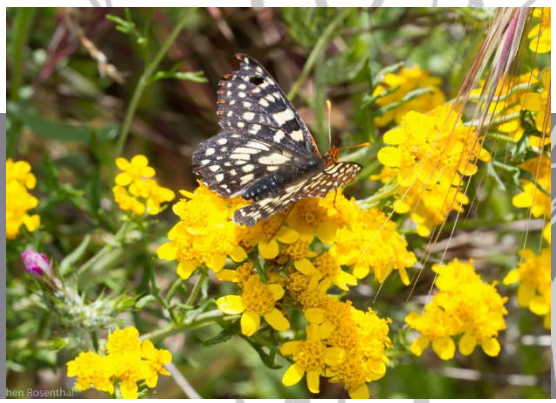
Native Plants for School & Urban Gardens

Southern California

California Native Plant Society



Introduction

Section I: Planning

Section IIa: Planting

Section IIb: Main Database

Section III: Appendices

Written and illustrated by
Betsey Landis

CNPS Los Angeles/Santa Monica Mountains Chapter

www.cnps.org/gardening

CONTENT FOREWORD

For the convenience of teachers, the Southern California Native Plants for School & Urban Gardens book has been split into three sections, and saved as four separate PDF files convenient downloading.

- Section I – Planning (pg. 1-20)
- Section IIa – Planting (pg. 21-134)
- Section IIb – Plant Database (pg. 135-164)
- Section III – Appendices (pg. 165 – 171)

These files in part or as a whole are free to educators, those working on school garden projects, and those working on public urban garden sites, but the contents of the files may not be sold without permission of the Los Angeles/Santa Monica Mountains Chapter of the California Native Plant Society. The Los Angeles/Santa Monica Chapter will print copies of the book in small quantities for special orders.

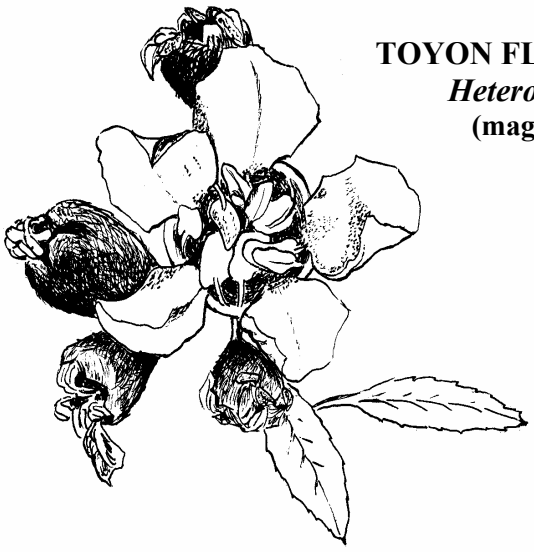
The book, Southern California Native Plants for School & Urban Gardens and the author, Betsey Landis, should be cited as the source of any information, illustrations or photos from this book used in electronic media or in print.

California Native Plant Society

The California Native Plant Society (CNPS) is a statewide non-profit organization of amateurs and professionals with a common interest in California's native plants. The Society, working through its local chapters, seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. Membership is open to all. Our members have diverse interests including natural history, botany, ecology, conservation, photography, drawing, hiking and gardening.

The Education Committee of the Los Angeles/Santa Monica Mountains Chapter has designed this book to aid interested teachers and parents in establishing native plants in school landscaping and in using native plants as part of the curriculum. The materials are copyrighted February, 1999, and revisions are copyrighted July, 2011, by the Los Angeles/Santa Monica Mountains Chapter of CNPS (website: www.lacnps.org). Copies of the material or free downloads from the web may be made for use in the classroom but not for sale.

Comments or questions about the material contained in this book may be addressed to CNPS Education, 3908 Mandeville Canyon, Los Angeles, CA 90049. For further information about CNPS, write State CNPS Office, 2707 K Street, Suite 1, Sacramento, CA 95816, or visit the State CNPS website: www.cnps.org.



TOYON FLOWER & BERRIES
Heteromeles arbutifolia
(magnified ten times)

FRONT COVER: Will Rogers Elementary School, Santa Monica, CA, native plant garden with a young toyon, poppies and elegant clarkia in the foreground. Sagebrush is in the upper left.

SOUTHERN CALIFORNIA NATIVE PLANTS FOR SCHOOL & URBAN GARDENS

by Betsey Landis
Los Angeles / Santa Monica Mountains Chapter
California Native Plant Society
Revised August 2011

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California Buckwheat
Eriogonum fasciculatum

INTRODUCTION

The California Native Plant Society encourages the preservation of California's native flora through conservation, research and education. We encourage and appreciate all efforts on the part of teachers, students and parents to learn more about our fascinating native plants, their history and their value.

The Los Angeles/ Santa Monica Mountains Chapter of the California Native Plant Society receives many requests from teachers and parents for information on landscaping with native plants at their schools and for help in getting grants to establish water-conserving gardens and to create a curriculum based on native plants for courses in science, history and ethnobotany.

Every request has some common problems, but each is different and each needs a site-specific solution. Eventually the Education Committee of our Chapter decided to design a book with the aid of several local teachers to answer all these questions and to help each school design the type of garden most suitable to their location and requirements. The book has two goals: one on how to design a garden or to grow native plants in containers, the second to offer tips and to provide information sources on how to incorporate native plants in the curriculum.

This garden design book tell you what you need to know to initiate the project, what kind of support and permissions are necessary, what kind of restrictions you may face, and then, if you are forging ahead, how to get funding for the project. The book shows you how to decide what to plant where, what kind of garden (or containers) you want, how to decide which plants are most suitable not only for the landscape, but for the curriculum and where to get them. Finally a section on planting explains how to give your garden a good start. There are selected plant palettes for container planting, plant communities, butterfly gardens and native American gardens. These plant palettes were created from the main database on native plants at the back of the book.. A glossary, list of local nurseries, and many useful references are found in the Appendices.

We encourage teachers to involve students in all phases of planning, planting and caring for the garden. Even very young students are quite capable of making planning decisions through site observations, mapping and study of suitable plant habitats. All students benefit from knowing the garden is their creation, is growing with them and is a living book to study and to enjoy.

Many thanks to Bonnie Freeman of Gardening Angels, Angelika Brinkmann Busi, and Will Rogers School in Santa Monica for reviewing and using the materials and making suggestions. Special thanks go to Bart O'Brien of Rancho Santa Ana Botanic Garden for the section on container gardens and to Lorrae Fuentes, also of Rancho Santa Ana Botanic Garden, for helping us to finish this book properly. And finally, to the Education Committee of our Chapter who have listened to progress reports on these garden books for five years, who have read and commented and corrected many things, and agreed to publish the results, *THANKS!*

CNPS Education Committee
School Garden Books Project:
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Kristine Chinn, Resource Teacher
Mary Haenscke, Teacher
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California Poppy (*Eschscholzia californica*)
Drawing by Angelika Brinkmann-Busi

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California Native Plant Society
Revised August, 2011

Available in three sections as pdf files

SECTION I: PLANNING

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STARTING YOUR GARDEN PROJECT: SOME PRACTICAL ADVICE

If you, as a teacher or parent, are interested in introducing native plants into the school landscaping or in placing containers of native plants anywhere around your school you need to consider the following:

1. Do you have teachers and parents who will help you?

2. Do you have the support of the principal and any other administrative personnel who have jurisdiction over your school's landscaping? Can you fence off the garden area to protect it from vandalism?

3. Do you have a source of tools, containers, native plants and funds if major re-landscaping is contemplated?

4. Do you know who maintains the grounds? School janitor or grounds keeper? Outside contractors? Local or district control?

5. Do you have the full understanding of the ground maintenance crew as to the nature of the new landscaping? (This usually means you have to take care of the plantings yourself.)

6. What is the irrigation schedule for your school grounds?

7. Can you turn off or modify the irrigation section near your proposed plantings? Or does the maintenance crew or the school janitor have to change it for you?

8. What is the summer or vacation maintenance routine? Do you need to find volunteers to water the plantings during those periods?

9. Does the school district have strict guidelines about desireable and undesireable plant characteristics? (This may mean no shallow-rooted trees near building foundations, no plants with thorns or bees near play or eating areas, and no plants with poisonous fruit/leaves/flowers.)

10. Does your plant list have to be approved at the district level?

11. Will the school district help if you need to have the soil tested? (If you are planting edible plants or removing asphalt to create a garden site, you **must** get the soil at the school garden site tested.)

Information you may need to present to the school administration, other teachers, interested parents and especially your students:

1. Plant names: both common and scientific.

2. Plant characteristics: thorns, poisonous fruit or leaves, attractiveness to bees, size, root structure (trees).

3. Plant requirements: drainage, type of soil, amount of morning/afternoon sun, amount of water.

4. Plant uses: research tool, ethnic or historical value, modern uses, bird or butterfly attractants.

5. Map of area and possible locations for native plantings in containers or gardens.

6. Plant care: who is responsible and what might be changed in the current landscaping, such as mowing, pruning and watering.

BUSH SUNFLOWER
Encelia californica

FUNDING

How do you go about funding your native plant project? It is one thing to buy a few seeds or a small native plant and recycle a container or two. It is quite another to launch a garden project. Here are some suggestions for acquiring plants, tools, fencing, books, potting soil or mulch, even for getting rid of old landscaping.

1. Community Letter:

a. Go through the local phone book and select businesses in the community that might be able to supply something you need or donate money. Large discount outlets may give discounts on tools, gloves, or an outright gift of materials. Hardware stores, lumber yards, nurseries, chain drug stores, supermarkets can all be helpful if you ask.

b. Call first for a contact person. Personally addressed letters reach the right person to help you.

c. The letter should include the scope of the project, the benefit to students, the commitment of the school: teachers, parents, students, etc. to this project, specific requests or needs, and how the donor will be recognized (in the school paper, in the brochure the students will prepare describing their projects, to the parents at Open House, etc.) Add a wish list of things you would like, but cannot afford now (such as a tool shed, canvas sunscreen, etc.) Always be specific.

d. Make sure you have a contact person at school that potential donors may call for further information.

2. Parent Teacher (Student)Association (PTA or PTSA):

Attend a PTA Board meeting and present the project to them. Slides or a video are a great tool. Letters from your enthusiastic students and their parents also help. Not only will you meet the PTA officers, who may be able to provide grant opportunities, but they may have contacts in the community who can help with materials or discounts.

3. Grants:

a. There are local grants from cities and the County for water conservation or educational projects. Since many native plants are drought-tolerant, this is one way to fund your project.

b. State or federal grants are available, especially for water conservation or science education. The Environmental Affairs Department of the City of Los Angeles has some of this information, the County Agricultural Extension also may have information. Workshops are available to help you learn how to write grant proposals.

c. The National Gardening Association offers a $500 grant of tools and supplies every year.

d. There are other private associations that will fund the planting of specialty gardens such as edible native plants or native American gardens or a butterfly- or bird-attracting gardens.

4. Sales:

Selling seeds or seedlings collected or grown by students is a good way to maintain a cash flow. These can be sold at Open House, Back to School night or at other school gatherings.

5. Recycling:

Recycle cans or other material with a redemption value as an ongoing way to support your garden.

6. School Improvement Funds:

Many schools have worn out, trashed or overgrown landscaping areas. With your native plant garden you are not only providing an educational resource for the school but an improvement in the grounds as well. Find out from the school district, or the PTA, if any money is available to improve the school grounds.

7. School Newspaper:

Put your very specific wish list in the school paper and ask for donations of materials by parents and students.

8. City Services:

Parks and Recreation, the Department of Water and Power, Bureau of Sanitation, etc. are sometimes able to donate mulch, wheelbarrows and hoses. Los Angeles County Public Works has a website market for finding donated materials.

9. City Clubs:

Business organizations often are looking for ways to help schools.

WHEN SEEKING FUNDING:

DON'T BE AFRAID TO ASK.

BE CREATIVE.

IF AN AGENCY, BUSINESS OR GROUP CAN'T HELP YOU, ASK IF THEY CAN RECOMMEND ANOTHER SOURCE FOR FUNDING.

ALWAYS OFFER TO ACKNOWLEDGE DONORS/DONATIONS OR GRANTORS IN YOUR SCHOOL NEWSPAPER AND AT PARENT-TEACHER EVENTS.
AND

ALWAYS SAY "THANK YOU" !

PLANNING :
TYPES OF NATIVE PLANT GARDENS SUITABLE FOR SCHOOLS

The following types of native plant gardens offer great learning experiences as well as everchanging beauty:

1. Container Gardens:

Planting in containers has several advantages:

a. The plants can be changed every year easily or they can be permanent plantings.

b. The containers can be moved if the location turns out to be inappropriate for the plants, the students or the future plans of the school.

c. If funding is small or nonexistent for a native plant garden, outdoor containers can be constructed from old tires, old sandboxes, leftover concrete blocks or bricks, even discarded toilet bowls and sinks.

d. Experimenting with plants from seeds on through the development of mature root systems, flowering and fruiting is more easily controlled through the use of containers.

e. When planting in containers, a well-drained soil mix is required. All the native plants will require more water than they would if they were planted in the ground, because their roots cannot grow deep in search of water.

f. Pots need to be insulated from the heat of the sun, especially if the pots are black plastic or the pots are sitting on asphalt. The pots may be put inside larger pots to provide an insulating layer or they can be placed on a layer of mulch to insulate them from the hot asphalt. Canvas sunscreens (like they use on tennis courts) can be used to shade the container location. Too much hot sun can cook sensitive young roots, killing the plant.

2. Small Gardens:

A large variety of native plants can be grown in small areas as long as the plants are compatible, the soil and drainage are correct, the water supply is sufficient and the plants receive the correct amount of sun. Some native plants are much more tolerant of variations in these conditions than others. Some types of small native gardens suitable for schools are:

a. Areas less than 16 square feet:

These can be planted all at once with one large shrub or small tree, a few low shrubs and some annuals and perennials scattered around the outside edge or over the entire area. As the plants mature, many interesting experiments can be done with leaves, flowers and seeds.

The small garden also can act as the final planting location for plants grown from seed in the classroom, though the area will fill up rapidly if too many successful seed experiments are done. Sometimes the school grounds will have one area where normal landscaping fails because of too much water, too little water, too much sun, too little sun or poor soil conditions. Since native plants manage to survive in salt marshes, streams, deserts, dark narrow canyons and a wide range of soil conditions, these bare spots on the school grounds may be the perfect spot to plant with native flora.

b. Long narrow raised beds:

These are usually used to divide one area from another at schools. Often the children climb into and out of them or everyone dumps their trash in them. Depending on the location, thorny shrubs such as gooseberry or wild roses might do well. There are a number of succulents and both tree-like and bushy chaparral shrubs that are not attractive to climbing children.

One suggestion to stop littering in the beds is to clearly mark that this bed is part of a classroom garden experiment or a project of the school garden club. If annual and perennials are planted among the shrubs, the beds could have something blooming the entire year.

c. Borders:

These are usually narrow strips along sidewalks, buildings and as edging to lawns. There are many tall native shrubs that make attractive borders and have natural, historical or ethnic values as teaching tools in the classroom. Annuals and perennials can be mixed in with the shrubs for a more colorful and versatile garden.

d. Specialty gardens:

These are designed to attract butterflies, birds, bees, or to be edible gardens or to represent those native plants used by California Indian tribes or by early settlers. Because these gardens may not meet the health and safety requirements of school districts, they are often placed in borders or small protected locations away from outdoor eating and play areas.

3. Large Gardens:

One ambitious school removed the front lawn of the school and planted representative native plant associations from various parts of Los Angeles County. Several others with school yards abutting hillsides or open areas have developed experimental gardens or are restoring the open space to native habitat as a study area for both native flora and fauna.

a. Habitat restoration:

If native habitat restoration is the goal, only plants native to the area should be used, not nursery-developed varieties or cultivars. Talk to the local native plant nurseries to see where they got their seeds or cuttings.

Removal of any weeds or ornamental plantings may require continual effort over a number of years, until the native plants are well established.

Plant the native plants in irregular groupings of trees, shrubs and herbs as randomly as possible. That can be an interesting classroom exercise in itself.

Depending on the location and the time of planting, some native plants may not need auxiliary water if the hole they are planted in is soaked with water

for three days before planting. Check the water requirement of the plants before installation.

Do not use standard "wildflower" mixes in packets. "Wildflower" means any annual or short-lived perennial, not local native plants. Buy seeds labeled "native to California". Do scatter the seed broadly over the area. If possible, try to scatter seed at the time of year that species of plant normally casts its seed.

Photograph, count and measure the success of your plantings. Usually a restoration project takes years to complete, so the area becomes an outdoor laboratory with something different going on each year.

b. Experimental garden:

This can be with or without a greenhouse. Seed propagation or experiments with different plant associations or species may occur in small plots or rows. Experiments with mulches, mycorrhizae, and other soil amendments can be tried. There are many interesting native plant hybrids, lots of curious insect associations, probably hundreds of odd seed germination schemes by native plants that have adapted to extreme conditions of soil, sun and water.

c. Practical gardens:

If the school is on a hillside or abutting a hillside, the best way to hold the hillside in place naturally is probably with chaparral habitat, at least in southern California. Chaparral (small trees, large and small shrubs, vines, perennials and some annuals) has a complex root system, that, once established, acts as a matrix to stabilise hillsides. On hotter or drier slopes, chaparral tends to give way to sage scrub habitat, which may not have as deep a root matrix.

If there is a large weedy area on the school grounds or abutting it, weeds can be displaced by planting a variety of native trees, shrubs and herbs. Some native plants are fire-resistant if that is a concern. Once established, the native habitat needs to have the dead material (branches and twigs) pruned from the plants every year, as is done in any garden. If needed, the spiny leaves and stems of many chaparral and sage scrub plants can form a effective multi-purpose barrier or border to the area.

SKETCH OF SCHOOL: FINDING A SITE

This sketch is of an actual elementary school and illustrates some of the many opportunities for landscaping with native plants. This school site is near foothills. Probably oak woodland or chaparral covered the site before the area became more densely settled. The altitude is about 500 feet above sea level.

What historically grew here is a good starting point. However buildings, irrigation, ornamental landscaping, raised planter beds and many other factors create urban habitats that may bear no relationship to environmental conditions 100 years ago at the school's present location.

With this sketch as guide, here are the parameters that determine what will grow well at various locations at this school.

1. Altitude:

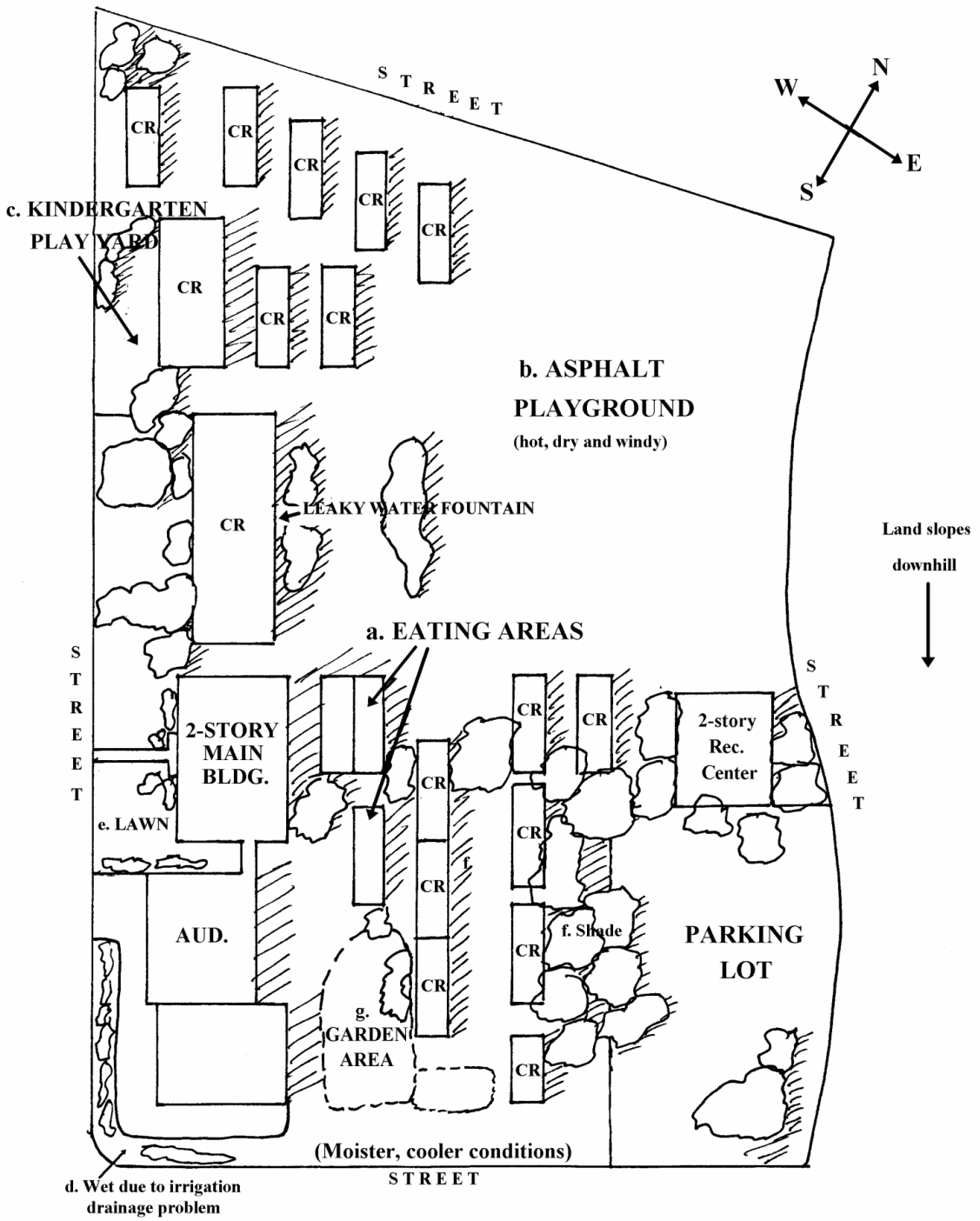
Alpine plants will not survive at sea level or in a desert area. Most lowland plants will not survive at high altitudes outdoors. Lowland plants would do well at this school.

2. Temperature of locality:

Wetland plants or plants requiring cool shade will not survive in a very hot, dry environment. Plants used to mild winters will die at the first hard frost or snow. Some semi-desert plants require hot days and cool nights during the growing season. The temperature is mild at this school, sometimes over 100 degrees Fahrenheit in the summer, but fog from the ocean often moderates the heat.

3. Soil conditions:

For permanent gardens, plants that like clay will have problems with sand and vice versa. Plants that like alkaline conditions (high pH) will not survive in acid conditions and vice versa. The soil at this school is clay or sandy clay. The pH will vary depending on location. Near sidewalks, concrete structures or stucco walls, the pH may be alkaline. It must be measured.



ROUGH SKETCH OF SCHOOL

CR - Classroom

- Tree or Shrub

- p.m. Shade

4. Climate:

High desert plants will not do well along the moist, foggy coast with less year-round sunlight. Coastal or wetland shrubs and trees requiring high humidity in the air will not do well in the desert. At this school the humidity is fairly high since the school is about a mile inland from the ocean in a damp location.

5. Light:

The ratio of daylight to darkness is very important to plants as is the intensity of the sunlight, i.e. if the sunlight is often dimmed by fog or clouds, then desert plants should not be used. There is a lot of sunshine at this school.

6. The school grounds:

Note that the sun travels from right to left across the school yard. The playground is always in full sun because the buildings do not shade it and there are no large trees in the main asphalt area.

The sun travels to the north during late summer and fall, then travels toward the south after the winter solstice until it reaches its most southerly exposure on the summer solstice (due to the axial tilt of the earth as it travels around the sun). That means that some areas may receive more sun during the summer months than the class may have charted during the normal school year. This has to be taken into account when permanent plantings are made, so that the plants do not get too hot or dry during the summer, or perhaps, do not get enough sun because during the summer the shade of a building or tree covers them all day.

7. Important areas:

> **a. Eating areas:** Native plants that attract bees during the school year should not be planted here.
>
> **b. Asphalt playground:** This area is probably too hot for plants, except under the trees. Plants with spines or thorns cannot be planted here. Again, plants that attract bees during the school year cannot be planted here. There is also the problem of any delicate plants being trampled by energetic feet or smashed by wayward balls.

c. Kindergarten play yard: This has the same restrictions as the asphalt play area except it is cooler and has dirt areas. Some container plants might be possible.

d. Wet areas: Areas wet due to irrigation drainage problems (bottom of page) or to constantly leaking water fountains (middle of page). These areas may be planted with a variety of small wetland plants, or, if the area is large enough, wetland shrubs, rushes, reeds or even trees.

e. Front lawn of school (by main building): This area has shade and some foot traffic as the children gather to get on the buses. There is room for native shrubs in place of the non-native shrubs by the front steps, native herbs and small shrubs along the walls and annual wildflowers around the trees.

f. Afternoon shade areas: All those areas may have container plants or raised beds of native plants requiring afternoon shade. The area near the parking lot has enough shade for plants that require little sun or partial shade and cooler temperatures.

g. Garden area: This area is usually planted with vegetables. However, if native food plants are part of the curriculum, perhaps part of the garden can be planted with annual or perennial edible native plants.

h. Building walls: Building walls reflect heat when the sun is on them. Walls also radiate heat and may keep plants located next to them warmer than plants located in open areas. Building walls that are always in the shade will keep adjacent plants cooler in hot climates, but will again moderate the temperatures so that the adjacent plants will not cycle through as large a temperature range as plants located in open areas.

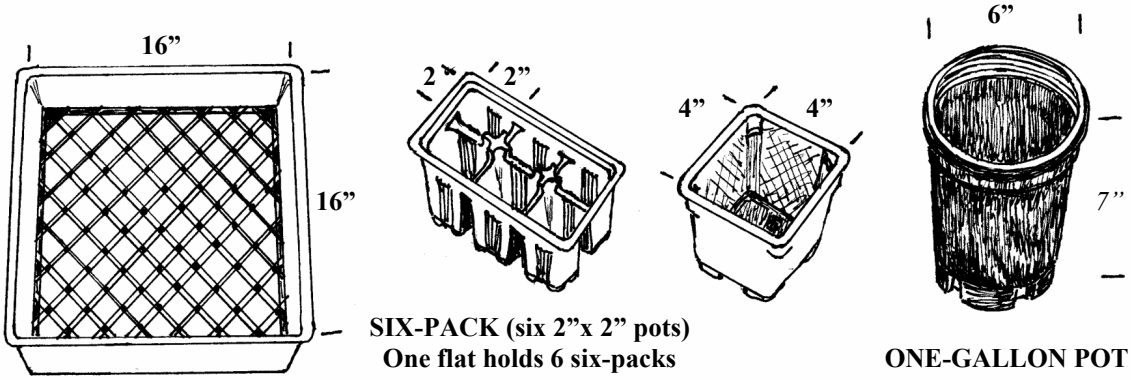
i. Asphalt: If plants in containers are situated on an asphalt area the containers may need an insulating layer of mulch between the container and the asphalt to keep them cool during hot weather or full sun exposure. Placing one container inside another container also helps insulate the plant in the inside container from excessive heat. Plant roots may cook in pots that are too hot. Never use plastic pots, because they are not porous and overheat.

If an area of asphalt is to be removed to create a garden area, the soil underneath the asphalt must be tested to see if herbicides or other chemicals were used to render the soil sterile before the asphalt was poured or if chemicals leached into the ground through the asphalt. If the soil contains hazardous chemicals, the soil must be treated or removed.

In general, if any edible plantings are planned, the soil must be tested to ensure that no dangerous chemicals or heavy metals are present which might render the plants inedible.

Because of the mild climate, many shade trees and general humidity, this school could be planted with coast live oak woodland plants, with coastal sage scrub plants or some chaparral plants on the hot sides of the buildings. Certain small areas on the school grounds with extremely hot or wet conditions would require a different set of native plants.

The next step is a visit to the native plant database to select a few shrubs and herbs that meet these requirements. The tree layer is already established at this school ground. No more than five different shrubs, five different perennials and five different annuals or herbs should be chosen. Start with a few plants and see how they do before expanding the native plant garden. (See list of "Native Plant Nurseries" in Appendices.)



FLAT (16" X 16")

SIX-PACK (six 2"x 2" pots)
One flat holds 6 six-packs

FOUR-INCH POT
One flat holds 16 four-inch pots

ONE-GALLON POT
(6" X 7")

TYPICAL CONTAINER SIZES USED BY PLANT NURSERIES

GARDEN PLANNING SHEET 1

1. DESCRIBE OR MAP LOCATION AND SIZE OF GARDEN SITE ON SCHOOL GROUNDS:

2. DESCRIBE OR MAP SUN EXPOSURE ON GARDEN SITE:

a. COMPASS ORIENTATION OF GARDEN SITE:

b. HOURS OF SUN & SHADE, AREA OF SUN & SHADE DURING

FALL:

WINTER:

SPRING:

SUMMER:

GARDEN PLANNING SHEET 2

3. SOIL CONDITIONS ON GARDEN SITE (Circle those conditions which apply):

a. IF YOU HAVE ASPHALT (Same problems with concrete):

REMOVE ASPHALT? (Need to test soil if you do.)

PUT MULCH INSULATING LAYER ON ASPHALT AND USE CONTAINERS? (May also need shade cloth.)

b. TYPE OF SOIL (Circle those that apply):

CLAY SILTY SAND SANDY LOAM GRAVEL ROCKS

c. MIXTURE OF ABOVE SOILS (Describe):

d. pH OF SOIL:

e. SOIL TEST/RESULTS (Soil must be tested by a professional soil testing service for heavy metals, pesticides, industrial chemicals and asbestos if you are planning an edible plant garden. If the soil is contaminated it must be removed or treated and retested before you can grow anything edible.)

4. WATER:

a.DOES SOIL STAY DRY FOR LONG PERIODS OF TIME (> 7 days)?

(Use your finger or a moisture gauge.)

ON SOIL SURFACE?

3 INCHES BELOW SURFACE?

1 FOOT BELOW SURFACE?

GARDEN PLANNING SHEET 3

4. WATER (Continued):

b. IS THERE DRAINAGE INTO THE GARDEN SITE FROM ROOFS OR OTHER AREAS?

DESCRIBE OR MAP LOCATIONS:

c. AUTOMATIC IRRIGATION:

CAN THE IRRIGATION BE SHUT OFF OR MANUALLY CONTROLLED?

DESCRIBE OR MAP LOCATIONS OF IRRIGATION DEVICES INCLUDING FAUCETS:

GARDEN PLANNING SHEET 4: SHOPPING LIST

NAME OF PLANT	HOW MANY OF EACH SPECIES?	MATURE HEIGHT	MATURE WIDTH	POT SIZE: 4-IN.? 1-GAL.?	TOTAL COST

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California Native Plant Society

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