TITLE: Using School Gardens as an Instructional Tool

NUMBER: REF-4441.0

ISSUER: Rene Gonzalez, Assistant Superintendent
Student Health and Human Services

DATE: September 22, 2008

ROUTING
Local District Superintendents
School Support Services Directors
Administrators of Instruction
Principals
Assistant Principals
Experts/Specialists
Teachers

PURPOSE: The purpose of this Reference Guide is to provide information on the use of school gardens for standards-based instruction.

MAJOR CHANGES: New Reference Guide.

INSTRUCTIONS: Using a school garden as an integrating context to learning creates the framework for interdisciplinary, collaborative, student-centered, experiential, and engaged learning. Recognizing the educational and health benefits of school gardens, the California Department of Education launched the "Garden in Every School" Initiative in 1995, led by the Nutrition Services Division. Subsequently, the Legislature, acknowledging the value of school garden projects, enacted several bills that promote instructional school gardens (California Department of Education, Nutrition Services Division, 2007).

On September 25, 2007, it was resolved that the Board of the Los Angeles Unified School District direct the Superintendent to:

1. Support the preservation of existing gardens in District schools that have instructional programming ties and funding support.
2. Encourage the use of school gardens as outdoor laboratories for instruction of the California State standards in science, mathematics, language arts, social studies, nutrition, and arts education.
3. Ensure compliance with federal, state, local and District environmental health and safety policies designed to support safe school gardens.
4. Promote the use of school garden produce through tasting and samplings of produce.
5. Allow and promote the sale of items, grown in school gardens, such as flowers and produce, by Associated Student Bodies.
6. Embrace the "garden in every school" program established by the California Department of Education.
7. Support pilot programs which link school and community gardens, similar to those at Venice and North Hollywood High Schools.

8. Work with the City of Los Angeles and the State of California to establish and ensure ongoing financial support for school gardens.

A classroom garden can act as a springboard for a wide range of lessons in science, mathematics, history-social science, English-language arts, visual and performing arts, and health. It is suggested that principals who consider this optional activity as an important one to improve student learning at their school discuss the use of the school garden with staff in charge of instruction in the major content areas.

Those in charge of the content areas can use Attachments A–F, which present effective ideas on how to integrate gardening with classroom curriculum in the various content areas, to present to department chairs and teachers to initiate the use of the school garden in their classroom instruction (from *Gardens for Learning,* California School Garden Network, 2006).

Teachers can begin by looking at the education standards and their own curriculum goals and making a list or map of areas intended to be covered. Next, teachers can make a second list of garden tasks, projects, and goals, and match them with the student outcomes detailed in the standards. Finally, teachers should select or develop specific activities that can help students achieve the standards.

RELATED RESOURCES:

- Attachments A–F
- Free garden curriculum resources for teachers are plentiful. The California Department of Education published the book *A Child's Garden of Standards: Linking School Gardens to California Education Standards, Grades Two Through Six,* which identifies specific activities found in a variety of commonly used curriculum books that meet California standards in science, history social science, mathematics, and English-language arts. This guide can be downloaded for free, along with the publication *Gardens for Learning* from the California School Garden Network (*www.csgn.org*).

ASSISTANCE:

For more information on the California Instructional School Garden Program with LAUSD, contact Tonya Mandl, Teacher Adviser, at tonya.mandl@lausd.net.

ATTACHMENT A

USING THE SCHOOL GARDEN IN SCIENCE CURRICULUMS

Key science concepts that can be explored in the garden include organisms, cycles, basic requirements or life, plant anatomy, adaptations, food webs, decomposition, interdependence, ecological principles, pollination, and diversity of life. Students practice and hone scientific process skills by observing, classifying, inferring, measuring, predicting, organizing and interpreting data, forming hypotheses, and identifying variables. Below are a few ideas for life, physical, and earth science activities in the classroom garden.

Life Science

• What are the differences between living and nonliving things? How are humans like plants? How are they different? Distinguish and describe differences and similarities.

• How does a plant grow? Observe the life cycles of plants by using fast-growing plants in your classroom.

• What do plants need to grow? Do all plants need the same things? Study the various conditions that different plants need to grow. Compare the things people need to the things plants need. Create experiments investigating what happens when plants are exposed to different amounts of light, water, air, space, and nutrients.

• Investigate the functions of different plant structures (cotyledons, roots, stems, leaves, flowers, fruits, and seeds).

• How do plants reproduce? How do seeds work? Dissect flowers and seeds. What factors influence germination of seeds? Create experiments to investigate how light, heat, and moisture affect germination.

• Explore the concept that some characteristics are inherited and others are caused by the environment. Locate examples of both in your garden.

• How do plants use energy from the sun to make food? Discuss photosynthesis. Do plants need light to photosynthesize?

• Discuss how plants adapt for survival. Research adaptations of seeds for dispersal and adaptations of flowers for attracting pollinators. Observe pollinators in the garden.

• Investigate the impact of environmental changes on plants.

• Study wildlife and insects along with their habitats.

ATTACHMENT A

• Investigate food chains and webs. Demonstrate how plants are the primary source of energy for all food chains.

Earth Science

• Create a garden weather station. Record daily measurements and compare conditions with plant growth.

• How are some soils different from others? Compare and contrast the properties of different types of soils (density, air spaces, presence of living organisms, composition, texture, smell, appearance).

• Simulate soil erosion in your classroom garden. Observe the difference in soil loss when water is splashed on a tilted, planted pot, and on a tilted, unplanted (but soil-filled) pot.

Physical Science

• What is pH? How does it affect plants? Use litmus paper or a test kit to test the pH of different soils. Investigate how plants respond to soils with different pH levels.

• Simulate the water cycle in the indoor garden by covering it with a "dome" of clear plastic. Study and observe the transpiration, evaporation, and condensation of water.

• What are the properties of different types of light? Cover pots with cellophane of different colors to screen out all but one wavelength of light from plants. Observe plant growth.

• How does energy change to matter during photosynthesis?

ATTACHMENT B

USING THE SCHOOL GARDEN IN MATHEMATICS CURRICULUMS

Designing and planting a garden takes mathematical problem solving and practice. Math becomes practical and relevant when students implement concepts they have learned in the classroom in a real-life garden setting such as calculations, comparisons, measurements, and varied representations of data (charts, graphs, etc.):

• Measure the growth rates of plants and display results on different types of graphs. Make predictions regarding future growth. Use standard and nonstandard units of measurement.

• Host a bean race. Plant a number of beans at the base of a trellis and track their growth on a chart. Determine the rate of growth and award the fastest plant a blue ribbon.

• Using information from seed catalogs, predict dates of germination and maturity.

• Plan backward from a desired harvest date to determine when each crop should be planted.

• Measure your garden parameters and calculate the area. Use graph paper to make a map to scale of your garden.

• Calculate amounts of fertilizer to use per quart and per liter of water.

• Chart temperatures of the air and soil in your garden in Fahrenheit and centigrade.

• Determine the weight and volume of soil mix when wet and dry. Determine the volume of soil in a rectangular window box.

• Investigate vegetable prices in a supermarket. Track the amount of produce harvested in your garden and use the market prices to determine the value of your harvest.

• Count the number of seeds planted and the number of seeds that sprout and calculate the germination rate.

• Measure the height of a group of plants and determine the mean, median, and mode.

• Calculate serving sizes of different fruits and vegetables by using Information on the analysis of food content by nutritionists.

• Make a recipe that uses fruits and vegetables from the garden and requires various measuring techniques.

ATTACHMENT C

USING THE SCHOOL GARDEN IN HISTORY-SOCIAL SCIENCE

Gardening activities can be used to teach students about specific historical events and cultures, and also to introduce current events like the impact of biotechnology:

• Research and report on cultural or ethnic differences in food consumption and gardening practices.

• Research agricultural history and create a timeline of important events.

• Visit some local farms and interview farmers about choice of crops, growing practices, marketing, and farm history.

• Study the contribution of Native American foods and other cultures' foods to our history and diet. Grow samples in the school garden.

• Research the histories of classroom garden plants. Discover where they originated, the impact they've had on our diets, and how today's varieties differ from the original plants. Locate their origin on a map and then trace their movement around the world.

• Use the Thanksgiving holiday to explore meals throughout history and the different crops grown and harvested at that time of the year.

• Complete a site analysis of the school garden and create a garden map noting important features.

• Trace the path of a fruit or vegetable from the field to the table.

• Use the classroom garden to complement a study of the influence of climate on food production.

• As a class, develop gardening rules and then vote on them.

ATTACHMENT D

USING THE SCHOOL GARDENT IN ENGLISH-LANGUAGE ARTS

Relating language arts exercises to the garden can reinforce classroom lessons:

• Keep daily garden journals documenting observations, weather conditions, and classroom activities.

• Research the growing habits of the school garden plants using the Internet and reference material. Create a planting schedule based on the information.

• Write letters to local merchants, explaining the school gardening project and asking for donations.

• Write thank-you notes to volunteers and garden sponsors.

• Write, illustrate, and publish a collection of garden stories and poems.

• Brainstorm different adjectives to describe each plant in your garden.

• Study new vocabulary that relates to plants and gardens.

• Publish a class newsletter with student articles about the garden and distribute it to other classrooms and parents.

• Write step-by-step instructions for common garden activities.

• Follow written instructions to perform a garden task like planting seeds.

• Read books and stories about plants and gardens.

• Write a research paper on a favorite plant and include source citation.

• Prepare and deliver a presentation about the garden for other students, teachers, and parents.

• Learn about the origins of scientific plant names.

• Read a garden magazine article highlighting a plant and distinguish between the facts and opinions presented by the writer.

• Research the nutritional value of your favorite garden vegetable and then write a script for a 60-second advertisement designed to get more people to grow and eat it.

ATTACHMENT E

USING THE SCHOOL GARDEN IN VISUAL AND PERFORMING ARTS

The school garden can be the inspiration for many works of art, dance, music, and drama:

- Create paintings and drawings of garden plants.
- Paint a class garden mural to hang in the hallway for parents' night.
- Make a seed mosaic.
- Create a color wheel collage by using pictures from old seed catalogs.
- Make musical instruments from gourds and learn how to play them.
- Make prints by using paint and stamps made from various plant parts.
- Create and perform a garden-inspired dance expressing the growth of a seed or the opening of a flower bud.
- Pantomime various gardening tasks (transplanting, fertilizing, sowing seeds, pollinating).
- Learn a collection of songs that relate to food, gardens, and the environment.
- Draw your dream garden.
- Listen to the music of composers inspired by nature.
- Build clay or tissue paper models of flowers.
- Use leaves to make crayon rubbings or fossils in clay.
- Using a movie camera with single-frame capability, make a time-lapse film of a plant growing.
- Create a skit about food safety.
- Paint a classroom mural by using samples of different soils as the medium.

ATTACHMENT F

USING THE SCHOOL GARDEN IN HEALTH AND NUTRITION

Use the garden as a hands-on tool to teach nutrition lessons, including the importance of fruits and vegetables and proper food preparation techniques:

- Compare the importance of nutrients in the health of humans and of plants.
- Study the nutritional value of the various crops in your garden.
- Identify the parts of the plant represented by common fruits and vegetables.
- Discuss the difference in nutritional value of various plant parts.
- Study adaptations of plant parts that make them good food sources.
- Sprout various seeds for eating.
- Conduct a blindfolded taste test using classroom-grown vegetables and supermarket vegetables.
- Experiment with food preservation techniques, such as drying, freezing, and canning.
- Grow a salad garden and give students a chance to sample the harvest with a salad party.
- Invite a grocery store employee to talk to the class about where the store's products come from.
- Visit a local farm or farmers market.
- Create brochures with information on daily food intake recommendations.
- Plan a day's menu that includes all components of a balanced diet.
- Keep food journals that highlight how many fruits and vegetables are eaten and describe any new produce tried.
- Invite chefs from the community to do cooking demonstrations for students and parents. Coordinate a cooking lesson in your school's kitchen using the produce your class has grown.

ATTACHMENT F

• Ask cafeteria managers to share safe food handling information and provide tours of school kitchens.

• Invite a registered dietitian to visit classrooms and discuss healthy food choices and healthy preparation methods in connection with *MyPyramid.gov.*

• Use *MyPyramid.gov* to help you choose a healthy diet. Come up with tasty recipes that use lots of fruits and vegetables and little fat or sugar.

• Create a classroom or school recipe book that features produce grown in school gardens.

• Compare the nutritional content of different colors of a specific variety of vegetables, e.g., salad greens. Graph the Vitamin A content in the lighter-colored greens and in darker greens. Contrast this with other vegetables.

• Research and compare fruits and vegetables with various origins. Identify cultural dishes and their preparation methods. Host an "international day" and provide healthful samplings of fruits and vegetables from those cultures.

• Research cultural holidays and the symbolism of particular fruits and vegetables that are included during those holidays. For example, identify the symbolism of tangerines in the Chinese New Year celebration.

• Create a public service announcement or school announcement promoting fruits and vegetables. The promotion could highlight something growing in the garden, a fruit or vegetable offered in the cafeteria, or both. This will encourage students to develop skills for marketing food choices.

• Grow and use fresh herbs to flavor your dishes with natural ingredients and decrease the use of salt in recipes.