Congratulations! You have taken the first step to create a safer place for yourself, your family and our environment. This guide will help you create a vibrant garden and do the earth a good turn by showing you how to:

- Create healthy soil
- Plant the right plants
- Reduce toxic chemical use
- Control pests naturally

A word about garden chemicals:

Fish and wildlife are harmed by improper use and disposal of chemicals:

- Chemicals over-applied or not used according to label directions
- Chemicals poured down household drains
- Chemicals washed into storm drains by rain or overwatering
- Chemicals thrown away in the garbage can cause problems for landfills

Local resources for proper disposal of chemicals exist to help you. Keep reading for better alternatives.

For more information to help protect our Bay Area waters call:
1-888-Bay-Wise
(1-888-229-9473)

The Bay Area Stormwater Management Agencies Association (BASMAA) is a group of local water quality agencies focused on regional challenges and opportunities to improving the quality of storm water runoff to the San Francisco Bay and Delta.

Garden and yard chemicals pollute our creeks, the Bay and Delta when poured or rinsed down household drains. Rain and over-watering wash chemicals off lawns and gardens into storm drains. Chemicals entering storm drains flow directly to our waterways. Even chemicals poured down household drains cannot be removed at the sewage treatment plant and enter waterways untreated. Either practice harms our fish, wildlife, and clean water supplies.

Adding compost to create soil with enough organic matter and the right nutrients to grow strong healthy plants. These plants will require less care and resist disease and insect attacks without pesticides.

USE OF COMPOST:

Soil Amending:
Mix a 4-6” layer of compost deep into newly reclaimed or poor soils. Dig 1”-3” of compost into annual garden beds at least once a year.

Mulching:
Spread compost 3”-5” thick over soil around plants during the growing season. Do not pile mulch against plant stems.

Potting Mix:
Mix equal parts of compost and sand or soil. Be sure compost is fully decomposed and sifted before mixing.

For more information see Resources in this guide.
Beneficial creatures that already frequent your garden reduce the need for chemical pesticides because these beneficials feed on a wide variety of pest insects and mites. These beneficials include lacewings, ladybugs, ground beetles, syrphid (hover) flies, tiny parasitic wasps, and spiders. Beneficials are particularly susceptible to pesticides. By significantly reducing your use of pesticides, you’ll find that the numbers of these “toxic-free pest controllers” will increase in your garden.

You can also purchase certain beneficial creatures from nurseries and gardening catalogs. However, purchasing ladybugs or praying mantids is a poor choice. Purchased ladybugs often fly away from your garden without feeding, and praying mantids feed indiscriminately on beneficials and pests and aren’t adapted to the Bay Area’s climate.

Beneficial creatures will be attracted to your garden if you grow certain plants whose pollen and nectar provide food. Try planting:

- Parsley family (parsley, fennel, coriander, dill, and chervil)
- Sunflower family (sunflowers, daisies, asters, and cosmos)
- Sweet alyssum
- Native buckwheat
- Baby blue eyes
- Tidy tips

*These plants must be allowed to bloom in order to attract beneficial insects which feed on their nectar and pollen.*

It is important for gardeners to be aware of the problems and opportunities associated with native and exotic plants. The landscape industry traditionally provides cultivars and exotic plants which are attractive to the eye. However, exotics may become pests when they invade the neighboring creek, wetland, or oak woodland. Native plants are less common in landscape nurseries, but many are available if one takes the time to look for them.

In general, plants that have evolved in a given geographic area are best adapted to that area and require less maintenance in the long run than some of the traditional exotics. These native plants need less water, fertilizer, and pesticide to do well—saving you money. Another benefit is that native birds, insects, and other wildlife have evolved with the native plant species and are able to use the nectars, fruits, and habitat these plants provide. Exotic plants, on the other hand, usually require more maintenance to control; or they may simply get out of control and smother other plants, creating seemingly sterile monocultures. Periwinkle, for example, can be seen along streambanks; however, it is very invasive and can quickly block out the growth of other plants, including natives.

If you live adjacent to a creek, open space, or park land, consider using native species in your landscaping.

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1 Plants bred and cloned for specific attributes such as color of leaves or flowers.

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Alameda County has four major climate zones as described in the Sunset Western Garden Book. Using plants that are right for your zone will reduce the need for pest control in your garden. The plants listed in this guide are appropriate for any of the climate zones below.

**Zone 14**
Berkeley, Dublin, Fremont, Livermore, Oakland, Pleasanton

**Zone 15**
Castro Valley, Fremont, Hayward

**Zone 16**
Berkeley, Castro Valley, Fremont, Hayward, Oakland, Piedmont, Pleasanton, San Leandro

**Zone 17**
Alameda, Albany, Berkeley, Emeryville, Fremont, Hayward, Newark, San Leandro, San Lorenzo, Union City

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Other Climate Zones
The Right Vegetables

- Arugula
- Asparagus
- Beans—Scarlet Runner*, Snap Beets
- Broccoli
- Cabbage
- Carrot
- Cauliflower
- Celery
- Corn (short season varieties in zone 17)
- Cucumber (short season varieties in zone 17)
- Fava Beans
- Garlic
- Globe Artichoke
- Greens—Mustard
- Leeks
- Lettuce
- New Zealand Spinach
- Onions
- Parsnips
- Peppers
- Potatoes
- Peas - Snap and Snow Peas
- Pumpkins*
- Radishes
- Shallots
- Spinach
- Summer Squash*
- Sunflowers*
- Tomatoes (short season varieties in zone 17)
- Turnips
- Winter Squash*

*Grows well in warm season only (April to October)

The Right Herbs

- **Annuals**
  - Basil—Sweet and Holy (only in warmer climate zones)
  - Borage
  - Chervil
  - Coriander
  - Dill
  - Mustard Seed (Black Mustard)

- **Biennials**
  - Anise Hyssop
  - Chinese Celery
  - Fennel (Sweet, Bronze, and Florence Fennel)*

- **Trees**
  - Bay Laurel and California Bay

- **Perennials**
  - Chamomile*
  - Catnip
  - Catmint
  - Cat Thyme
  - Chives*
  - Eupatorium (Mexican Tea)
  - Garlic Chives
  - Lavender (English, French, and Spanish)
  - Lemon Balm*
  - Lemongrass
  - Marjoram
  - Mint (Apple Mint, Corsican Mint, Orange Mint, Peppermint, and Spearmint)
  - Oregano, Greek*
  - Rosemary*
  - Sage, Garden*
  - Tarragon, French
  - Thyme (English, Lemon, and Caraway)*
  - Yerba Buena

*Drought tolerant once established

The Right Cut Flowers

- **Perennials**
  - Alstroemeria
  - Cala Lily
  - Chrysanthemum
  - Columbine
  - Coreopsis
  - Crocosmia
  - Daffodil
  - Dahlia
  - Day Lily
  - Feverfew
  - Freesia
  - Gaillardia
  - Gladiolus
  - Iris
  - Lily
  - Marguerite
  - Ranunculus
  - Roses
  - Shasta Daisy
  - Watsonia
  - Yarrow

- **Annuals**
  - Calendula
  - (Pot Marigold)
  - Cornflower
  - (Bachelor's Button)
  - Cosmos
  - Flowering Tobacco
  - Forget-me-not
  - Foxglove
  - Gerbera
  - Johnnie-jump up
  - Larkspur
  - Love in a mist
  - Marigold
  - Nasturtium
  - Parsley
  - Pincushion Flower
  - Shirley Poppy
  - Snapdragon
  - Statice
  - Stock
  - Strawflower
  - Sunflower
  - Sweet Alyssum
  - Sweet Pea
  - Sweet William
  - Viola
  - Zinnia

Drought Tolerant Plants

- Groundcovers
  - African Daisy
  - Canothis
  - Chamomile
  - Dwarf Coyote Brush
  - Dwarf Plumagbo
  - Germander
  - Manzanita (Pt. Reyes, Monterey)
  - Mexican Evening Primrose
  - Monterey Manzanita
  - Myoporum parvifolium (Putah Creek #2)
  - New Zealand Tea Tree
  - Sea Thrift
  - Shrub Lantana
  - Silver Thyme
  - Sunrose
  - Trailing Morning Glory
  - Trailing Rosemary
  - Verbena
  - White-blooming Bergenia

- Vines
  - Chinese Wisteria
  - (Happy Wanderer) Rose
  - Lady Banks' Rose
  - Lavender Trumpet Vine
  - Pink Jasmine
  - Potato Vine
  - White Passion Vine

Note that many of the plants native to California are drought tolerant and well adapted to the Bay Area's climate but cannot stand summer watering. However, drought tolerant plants often need water until established. They should not be planted among plants that require water in the summer. Check with your local nursery for other growing tips.
Free Pesticide and Fertilizer Disposal

Always follow label directions when mixing, cleaning up, and disposing of garden chemicals. Never:
- pour garden chemicals down household drains
- clean up and wash garden chemicals into streets, gutters, or storm drains
- dispose of leftover garden chemicals in the trash

The following garden products can be disposed of at mobile collection events and permanent collection sites for household hazardous waste (HHW) in the Bay Area:
- Fungicides
- Herbicides
- Insecticides
- Rodent, mouse, and gopher poison
- Soil fumigants
- Snail and slug poison
- Vegetation killer
- Weed killer

For more information see Resources in this guide.

Transporting Household Hazardous Wastes:

Follow these important guidelines when transporting HHW to mobile or permanent collection sites:
- Do not transport more than five gallons or fifty pounds of hazardous waste in your vehicle.
- Do not mix materials.
- Keep pesticides and other chemicals in their original container.
- Make sure lids and bags are sealed tightly.
- Pack waste carefully in the trunk of your vehicle in leak-proof containers or boxes that you plan to leave at the collection site.

Resources

For More Information About...

Home Composting and Free Home Composting Workshops:
Call the Alameda County Home Composting Education Program's "Rotline" at (510) 635-6275

Less-toxic Control Techniques, Sources of Beneficial Insects and Pest Control Products:
Call Bio-Integral Resource Center (BIRC) at (510) 524-2567
BIRC is a non-profit that publishes a variety of booklets on specific pest problems and a Product and Services Catalog listing sources of less-toxic pest control products and beneficial insects.

The Right Plants for Your Area:
Call the University of California Cooperative Extension Office at (510) 670-5200.

Proper Use of Pesticides:
Call the Alameda County Agricultural Commission at (510) 670-5252 or the Alameda County Vector Control at (510) 667-7557.

Free Disposal of Pesticides and Fertilizer:
Call the Alameda County Household Hazardous Materials Facilities at (800) 606-6606 (within Alameda County) or (510) 670-6460 (outside Alameda County). Facilities are located in Hayward, Livermore, and Oakland. Their services are FREE and available to Alameda County residents.

Books and Brochures:
An Illustrated Guide to Organic Gardening, Sunset Publishing Corp.

How to Grow Vegetables and Fruits the Organic Method, Rodale Press.

Tiny Game Hunting, Klein & Wenner, Batam Books.

Pests of the Garden and Small Farm, and other U.C. literature, University of California; order through U.C. Extension at (510) 642-2431.

Alternatives, Washington Toxics coalition; for pest-specific fact sheets (small fee) call (206) 652-1545.

Common-Sense Pest Control, Oikowski & Darr (of BIRC). For a thorough presentation of IPM for garden, house, and animal pests and other BIRC literature call (510) 524-2567.

How you can prevent runoff pollution:
Call the Alameda Countywide Clean Water Program at 1-888-RRT-WISE or write 951 Turner Court, Room 300, Hayward, CA 94545.
Controlling Pests the Less Toxic Way

ARGENTINE ANTS

Detection
Look for single scouts or long lines of ants in or around the house, near food or water. Distinguish from carpenter ants by size. Argentine ants are small (1/8"), their queens slightly larger; carpenter ants are much larger (1/4" or more).

Less Toxic Controls
- Use soapy water in a spray bottle to kill ants. Wipe up with a sponge.
- Follow trails to find entry points. Temporarily close with petroleum jelly or duct tape. Use silicone caulk for a permanent seal.
- Use slow-acting baits containing boric acid or hydramethylnon. Do not leave baits out after ant trails have disappeared.

Prevention
- Store food in containers that seal tightly. Wash dishes frequently; wipe up spills.
- During ant invasions, empty garbage often and keep sweet, protein-rich, or greasy items in the refrigerator.
- Place pet food in a soapy mortar or coat the outside of bowls with Teflon® spray (available in hardware stores).
- See Aphids in this guide for excluding ants from plants.

APHIDS

Detection
Aphids are small (1/8"), soft-bodied insects that feed by sucking plant sap. They are often found in clusters. Look at growing tips, flower buds, and backs of leaves frequently during the growing season.

Less Toxic Controls
- Wipe off small colonies with gloved hands.
- Pinch or prune off severely infested portions of the plant.
- Spray with insecticidal soap (available in nurseries). Always test a small portion of foliage before treating the entire plant. Some plants are very sensitive to soap sprays.
- Spray with highly refined "superior" or "summer" horticultural oils which are fairly gentle on natural enemies (mix 4 teaspoons of oil in 1 quart of water).

PREVENTION
- Do not over fertilize because aphids reproduce more quickly on plants with high levels of nitrogen in their leaves and buds. Use slow-release fertilizers such as compost, biosolids, urea-based fertilizers, or encapsulated materials.
- Exclude ants from aphid-infested plants because ants protect aphids from their natural enemies. Encircle woody shrubs or trees with sticky paste or with Teflon® tape (both are available in nurseries).

EARWIGS

Detection
Earwigs attack leaves of seedlings or older plants. Look for shiny brown insects, with pincers on their rear ends, in plant crevices, near the soil surface, under flower pots, or boards. Earwigs are often blamed for damage done by other insects or snails and slugs because they like to curl up in plant crevices and holes in fruit during the day. To be sure of who is causing the damage, check with a flashlight on several consecutive nights.

Less Toxic Controls
- Hand pick earwigs and crush on a hard surface.
- Set out short lengths of bamboo or rolled-up newspaper to trap earwigs. Check in the morning and shake earwigs into a bucket of soapy water.
- Set out traps made from tuna fish cans containing 1/2 inch of vegetable oil.
- Set out traps made from plastic cottage cheese containers filled with 1/2 inch of soy sauce covered with a thin film of vegetable oil. Punch several holes in the side of the container near the top through which the earwigs can enter. Replace the lid to reduce evaporation.

PREVENTION
- Spread a thick organic mulch on the soil (earwigs will eat the mulch). Add another layer of mulch when the original layer decomposes.
- Start seedlings indoors and plant outside when large enough to withstand damage.

FLEAS

Detection
Adult fleas are most often found on pets. Flea eggs, larvae, and pupae are found in cracks and crevices, in rugs, and anywhere animals rest or sleep.

Less Toxic Controls
- Comb pets with a flea comb.
- Vacuum carpets, furniture and floors weekly, daily in flea season. Carpets can be steam cleaned.
- Use borate carpet treatments or sprinkle and brush in diatomaceous earth.
- Wash or vacuum pet bedding frequently.
- Use commercial flea traps made of a light bulb and sticky paper. The best traps have a green light that can flicker on and off.
- Outside, use flea-attacking nematodes on areas with high flea populations.
- Spot-treat areas with an insect growth regulator such as methoprene to arrest flea development.

PREVENTION
- Comb pets during flea season.
- Restrict pets to specified areas and vacuum those areas frequently.
DETECTION
Lawn weeds are easily detectable. Most people can tolerate a few weeds, so make it your goal to keep weed numbers low enough to prevent significant visual damage. The number you can tolerate is a personal decision.

LESS TOXIC CONTROLS
- Dig out small patches of weeds with a sharp weed-knife or V-shaped dandelion knife. Immediately loosen the soil and sow grass in the bare spot.
- Spray weeds with herbicidal soap (available in nurseries). This soap will also damage grass, so cover surrounding grass with cardboard or plastic.
- Do not use lawn fertilizer containing herbicides.

PREVENTION
- Plant appropriate grass species for your area.
- Fertilize your lawn in spring and fall with a slow-release fertilizer (see Aphids).
- Lawns mown too close to the ground are very susceptible to weed invasions. Set the mowing height at 2.5 to 3 inches so the grass can shade out weeds.
- Aim for slow, deep irrigation. Over- or under-watered lawns are also susceptible to weed invasions.
- Aerate your lawn regularly.
- Consider planting drought-tolerant ground covers instead of grass.

DETECTION
Mites feed on many vegetable, ornamental, and indoor plants. Mites are tiny, 8-legged creatures. Inspect the undersides of leaves with magnification of 15X or greater. Look for stippling, silverying, or yellowing of the upper surface of leaves and fine webbing under and between leaves.

LESS TOXIC CONTROLS
- Avoid using broad-spectrum pesticides because they will kill more of the beneficials than the pest mites.
- Isolate infested indoor plants so they will not infect others.
- Spray with insecticidal soap or horticultural oil (see Aphids).
- Dust with sulfur, but do not use horticultural oils for a month after sulfur application because sulfur residues can cause oil sprays to burn plant leaves.

PREVENTION
- Keep plants well watered because water-stressed plants are more susceptible to mites.

DETECTION
Powdery mildew attacks many plants. Early symptoms are raised, blister-like areas that cause leaves to curl. Later leaves are covered by a greyish-white, powdery fungal growth. Unopened flower buds can become white and fail to open. This fungus prefers young succulent growth.

LESS TOXIC CONTROLS
- Prune out damaged foliage or flowers.
- Wash new growth with a spray of ordinary water. Powdery mildew thrives in cool, dry conditions.
- Spray new growth with antitranspirants (available in nurseries). These are waxes, silicone, or other compounds that make an invisible barrier to prevent powdery mildew spores from penetrating plant tissue.
- Spray with a baking soda mixture: 1 tablespoon baking soda plus 2 1/2 tablespoons of horticultural oil (see Aphids) in one gallon of water. Spray at the first sign of the disease and repeat whenever new symptoms appear.

PREVENTION
- Plant disease-resistant varieties (this applies mainly to roses).
- Avoid over-fertilization and use slow-release fertilizers (see Aphids).

DETECTION
Many garden roses, especially hybrid tea, floribunda, and grandiflora are susceptible to rose diseases such as black spot and rust. Symptoms of black spot are circular black spots with fringed edges on canes and on both leaf surfaces. Symptoms of rust are small orange or yellow pustules on any green portion of the plant.

LESS TOXIC CONTROLS
- Remove all leaves from the plant in mid-December and destroy them, prune and destroy any infected canes, and then apply a layer of mulch around the plant (the mulch acts as a barrier between the plant and the overwintering disease spores on the debris beneath the plants).
- Remove all leaves and petals in the fall and apply a layer of mulch.
- Spray with a fungicidal soap (available in nurseries).
- Spray with a baking soda mixture (see Powdery Mildew).
- Spray with a sulfur-based fungicide. Be sure to cover the tops and undersides of the leaves, paying special attention to the growing tips. Begin application early in the season. Do not apply sulfur when temperatures exceed 85 degrees Fahrenheit.
**ROSE DISEASES**

**PREVENTION**
- Plant disease-resistant varieties, such as Rosa banksiae or polyamtha and rugosa roses.
- Plant roses where they will get six or more hours of sun and good circulation.
- Keep plants well watered.
- Prune roses so they have open centers.
- Keep foliage dry by avoiding overhead sprinkling, or sprinkle when foliage will have time to dry before nightfall.
- Avoid over-fertilization and use slow-release fertilizers (see Aphids).

**DETECTION**
Snails and slugs will eat almost any kind of plant. Look for them at the bases of leaves of plants, in moist cool areas, or under debris, boards, and flowerpots. Snails and slugs leave a shiny slime trail on leaves or soil.

**LESS TOXIC CONTROLS**
- Pour beer or mix water and commercial yeast in a shallow pan. Remove attracted snails and replenish liquid as needed.
- Remove pearly-like egg clusters to reduce populations.
- Place commercial baits in a covered container such as a plastic margarine tub, and cut a hole for the snail/slug’s entrance.
- Set out traps such as overturned flower pots or plastic garbage bags laid on the soil or on groundcovers. Check traps in the morning.

**PREVENTION**
- Add compost. Ground beetles will eat slugs and snails.
- Remove garden debris (loose boards, old pots, etc.) unless you’re using them as traps.
- Remove or reduce the area of favored breeding sites such as ivy, nasturtiums, and clumps of iris.
- Install a band of copper sheeting (available at nurseries) around tree trunks, flower pots, or planters.
- Spread sawdustPaths to deter slugs and snails.

**SLUGS/SNAILS**

**SOW AND PILLBUGS**

**DETECTION**
Sow and pillbugs like plants in a moist environment or on the verge of decay (e.g. ripe strawberries, ripening tomatoes that are touching the ground, etc.). Year-round, look in debris and on the soil surface for gray, segmented bugs that curl up into a ball when disturbed.

**LESS TOXIC CONTROLS**
- Hand pick and crush.
- Make baits with cubes of raw potato (check daily and trowel the bugs into a plastic bag or a pail of soapy water).

**PREVENTION**
- Spread mulch on soil (see Earwigs).
- Grow plants up trellises or at least keep ripening fruit off the ground.
- Remove dying lower leaves to improve air circulation.

**SPIDERS**

**DETECTION**
Spiders are beneficial creatures that feed on insects. Habitat varies widely. Many spiders make webs. The vast majority of spiders are not dangerous and cannot pierce human skin with their mouthparts.

**LESS TOXIC CONTROLS**
- Vacuum up spider and web.
- To avoid killing a spider, cover it with a glass and slide an index card under the glass. Release spider outside.
- If possible, eliminate spider’s food supply.
- Teach children to respect spiders. Do not let them tease spiders or poke fingers into dark crevices.

**PREVENTION**
- Vacuum regularly.
**DETECTION**

Yellowjackets—found around picnics and garbage in late summer and early fall—look for sweet and protein-rich foods. Yellowjackets are aggressive and can inflict multiple stings. Their papery nests are completely enclosed and mostly in the ground.

Paper Wasps—not aggressive and usually need no control—resemble yellowjackets but have long, dangling legs. Their papery nests are open and look like small umbrellas hanging from eaves, etc.

**LESS TOXIC CONTROLS**
(for Yellowjackets)

- Trap yellowjackets using commercial traps baited with liverwurst. Cone-type traps can be baited with sweet liquids. Freeze trap overnight or seal in a plastic bag and set in the sun for several hours before emptying.
- Have a professional kill only nests that directly threaten humans. Only extremely small amounts of pyrethrin insecticide need to be used. Never use gasoline.

**PREVENTION**

- Bring traps along on picnics in late summer and early fall.
- Keep garbage cans sealed. Keep pet food indoors or in a screened area. Pick up fallen fruit from trees.
- Never swat at a wasp. Move slowly without sharp motions to gently brush it away.

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**DETECTION**

Beans, poinsettias, and tomatoes are susceptible to whiteflies. Look at the underside of leaves for small, light-colored speckled larvae, or tap the plant to see if small white insects flutter about (during warmer months).

**LESS TOXIC CONTROLS**

- Avoid the use of broad-spectrum pesticides; they can cause a whitely outbreak.
- Spray bad infestations with insecticidal soap or horticultural oil (see Aphids).
- Vacuum the plants when the air is cool.
- Install yellow sticky traps (yellow attracts these insects).

**PREVENTION**

- Do not over-fertilize with nitrogen.
- Prune and remove badly infested leaves and plants.

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**Thanks**

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BASMAA has adapted this guide from one originally developed and generously shared by the San Francisco Water Pollution Prevention Program. This guide was developed to provide information on less-toxic alternatives for the garden to reduce the amount of toxic pollutants discharged to the Bay Area’s storm drains, sanitary sewers and landfills. Any mention of individual products, vendors, or technologies does not constitute an endorsement by BASMAA, the San Francisco Water Pollution Prevention Program or any of BASMAA’s member agencies.

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