Health and Learning Success Go Hand-In-Hand

Research shows a direct relationship between eating a nutritious breakfast and educational achievement, including improved attendance. Encourage your students to start the day with a healthy breakfast that includes at least one fruit or vegetable. If students cannot eat breakfast at home, encourage them to enroll in the school breakfast program. *Harvest of the Month* supports academic content standards to give students the chance to explore, taste, and learn about the importance of eating fruits and vegetables. It links the classroom, cafeteria, home, and community to motivate and support students to make healthy food choices and be physically active every day.

Exploring California Green Beans: Taste Testing

What You Will Need (per group of 4-6 students):

- 1 cup each of fresh (uncooked), cooked, and canned green beans
- Printed Nutrition Facts labels for each green bean variety*
- Pencil and paper

*Download Nutrition Facts labels from **www.harvestofthemonth.com**.

Activity:

- Make three columns on paper for fresh, cooked, and canned beans.
- Taste fresh green beans and record the color, texture, smell, sound, and taste.
- Look at the nutrition label for fresh beans and record the sodium, sugar, calories, and vitamin content.
- Repeat for cooked and canned green beans.
- Compare and contrast the characteristics, as well as the differences in the nutrient content for each variety.
- Have a class discussion on the differences and similarities in characteristics.
- Hypothesize what factors contributed to increased or decreased nutrient levels.

Helpful Hint: Complement *Taste Testing* with *Adventurous Activities* (page 4).

For more ideas, reference:
School Foodservice Guide – Successful Implementation Models for Increased Fruit and Vegetable Consumption, Produce for Better Health Foundation, 2005, pp. 39-42.

Nutrition Facts

Serving Size: ½ cup fresh green beans (50g)

Calories 16	Calories from Fat 0
	% Daily Value
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 3mg	0%
Total Carbohydrate 3g	1%
Dietary Fiber 1g	6%
Sugars 2g	
Protein 1g	
Vitamin A 7%	Calcium 2%
Vitamin C 10%	Iron 3%

Cooking in Class: Green Beans in Dip

Makes 32 servings: ¼ cup green beans and ¼ cup salsa dip per serving

Ingredients:

- 4 cups fat free sour cream
- 4 cups fresh salsa
- 8 cups green beans, washed, ends cut off
- Small paper cups

1. In a large bowl, mix sour cream and salsa.
2. Spoon ¼ cup dip into cup.
3. Insert 4 to 5 green beans into each cup. Serve immediately.

Nutrition information per serving:
Calories 39, Carbohydrate 8 g, Dietary Fiber 1 g, Protein 2 g, Total Fat 0 g, Saturated Fat 0 g, Trans Fat 0 g, Cholesterol 3 mg, Sodium 238 mg

Adapted from: *Healthy Latino Recipes Made With Love, Network for a Healthy California,* 2008.

For more ideas, reference:
Kids Cook Farm-Fresh Food, CDE, 2002.

Reasons to Eat Green Beans

A ½ cup of cooked green beans provides:

- A good source of vitamin C and vitamin K.
- A source of vitamin A, fiber, and folate.

Champion Sources of Fiber*:

- Avocados
- Beans
- Blackberries
- Cooked greens
- Figs
- Kiwifruit
- Peas
- Soybeans

*Champion sources provide a good or excellent source of fiber (at least 10% Daily Value).

For more information, visit:
www.nal.usda.gov/fnic/foodcomp/search/
(NDB No.: 11052, 11053, 11061, 11729)

GREEN BEANS

What Are Vegetables?

- Vegetables are edible plant parts.
- There are two main kinds of vegetables – those that grow below ground and those that grow above ground.
- Below ground vegetables are described as ***roots and tubers*** (e.g., radishes, carrots, parsnips, potatoes, and onions).
- Above ground vegetables are described as ***leaves*** (e.g., spinach, cabbage, lettuce, kale), ***flowers*** (e.g., broccoli, cauliflower, artichokes), ***stalks*** (e.g., celery, asparagus), ***pods*** (e.g., peas, beans, okra), ***vegetable fruits*** (e.g., eggplant, tomato, chili), ***vine fruits*** (e.g., cucumber, squash, pumpkin), and ***fungi*** (e.g., mushrooms).
- There are a few plant foods that are botanically fruits, but commonly known and eaten as vegetables. These include tomatoes, cucumbers, squash, and avocados.

Source:
www.cfaitc.org

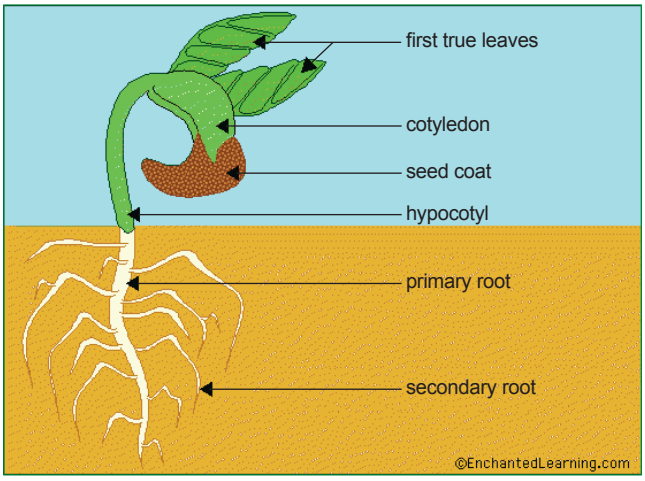
How Do Green Beans Grow?

Green beans are sensitive to cold temperatures and must be planted in the spring. Seeds are planted about one-inch deep and watered. The seeds tend to crack and do not germinate properly if the soil's moisture content is too high.

Once planted, the seed's ovary develops into the pod, which is six inches or more in length. The pod contains the seeds. Each seed consists of a coat containing two *cotyledons* (where food is stored); a *hypocotyl* (the lower portion which develops into the root); and an *epicotyl* (the young stem from which the *plumule,* or primary leaf bud, develops).

Harvesting takes place when the pods are firm, crisp, and fully elongated, but before the seed within the pod has developed completely. The plant continues to form new flowers and produce more beans if pods are continually removed before the seeds mature. Growers also assure a continuous supply of beans by planting seeds every two to four weeks in mid-summer.

For more information, visit:
http://rics.ucdavis.edu/postharvest2/Produce/ProduceFacts/Veg/snapbeans.shtml



Botanical Facts

Pronunciation: grēn bēn
Spanish name: ejote
Family: Fabaceae
Genus: *Phaseolus*
Species: *P. vulgaris*

The common bean is a species of the herbaceous annual plant of the Fabaceae family. These plants are grown worldwide specifically for their edible beans. There are two main classifications of beans — edible pod beans and shell beans — and the colors and shapes of each vary tremendously. In fact, there are more than 200 species of beans.

Green beans are edible pod beans that can be grown as bush beans or pole (running) beans. They are often referred to as *string beans* because a fibrous string originally ran along the seam of the bean pod. The string was noticeable when snapping off the end of the pod. This snapping noise is the reason for its other common nickname, *snap beans*. The pod color of green beans can be green, golden, purple/red, or even streaked, but the beans inside the pod are always green. Green beans range in shape from thin "fillet" to wide "romano" types.

Pod Color	Green Bean Varieties
Green	Yardlong (also called Asparagus or Chinese), Blue Lake, Haricot Verts, Burpee's Stringless, Roma II, Kentucky Blue/Wonder, Contender
Yellow	Golden Wax, Rocdor, Cherokee Wax
Purple/Red	Purple King, Red Swan
Streaked	Dragon's Tongue, Rattlesnake

For more information, visit:
http://plantanswers.tamu.edu/publications/vegetabletravelers/index.html
http://urbanext.illinois.edu/veggies/beans.cfm

How Much Do I Need?

A ½ cup of green beans is about one cupped handful. This is about 10 medium green beans. The amount of fruits and vegetables that is right for each person depends on age, gender, and physical activity level. Students need to get at least 60 minutes of physical activity every day. Encourage students to eat at least one fruit or vegetable with every meal and snack to help them reach their daily amount. Adding a variety of colorful fruits and vegetables to their plates will help them get the nutrients they need to be healthy and grow strong.

Recommended Daily Amount of Fruits and Vegetables*

	Kids, Ages 5-12	Teens and Adults, Ages 13 and up
Males	2½ - 5 cups per day	4½ - 6½ cups per day
Females	2½ - 5 cups per day	3½ - 5 cups per day

*If you are active, eat the higher number of cups per day.
Visit **www.mypyramid.gov** to learn more.

Student Sleuths

1. Why is nitrogen important for plant growth?
2. What is riboflavin? Name three things riboflavin does for the body.
3. Illustrate the two cotyledons, hypocotyl, epicotyl, and plumule that form during green bean growth.
4. What were some of the harvesting techniques for green beans practiced by Native Americans as observed by early explorers?
5. What does the "three sisters of life" refer to in green bean history? (Hint: Question #1 should help in finding this answer.)

For information, visit:
www.fruitsandveggiesmatter.gov/month/fresh_beans.html
www.ipmcenters.org/cropprofiles/docs/cabeans-green.html
www.mypyramid.gov

Home Grown Facts

- California ranks third in national production of green beans*.
- Ninety-five percent of the green bean crop in California is marketed as fresh and about five percent as processed.
- Tulare, Orange, and San Luis Obispo counties are the largest green bean-producing areas in California.
- Other counties that contribute acreage to green beans include Riverside, Santa Clara, Contra Costa, Stanislaus, San Diego, San Mateo, and San Bernardino.
- Bush-type green beans are the predominant variety grown for commercial production in California.

*2008 Data

For more information, visit:
www.anrcatalog.ucdavis.edu/pdf/7240.pdf

A String of Green Bean History

The common bean was cultivated in ancient Mesoamerica as early as 8,000 years ago. Beans were even found in the mummy covering of a woman in a Peruvian cemetery dating back to pre-Inca civilization. Green beans and all 200 varieties of *P. vulgaris* originated in the tropical southern part of Mexico, Guatemala, Honduras, and part of Costa Rica. They spread from this center of origin to North and South America long before European explorers ever arrived.

Early explorers found the climbing beans planted alongside maize. The first drawings of the bush bean were recorded by the German doctor Leonhart Fuchs in 1542, and were also described in detail by explorers John Verazanno and Samuel de Champlain.

When first discovered, the green beans had a "string" that ran on the outer curve of the pod shell. This led to the nickname "string beans." [See *Botanical Facts* (page 2) for details.] Botanists, however, found a way to remove the string through breeding and in 1894 the first "stringless" bean plant was cultivated. Today, nearly all varieties of edible pod beans are grown without strings.

For more information, visit:
www.extension.iastate.edu/healthnutrition/foodrecipeactivity/food

School Garden: Where Beans Grow

If your school has a garden, here is an activity you may want to implement. Look for donations to cover the cost of seeds, tools, irrigation systems, electric pumps, and any salary incurred by garden educators or others.

What You Will Need:

- Bean seeds, soaked overnight
- 4 plant containers (per group of 4 students)
- Potting soil
- Rulers
- Graph paper

Activity:

- Discuss factors that impact the growth of beans (e.g., air, water, nutrients, temperature).
- Divide students into groups. Distribute containers to each group. Label containers with group name.
- Students place soil in three of the four containers; add a bean seed to each container.
- Each group places containers in a different location: one near sunlight, one away from sunlight and covered with dark paper, one in a cold dark place (e.g., refrigerator), and the one with no soil near the window.
- Students water the seeds daily, being careful not to overwater.
- Measure weekly the growth rates of each seed using rulers.
- Graph results for each container using a bar graph.
- Make predictions regarding growth over time.
- Discuss how the various environmental influences impact the growth rate. Make connections to how farmers are impacted by environmental influences (weather, drought, pollution).

For more ideas, visit:
www.cangc.org

Just the Facts

- Green beans are nitrogen fixers, which means they have the ability to draw nitrogen from the air and return it to the soil. Because of this, farmers often plant beans and legumes in their crop rotations to replenish the soil.
- Fresh beans are classified into two basic categories: edible pod and shell beans (also called dry beans*). Green beans are the most popular edible pod bean, while lima beans are the most common shell bean sold in the United States.

*Refer to *Dry Beans Newsletter* on **www.harvestofthemonth.com**.

Adventurous Activities

Problem Solving:

- Use the pods and beans from the *Taste Testing* activity (page 1) in math equations, fractions, and to demonstrate multiplication tables.

  Example:
  - If there are four pods and each pod contains three beans, how many beans are there total?

History Exploration:

- Trace the history of the green bean back to its origins in ancient Mesoamerica. Have students research the native populations that cultivated beans and how they used them (e.g., food, medicine, religion). Assign groups of students with a region in North, Central, or South America and have each group do a presentation.

Creative Writing:

- Use green beans in a poetry assignment or for a discussion on literary elements such as alliteration, rhyming, onomatopoeia, similes, and metaphors.

For more ideas, visit:
www.nal.usda.gov/kids

Student Champions

Have students brainstorm and gather their favorite healthy green bean recipes. Ask students to visit their favorite restaurant to ask what kind of green bean dishes they have available; then offer to provide them with healthy recipes featuring green beans to promote as a "school special." Offer to include special student-made artwork to help the restaurant show they are supporting a local school.

Literature Links

- **Primary:** *One Bean* by Anne Rockwell, *Jack and the Bean Stalk* by Steven Kellogg, *Beyond the Beanstalk–Gardening Activities for Kids* by Nancy Allen Jarenka, *Explore the Magic World of California Beans* by the California Dry Bean Advisory Board, and *Vegetables (Good for Me!)* by Sally Hewitt.
- **Secondary:** *10 Terrific Vegetables and Everything You Need to Grow and Know Them* by the National Gardening Association and *Spill the Beans and Pass the Peanuts: Legumes* by Meredith Sayles Hughes.

Physical Activity Corner

Students will progress through the life cycle of a green bean plant by playing Rock-Paper-Scissors with other students.

- All students start out as seeds by walking low to the ground with arms wrapped around head until a signal is given to find a partner.
- Students play one game of Rock-Paper-Scissors with a partner.
- The winner becomes a sprout by walking upright with hands on top of head, wrists together, and fingers pointing up. The other student remains a seed.
- Continue the game until all students have grown from a seed, to a sprout, and finally to a green bean vine with arms outstretched and swaying.
- Students may only pair up with another student who is at the same stage.

Adapted from: Physical Activity Specialist, Northcoast Region, *Network for a Healthy California,* 2011.

For more ideas, visit:
www.letsmove.gov

Cafeteria Connections

Work with your school nutrition staff to conduct a contest to determine your school's favorite fruit and favorite vegetable. Make it simple by using poster boards to print out the names and pictures of various fruits and vegetables (one fruit or vegetable per board). Post the boards in the cafeteria and give every student two colored dots: red for fruits and green for vegetables. Students can then vote by placing the dot on their favorite fruit and vegetable. Older students can help with tallying the results. You can also involve school staff to vote for their favorites. Post all results in a common location to share with students and staff.

For more ideas, reference:
Fruits and Vegetables Galore, USDA, 2004.

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