

Harvest of the Month



Network for a Healthy California



Nutrition Facts

Serving Size: 1 cup fresh spinach (30g)
Calories 6 Calories from Fat 0

	% Daily Value
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 24mg	1%
Total Carbohydrate 1g	0%
Dietary Fiber 1g	2%
Sugars 0g	
Protein 1g	

Vitamin A 56% Calcium 3%
Vitamin C 14% Iron 4%

SPINACH

Health and Learning Success Go Hand-In-Hand

State testing in the spring is an ideal time to reinforce the importance of nutrition and physical activity. Academic achievement and healthy behaviors, such as eating breakfast, are mutually reinforcing. Kids who eat breakfast miss fewer days from school and have improved behavior and attitude. And kids who do well in school are more likely to practice other healthy behaviors. *Harvest of the Month* supports content standards to give students the chance to learn about the importance of making healthy food choices and being physically active every day.

Exploring California Spinach: Taste Testing

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

- 1 cup each of fresh and cooked* California grown spinach
- Nutrition Facts labels** for fresh and cooked spinach
- Paper and pencils

*Spinach may be microwaved, blanched, steamed, or sautéed.

**Download from www.harvestofthemoth.com.

Activity:

- Taste fresh and cooked spinach. Note color, texture, smell, sound, and flavor.
- Review the Nutrition Facts labels for fresh and cooked spinach. Compare and contrast the nutritional values, as well as serving size equivalents (i.e., 1 cup fresh = ¼ cup cooked). Ask students why the serving size equivalents vary.
- Poll for students' preferences. Share results with school nutrition staff.

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.

Cooking in Class: Spinach Raisin Salad

Makes 24 servings at ¼ cup each

Ingredients:

- 6 ounces raw spinach, washed and drained
- ½ cup raisins*
- ¼ cup light balsamic vinaigrette
- Small paper trays or plates

1. Combine spinach, raisins, and vinaigrette in a bowl. Mix well.
2. Place ¼ cup of salad on paper tray. Serve immediately or chilled.

*May substitute with other dried fruit.

Nutrition information per serving:

Calories 13, Carbohydrate 3 g, Dietary Fiber 0 g, Protein 0 g, Total Fat 0 g, Saturated Fat 0 g, Trans Fat 0 g, Cholesterol 0 mg, Sodium 23 mg

Adapted from: Tasting Trio Team, *Network for a Healthy California*, 2009.



Reasons to Eat Spinach

One cup of fresh spinach provides:

- An excellent source of vitamin A and vitamin K*.
- A good source of vitamin C and folate.

A ½ cup of cooked spinach provides:

- An excellent source of vitamin A, vitamin K, folate, and magnesium.
- A good source of vitamin C, vitamin B₆, calcium, iron, potassium, and riboflavin.

*Learn about vitamin K on page 2.

Champion Sources of Vitamin K*:

- Asparagus
- Broccoli
- Brussels sprouts
- Celery
- Cooked greens (e.g., spinach, collards, kale, mustard greens, Swiss chard)
- Peas
- Cooked soybeans

*Champion sources provide an excellent source of vitamin K (at least 20% Daily Value).

For more information, visit:

www.nal.usda.gov/fnic/foodcomp/search/
(NDB No.: 11457, 11458)

What is Vitamin K?

- Vitamin K helps stop cuts and scrapes from bleeding too much and starts the healing process.
- Together with calcium, vitamin K helps build strong bones.
- Vitamin K may also help keep blood vessels healthy.
- It helps your body make proteins for your blood, bones, and kidneys.
- Vitamin K deficiency is uncommon in healthy adults because it is widely available in foods. Bacteria in the large intestine also synthesize a form of vitamin K.

For more information, visit:

www.eatright.org

<http://lpi.oregonstate.edu/infocenter/vitamins/vitaminK/>

How Does Spinach Grow?

Spinach is grown mainly in California and Texas as a cool winter crop. An annual plant, spinach grows best in cool, damp weather and rich, moist soil. Spinach is typically planted by direct seeding, about one-half to three-quarter inches deep in soil, in four to eight rows on raised beds that are 38 to 40 inches wide. Generally, around 10 to 15 pounds of seeds are planted per acre (there are about 40,000 seeds in one pound).

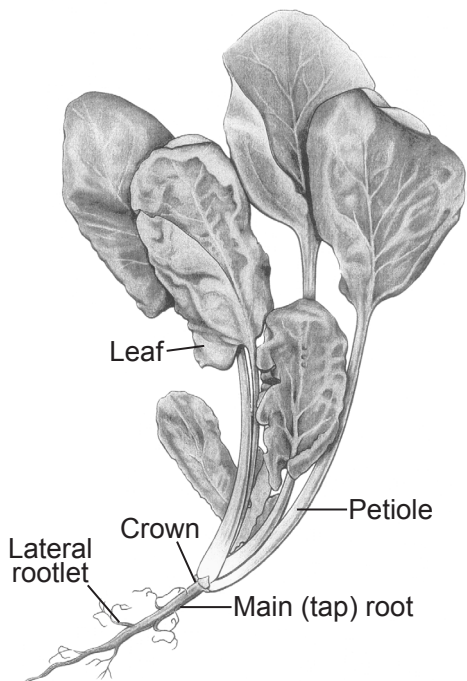
California growers may sow as many as 1.3 million seeds per acre in a six- or eight-row configuration for spinach that will be sold fresh in bunches. Fresh market spinach is planted at a rate up to twice as fast as the rate of spinach that will be used for processed foods (processed spinach) because the crop is harvested at a younger stage, when leaves are small and vertical.

For additional growing information, refer to the *Spinach Botanical Image* on www.harvestofthemonth.com.

For more information, visit:

www.leafy-greens.org/greens/spinach_nn.html

www.urbanext.illinois.edu/veggies/spinach.cfm



Botanical Facts

Pronunciation: spĭn'ĭch

Spanish name: espinaca

Family: Amaranthaceae

Genus: *Spinacia*

Species: *S. oleracea*

Spinach is an annual plant of the family Amaranthaceae, which includes widely distributed shrubs and herbs. Spinach consists of small and medium leaves that are bright green, thick, soft, and oval to arrow-shaped with green stems. Both the leaves and stems are edible. The leaves form rose-like clusters or rosettes from which flowering shoots emerge.



The name "spinach" has been applied to a number of leafy vegetables that are unrelated or only distantly related to spinach including: New Zealand spinach (Aizoaceae family), Water spinach (Convolvulaceae family), Malabar spinach (Basellaceae family), and Orach (Chenopodiaceae family), which is also referred to as "French spinach" or "mountain spinach." In reality, there are three main varieties of spinach:

Variety	About the Leaves, Taste, and Use
Savoy	Crinkly, dark green, curly leaves; rough texture with distinct taste; sold as fresh
Flat or smooth	Unwrinkled, spade-shaped leaves; milder taste than savoy; used for canned and frozen spinach, soups, baby foods, etc.
Semi-savoy	Slightly curly leaves; easier to clean than savoy; sold as fresh and found in processed foods

For more information, visit:

www.fruitsandveggiesmatter.gov/month/spinach.html

How Much Do I Need?

One cup of fresh spinach is about two cupped handfuls. When cooked, this makes about a ¼ cup of cooked spinach*. The amount of fruits and vegetables you need depends on your age, gender, and physical activity level.



Spinach is available fresh, frozen, and canned – and all forms count toward your daily amount. Have students visit www.mypyramid.gov/kids to learn how much they need. Have them make a list of fruits and vegetables they like to eat and how they like to eat them.

*Most fresh and cooked vegetable portions are equivalent in size (i.e. a ½ cup fresh equates to a ½ cup when cooked). Spinach is unique in that the fresh and cooked forms vary in size.

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 Vitamin K is a fat-soluble vitamin. The “K” is from the German word “koagulation.” Coagulation refers to the process of blood clot formation. Describe how vitamin K causes blood to clot.
- 2 Research the nutritional benefits of vitamin K. List at least five food sources that contain vitamin K.
- 3 How does cooked spinach compare in protein content versus other green vegetables, such as broccoli, leaf lettuce, green beans, and avocados?
- 4 Spinach contains oxalic acid, which binds with iron and calcium and reduces the absorption of these minerals. Ask students to provide ways that help to improve absorption of these minerals while eating spinach.
- 5 Ask students to research chlorophyll and its role in the growth process of plants and vegetables.
- 6 Determine how much of the spinach harvested in California goes into processed and frozen foods versus how much is available to be sold whole/fresh.

For information, visit:

www.leafy-greens.org/greens/spinach_nn.html
www.ipmcenters.org/cropprofiles/docs/caspinach.html
www.fruitsandveggiesmatter.gov/month/spinach.html

School Garden: Classroom Plants

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.

Many plants can be easily started in a classroom where there is ample light (a window sill) and by using seeds, cuttings, or plants. If the weather outside permits, spinach and herb plants can also be easily planted in a school garden. Spinach must have at least six weeks of cool weather from seeding to harvest.

What You Will Need:

- Shallow plant containers
- Seeds (herbs, spinach, etc.)
- Potting mix ($\frac{1}{3}$ sand, $\frac{1}{3}$ peat moss, $\frac{1}{3}$ soil)

Activity:

- Fill containers with potting mix.
- Plant small herb seeds no more than $\frac{1}{4}$ -inch deep; or, sprinkle on top of soil and cover lightly with potting mix.
- Mist soil and cover containers with plastic to keep seeds moist until germination.
- Give herb plants room to grow to maturity (one plant per four-inch container or two per six-inch container).
- Discuss how herbs are utilized in cooking to add flavor.
- Have students complete *Student Sleuths* #1-3 (below) to learn the health benefits of eating spinach.
- When ground outside is ready, transfer plants to garden.

Adapted from: www.garden.org/articles/articles.php?q=show&id=2116

For more ideas, visit:

www.foodlandpeople.org/resources.pdf



Cafeteria Connections

Work with school nutrition staff to capitalize on the historical cartoon figure “Popeye” to promote spinach.

- Have students develop cartoons, school announcements, and recipes for the school cafeteria menu to promote Popeye’s favorite vegetable — spinach.
- Work with a few classrooms and have students create “cartoons” that promote the benefits of spinach. Students can develop either posters or cartoon strips that include nutrition information, history, and other interesting facts.
- Older students can develop a media campaign to promote the health benefits of leafy green vegetables.

For more ideas, reference:

Fruits and Vegetables Galore, USDA, 2004.

Home Grown Facts

- California is the leading producer of fresh market and processed spinach in the United States.
- Processed spinach accounts for about 74% of all spinach grown in California. It is used for canning and freezing, as well as for baby food (puréed).
- Spinach is produced in four major areas: the north central coast (Monterey, San Benito, Santa Clara, Santa Cruz counties), the central San Joaquin Valley (Stanislaus, Tulare counties), the southern and desert valleys (Imperial, Riverside counties), and the south central coast (Santa Barbara, Ventura counties).
- Almost half of California’s spinach acreage and production is located in Monterey County.
- Most spinach grown in the San Joaquin Valley is used for processing due to lower production costs.

For more information, visit:

www.ipmcenters.org/cropprofiles/docs/caspinach.html
www.cdffa.ca.gov

Just the Facts

- Annual consumption of spinach (fresh, frozen, and canned) jumped 66% from 1992 to 2002. This is mostly due to the availability of pre-cut, bagged spinach.
- Chlorophyll, or a group of green pigments found in plants and vegetables, like spinach, can be used to create a phenomenon called “fluorescence,” which is essentially the same phenomenon as neon light.
- Spinach was the first frozen vegetable to be sold for commercial use.
- When Popeye made his debut on January 17, 1929, spinach became the third most popular children’s food after turkey and ice cream. Today, more than 94% of Americans associate spinach with Popeye.



Physical Activity Corner

One of the best ways to ensure that students have fun while engaged in an activity is to allow them to take part in the decision-making process. Encourage students to plan their own daily physical activity.

What You Will Need:

- Vegetable and fruit paper cut-outs
- Mixing bowl

Activity:

- Start with discussion about differences between aerobic and anaerobic exercises.
- Students write down aerobic exercises they want to do on vegetable cut-outs.
- Students write down anaerobic exercises they want to do on fruit cut-outs.
- Toss the “salad” in mixing bowl.
- Have a volunteer select a vegetable or fruit cut-out from the bowl.
- Do the aerobic or anaerobic activity as a class.

Go Further: Have students count their pulses for 60 seconds after each activity and record it in a log. Compare changes at the end of the month.

For more ideas, visit:

www.letsmove.gov/activeschools.php

A Leaf of Spinach History

Spinach originated in Persia (now Iran) where it was known as *aspanakh*. It made its way to China in the 7th century when the king of Nepal sent it as a gift. Spinach arrived in Europe in the 11th century when it was brought to Spain by the Moors (Muslims). In fact, spinach was known as “the Spanish vegetable” in England.



In the 16th century, spinach became the favorite vegetable of Catherine de Medici of the famous Medici family of the Italian Renaissance. When she left her home in Florence, to marry King Henry II of France, she brought along her own cooks to prepare spinach in the many different ways she liked. Since then, dishes prepared on a bed of spinach are referred to as *à la Florentine*.

North Americans began growing spinach in the early 19th century. In the 20th century, spinach was popularized by the cartoon character, Popeye, who gained amazing strength whenever he ate a can of spinach.

Adventurous Activities

Problem Solving:

- Present students with a variety of Nutrition Facts labels from various fruit and vegetable products.
- Compare serving sizes and calculate the differences in specific nutrients for each food.

Science Investigation:

- Distribute a variety of *Fruit and Vegetable Photo Cards** (CDE, 2008) to students. Ask them to think about why plants have so many different colors and what effect(s) environmental factors might contribute to their variations. What purpose might these factors serve for the plant? Have students use the information on the *Photo Cards*, as well as what they know and have observed, to help them answer these questions.

History Exploration:

- Besides food, spinach has been used throughout history in class systems, art, medicine, and science — even war. Ask students to research how spinach was utilized throughout history and choose a specific use they find interesting. Have students present their findings, including visuals and interesting facts.

*Download from www.harvestofthemonth.com.

For more ideas, visit:

www.nal.usda.gov/kids

Student Champions

Encourage students to write to the manager of their local grocery store or favorite restaurant asking them to feature spinach in the produce aisle or on their menu. Provide the manager with spinach nutrition information, ideas for displays, in-store taste testings, and recipes. Students can also offer promotional posters, inserts, and student-made handouts*. Materials can provide customers with spinach nutrition facts, recipes, and healthy eating tips while also letting them know that the retail business is supporting a local school.

*See *Cafeteria Connections* (page 3) for more ideas.

Literature Links

- **Primary:** *Eddie's Garden and How to Make Things Grow* by Sarah Garland, *Good for Me Vegetables* by Sally Hewitt, *Tiny Green Thumbs* by Loretta Krupinski, *Sun Song* by Jean Marzolo, and *What is a Plant?* by Bobbie Kalman.
- **Secondary:** *Green Power: Leaf and Flower Vegetables* by Lerner Publishing Group and *Sell What You Sow* by Eric Gibson.



This material was produced by the California Department of Public Health's *Network for a Healthy California* with funding from USDA SNAP, known in California as *CalFresh* (formerly Food Stamps). These institutions are equal opportunity providers and employers. *CalFresh* provides assistance to low-income households and can help buy nutritious foods for better health. For *CalFresh* information, call 1-877-847-3663. For important nutrition information, visit www.cachampionsforchange.net. © 2011

