

# NUTRITION TO GROW ON

A Garden-Enhanced Nutrition  
Education Curriculum for Upper  
Elementary School Children





# **NUTRITION TO GROW ON**

## **A GARDEN-ENHANCED NUTRITION EDUCATION CURRICULUM FOR UPPER ELEMENTARY SCHOOL CHILDREN**

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## Publishing Information

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### Notice

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Prepared for publication  
by CSEA members.

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# MESSAGE FROM THE STATE SUPERINTENDENT



**F**or many years now, I have had a dream that every California school would one day have a school garden. We are moving closer to that vision as educators recognize the exciting learning experiences that are possible when school communities plant gardens. School gardens are wonderful sources of food and outlets for physical activity; they also beautify school grounds and allow for learning across subject areas. Through gardens, we help our children to discover fresh food, make healthier food choices, and become better nourished, which—in turn—means they are healthier and ready to learn.

*Nutrition to Grow On* is an innovative curriculum for grades four through six that offers teachers a direct link between the garden and nutrition education. The curriculum uses the garden to integrate disciplines, including science, mathematics, language arts, history, environmental studies, nutrition, and health. This approach enriches students' capacities for observation and thinking and encourages them to develop a wide range of skills. The lessons also reinforce some of the state's academic content standards.

Children can experience deeper understandings of natural systems and become better stewards of the environment by designing, cultivating, and harvesting school gardens. When students eat the produce they grow, whether it is fresh from the garden or prepared as part of the school lunch program, they are exposed to new worlds of tastes and foods. *Nutrition to Grow On* teaches children about nutrition by relating each lesson to a garden activity; this linkage between nutrition and gardens can make a big difference in how well students remember what they are learning.

The connection between gardening and choosing healthful foods is all the more important given findings that children's current dietary habits do not meet national recommendations. Young people do not eat enough fruits and vegetables, and most of the servings that they do consume come from either fruit juices or fried potato products. Studies show that only two percent of youths meet all the recommendations of the United States Department of Agriculture, and 16 percent do not meet any of the recommendations.

Consistent with these findings, the rate of childhood obesity and other risk factors in children, such as high cholesterol levels and high blood pressure, are rising. When poor eating habits and physical inactivity extend into adulthood, they account for at least 300,000 deaths among American adults; only tobacco use contributes to more deaths.

Many people, including educators, gardeners, students, and parents, helped to develop this creative curriculum, and I would like to thank them for all their hard work. I hope you find these materials both useful and fun to implement, and I look forward to hearing about the results of your school garden and nutrition education programs.

A handwritten signature in blue ink that reads "Delaine Eastin". The signature is fluid and cursive, with a large initial "D" and "E".

DELAINE EASTIN  
*State Superintendent of Public Instruction*

# AUTHORS' NOTE



This curriculum was developed with the health and well-being of the nation's children in mind. Much evidence confirms that the health of children can be optimized by improving their dietary habits. Few children truly know where much of their food comes from or appreciate the importance of their local agriculture to food production. Fortunately, educators are in a position to make a difference, and school gardens have recently become recognized as a possible solution. Gardens not only teach children where their food comes from but also expose them to a variety of fresh fruits and vegetables. This curriculum was developed to provide teachers with the necessary tools to make such a project work.

To our knowledge this is the first curriculum of its kind to directly link nutrition with gardening activities in each lesson. The primary goal is to provide children and their caregivers with the knowledge and skills necessary to make healthful dietary choices while they gain a greater appreciation of the land that provides us with food.

Although this curriculum was tested with upper elementary school children, we hope that educators of all grade levels will find a use for it in their classrooms. This curriculum was developed with California's agricultural conditions in mind; however, we are confident that the activities described in this publication can easily be adapted to a variety of regions.

Many people helped complete the curriculum. We thank all the principals and teachers who allowed us to come into their classrooms to teach and evaluate the lessons. A special note of thanks is extended to their many students who also helped tremendously in the evaluation of the lessons. They quickly let us know which activities were enjoyable and which were not.

The following schools and teachers were involved in the initial pilot testing of the lessons:

**Birch Lane Elementary School, Davis Joint Unified School District**

Holiday Matchett, *Science Teacher*

**Markham Elementary School, Vacaville Unified School District**

Sharman Young, *Fourth Grade Spanish Immersion Teacher*

**Sheldon Elementary School, Fairfield-Suisun Unified School District**

Lori Lawn, *Fourth Grade Teacher*

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*Note:* The titles and locations of the persons included in this list were current at the time this document was developed.

The following schools and staff members were involved in the formal evaluation of the lessons:

**Alamo Elementary School, Vacaville Unified School District**

Julie Busher, *Principal, 1999-2000*

Janet Follett, *Principal, 1998-1999*

Janet Hardt, *Special Education Teacher and School Garden Coordinator*

Nancy Miller, *Fourth Grade Teacher*

Danielle Millward, *Fourth Grade Teacher*

Stuart Russell, *Fourth Grade Teacher*

**Fairmont Elementary School, Vacaville Unified School District**

Tom Armstrong, *Principal*

Andrea Booth, *Fourth Grade Teacher*

Christopher Cooper, *Fourth Grade Teacher*

Inge Dyrud, *Fourth Grade Teacher*

**Padan Elementary School, Vacaville Unified School District**

Ruth Mickelson, *Principal*

Patty Anderson, *Fourth Grade Teacher*

Paula Bradley, *Fourth Grade Teacher*

Kristine Early, *Fourth Grade Teacher*

The staff at the Vacaville Unified School District office provided a tremendous amount of support for the project. Special thanks go to the following two individuals who made the formal evaluation possible:

**Dr. Harold Bush**, *Deputy Superintendent, Educational Services, Vacaville Unified School District*

**Brenda Padilla**, *Director of Child Nutrition, Vacaville Unified School District*

The Solano County Master Gardener Program deserves special thanks for the time, knowledge, and financial support that made most of the gardening activities possible during the formal evaluation. The following individual deserves extra recognition:

**Mary Shaw**, *Program Education Chair, Solano County Master Gardener, University of California Cooperative Extension*. Mary shared her expertise with the students during most of the garden lessons.

The following master gardeners assisted in one or more of the garden lessons:

**Betsy Lunde** - Worm Bottles and Planting Seedlings

**Meg Grumio** - Weed Identification

**Kathy Lane-Pratt** - Bug Box Activity

**Sandy Gainza** - Dragonfly Activity

**Jennifer Baumbach** - Dragonfly Activity

**Larry Clement**, County Director/Farm Adviser

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**Carol Hillhouse**, *U.C. Davis Children's Garden Program Director*

Department of Pomology, University of California, Davis

**Michelle Neyman**, *Assistant Professor*

Department of Biological Sciences, California State University, Chico

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**Judith S. Stern**, *Professor*, Departments of Nutrition and Internal Medicine, University of California, Davis

Several evaluation forms sent home to the students' parents needed to be translated into Spanish. Translation was made possible thanks to **Myriam Grajales-Hall**, Spanish Broadcast and Media Services, University of California, Davis.

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Julie Schneider

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Esther Wong

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**Heather Graham**, doctoral student, Department of Nutrition, University of California, Davis, developed the matrix of the nutrition education curriculum and the California academic content standards. Her assistance is greatly appreciated.

Finally, the authors express gratitude to their family and friends whose support was invaluable. This curriculum would not be making its way into the hands (and stomachs) of schoolchildren everywhere were it not for that support.

**Jennifer Morris**, *Ph.D.*

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# INTRODUCTION



Teachers are beginning to notice that all too often their students come to school hungry, show a significant drop in energy level during mid-morning activities, and bring lunches that lack fruits and vegetables. This observation is a valid concern because research shows that when children come to school hungry, their potential to learn is affected. A recent review suggests that a child's brain is sensitive to short-term variations in nutrient intake (Pollitt 1995). In other words what a child eats or does not eat affects his or her ability to learn. Current national recommendations promote diets high in fruits, vegetables, and whole grains but low in fats and sugars for persons two years of age and older (U.S. Departments of Agriculture and Health and Human Services 2000). Such diets provide the nutrients necessary for healthy growth and development and reduce the risk of chronic diseases. Unfortunately, children often eat insufficient amounts of fruits and vegetables and excessive amounts of less nutrient-dense foods, which are generally high in fats and sugars (Muñoz et al. 1977).

Some children understand why it is important to eat healthfully, but few know how, and even fewer are actually able to do so. In addition, few children truly know and appreciate where their food comes from. Many children believe their fruits and vegetables come in bags from the grocery store. Children need to be equipped with the knowledge of how to incorporate healthful foods into their diets and an appreciation for agriculture. However, children will not be able to go through this learning process alone; their caregivers need to be involved as well. Families need to learn that all foods can and do fit into a healthful diet and that the key lies in moderation and variety.

The two main objectives of this curriculum are to (1) teach upper elementary school children and their caregivers the importance of making healthful food choices and the ways in which to do so; and (2) improve children's preferences for fruits and vegetables by giving children an opportunity to work with the land and grow their own produce. All lessons were tested prior to inclusion in this publication. (See Appendix A for details of the testing process.)

For a curriculum to be effective, research shows that it should be based on sound theoretical principles. This curriculum is based on the social cognitive theory (SCT)—the belief that children's behavior is influenced by several factors. Personal (i.e., knowledge), behavioral (i.e., skills), and environmental (i.e., visual reinforcement) factors are believed to influence children's health-related behaviors, such as dietary choices (Bandura 1986). Young children are greatly influenced by their surroundings, so the curriculum uses the

environment to stimulate learning about nutrition and academic subjects, such as science and mathematics. This curriculum teaches children about nutrition while taking them through the steps of planting, maintaining, and harvesting their own vegetable garden. Garden activities have been incorporated into the lessons to teach children more about where their food comes from and reinforce the principles of the SCT. Another benefit of having a garden at a school is that it is a constant visual reminder that good nutrition is important even on those days when no nutrition lessons are formally presented.

## CURRICULUM PRINCIPLES

The principles guiding the development of this curriculum were simple. The lessons had to be fun, easy to implement, integrative, and adaptable.

**Fun.** First and foremost, the curriculum is meant to be fun and interactive for the students and the teachers. Children must be constantly stimulated. No one would continue with a healthful lifestyle if he or she saw it as nothing more than another chore.

**Easy.** The authors wanted to make the curriculum easy for teachers to use; therefore, preparation time is minimal. Teachers are already inundated with work. The last thing they need is another lesson plan that requires hours of preparation. Most of the lessons require few materials to be gathered or prepared prior to the activity. Detailed background information is included in each lesson so that little additional research, if any, is needed.

**Integrative.** From the first day of school to the last, teachers are asked to teach their students according to a set of standards or a curriculum framework. Standards are necessary to establish consistency among teachers and schools in many regions. Some of the standards were incorporated into this curriculum so that teachers would not feel as though they needed to add yet another activity to an already full schedule. This curriculum was developed with the California content standards and curriculum frameworks in mind. The lessons offer students opportunities to practice the skills called for in the content standards. (Appendix B shows the academic content standards supported by each lesson.)

**Adaptable.** The dynamics of all classrooms are unique. What works in one classroom may not work in another. Another requirement for this curriculum was that it had to be adaptable to any educational situation. The hope is that teachers take what they wish from these lessons to make them fit their own classroom. The lessons have enough structure to be taught exactly as written but also have enough flexibility to be modified as needed. In addition, the lessons include enough activities to provide a challenging environment for older children but may be broken down into much simpler activities for younger children.

## ORGANIZATION OF THE CURRICULUM

The curriculum is divided into nine lessons on topics related to a healthy lifestyle. Although the lessons were developed to build on one another, they may also be taught independently. Enough information is presented for each lesson to be taught exactly as is. However, teachers are encouraged to adjust lessons to better fit the dynamics of their individual classrooms. Because the lessons are designed to build on one another, they should be taught in the order presented in this curriculum. The earlier lessons lay the groundwork for subsequent activities.

Each lesson was developed with several objectives in mind, most of which are behavioral in nature. They are noted on the first page of each lesson along with an objective for the hands-on gardening activity. The materials needed for the nutrition lesson and gardening activity are noted for each lesson as well. Changes are encouraged if they make the lesson more appropriate for a given classroom. All the necessary handouts are included at the end of the lesson.

All lessons begin with a brief review of the previous lesson. Sometimes this material is necessary for the activities that follow. If these lessons are presented independently of each other, make sure that the students have ample background knowledge to be able to perform the learning activities.

The nutrition portion of each lesson is intended to last approximately one hour, and the hands-on gardening activity may be taught in about 30 minutes. Most activities can be modified to increase or decrease the duration of the lesson. The nutrition and gardening activities are meant to be complementary and function as a form of reinforcement. During the formal evaluation of this curriculum, the gardening activities were taught within a day of the nutrition lesson. Although the length of time between the two activities may vary among individual classes, the nutrition lessons should be taught within a week of the gardening activities. Selected hands-on gardening activities may be taught without students going through the actual planting and harvesting of a vegetable garden; however, omitting the hands-on activities may not be as beneficial to the students.

If the hands-on gardening activities are to be taught along with the nutrition lessons, it may be better to teach the lessons together on alternate weeks. Such scheduling allows ample time for the growth of most crops. Be sure to check the approximate length of time until you harvest the crops you choose to plant because that will determine when you begin teaching the lessons and when the students can make snacks from the food they grow.

The section “Additional Activities” in each lesson contains ideas for follow-up and an optional snack. The last section, “Background Information,” provides teachers additional information about the lesson.

A newsletter accompanies each lesson and should be sent home to the students’ families within a few days of the lessons being taught in class. The purpose of the newsletter is to educate the students’ families about the material students are learning in class and promote family discussion about healthful

eating choices. There is substantial evidence that parental involvement is necessary for the success of any educational program. The more that caregivers are involved in their children's education, the more the children will appreciate the importance of what they are learning.

## TIPS ON STARTING A GARDEN

Starting a garden at a school can be a very easy task. There are a few things to consider, however, when planning the garden. First, school administrators must be contacted to gain their support and to find out whether there are any site regulations. Talk to the principal, vice principal, janitors, and other maintenance staff who need to be informed of the garden project. Second, the size of the area you need will depend on your desired level of gardening. The garden may range in size from a couple of pots on a windowsill to a 10' x 4' raised bed. Third, the location of the garden is important. It must allow for ample sunlight for most of the day. Fourth, the condition of the soil must be determined. If the soil was already used to grow crops, some additional nutrients may be needed. However, you may need to start fresh with brand new soil if nothing is currently growing in it. Last, determine how you will get water to your crops. Watering can be done with cans, hoses, or a drip irrigation system.

If unsure about any of these steps, consult a local nursery or master gardener through your county Cooperative Extension. You may even be able to find a knowledgeable parent at the school who is willing to help in the planning stages. In addition, it is a good idea to contact other members of the community. Many people may be able to donate labor, money, or supplies to help get the garden ready.

## ASSESSMENT

Assessment is built into this curriculum. Nutrition quizzes are aligned with the objectives for each lesson (see Appendix C). Teachers may use these quizzes as they deem best. For example, teachers may ask students questions following each lesson, give the whole set to the students once all the lessons have been taught, or distribute the questions before *and* after teaching the lessons to determine changes in the students' knowledge. It is recommended that teachers read aloud the questions to students below fourth grade if students cannot read with proficiency.

Another idea for assessment of students' learning is to have the students keep journals or notebooks. Ask students to write about their various food and garden-related experiences. At various times during the lessons, the students may also keep track of the foods they eat for one day. At the end of the project, students can go back and compare their diets to the Food Guide Pyramid recommendations (see Lesson 3). Ask them to look for any improvements in their diets. You may also have students keep track of any new vegetable they

try and record what they thought of it. Research shows that children often take 10 to 15 tries before they begin to like a new food (Birch et al. 1987).

These are only a few ideas for assessment. Teachers are encouraged to do whatever works best in their classrooms.

## SUGGESTED TEACHING STRATEGIES

Before beginning this project, check the students' emergency information cards for any known allergies. Such information may influence the snacks prepared or the vegetables selected for planting. The following strategies for teachers are suggested to maximize the value of these lessons for the students:

- ◆ Mention healthy lifestyle habits in regular classroom discussions by using food, exercise, and garden-related examples whenever possible. For example, teach fractions by cutting an apple into pieces instead of using a circle. Do not wait for the occasional nutrition lesson to emphasize the importance of good health.
- ◆ Work with the food service staff at the school. Consider arranging a tour of the cafeteria or ask a staff member to come into the classroom to help during a cooking activity. This strategy also helps to strengthen the link between the classroom lessons and the lunchroom. Often, a student's most healthful meal of the day is the one received from the school cafeteria. Most likely the cafeteria staff already offer healthful items on the daily menus.
- ◆ Include the following health-related questions as daily journal topics: What does it mean to be healthy? What are some things that I can do to stay healthy? What are some foods that I can choose as healthful snacks? Why would they be considered healthful? How can I make them a part of my daily routine? What are some activities that I like to do that keep my body moving?
- ◆ Post nutrition-related news and activities on a bulletin board. Consider displaying the Food Guide Pyramid poster in the classroom throughout the year.
- ◆ Remember that it is important for teachers to be good role models. All foods can be included in a healthful diet; there are no good or bad foods, just good or bad diets. Teachers should try to include fruits and vegetables in their own snacks and lunches.
- ◆ If students bring their own snacks or lunch to school, encourage them to bring healthful meals. Once a week have the students talk about what they brought and why and brainstorm on other choices for snacks and ways to get them. Be sensitive to the fact that some students will have a difficult time bringing in particular foods.
- ◆ Encourage students to bring healthful snacks for class parties. Try 100 percent real fruit juice instead of sodas and pretzels or popcorn instead of potato chips. Other ideas include graham crackers or cut-up fruits and

vegetables to go along with the pizza. What about trying a pizza with vegetables on it? Check out the lesson on snack making (lesson 9) and some children’s cookbooks for more ideas of snacks that can easily be made in the classroom.

- ◆ Do not use sugary treats as the only class reward. Consider classroom items, such as pencils, erasers, or notebooks. Low-fat snack packs are also a good idea: pretzels, graham crackers, or popcorn. If a garden is planted as part of the lessons, some students will consider it a reward to go out to the garden at a designated time every day. The goal is to steer away from offering sweet treats to children.
- ◆ Impress upon the students that they should look at their diets over the course of a few days and not just one day or meal at a time. If the diet is a little higher in fat one day, the diet the next day should be lower in fat.
- ◆ Consider long-term class goals when doing the garden-  
ing activities. It may be possible to plant a theme garden relevant to some of the topics to be discussed during the year. Consider also what snacks you can make when the garden is ready for harvest. The goal is to allow the students to taste everything they grew during the year. You may need to speak to a local master gardener or nursery for ideas that work with the local climate and the timing of planting.
- ◆ If a class decides to plant a garden, walk the class by the garden daily (for example, on the way to or from recess) to keep track of its progress.
- ◆ Have a parent or master gardener come into the classroom to assist on the days of the gardening activities. It helps to have an extra adult or two in the garden during the outdoor activities.
- ◆ Add “gardener” to the list of class roles. One student or several may be assigned the responsibility of keeping an eye on the garden and watering or weeding when necessary. He or she can check the garden and inform the class when something new sprouts.
- ◆ Encourage the community to get involved with the school gardens. Local businesses may be able to donate money, labor, or resources to get the project operating.

Appendix D, “Nutrition Education Resources,” contains a list of helpful web sites, professional associations, and ideas for field trips.

***The lessons were  
captivating, educational,  
and fun!***

*Teacher*

*Alamo Elementary School*

## FUTURE CURRICULUM

No curriculum is ever completely finished. Therefore, much work is already underway to enhance the lessons. First, a document on teacher training is being developed to provide teachers with all the tools necessary to make the most of the lessons. The final document as well as the names of individuals to contact for limited personalized training will be available.

Second, there are plans to evaluate the lessons formally following instruction by a classroom teacher (not a trained nutritionist). This step will help with fine-tuning the activities.

Other plans relate to the delivery of the material. For example, the handouts and newsletters are expected to be available in Spanish within a year or two. If the curriculum is being used extensively in communities with other language needs, educators are welcome to translate the materials as necessary. In addition, the curriculum and the teacher-training materials will be made available on the World Wide Web after publication.



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