A Guide on Planting and Caring for Trees

Planting a Tree

1. Select the site.

The first step in planning your planting is to choose the right place for your tree. Several factors limit potential tree sites in an urban setting – legal, practical, and aesthetic. Make sure you consider factors such as city ordinances, utility lines, use of the sidewalk, and parking behavior on your street when choosing a location for your tree.

2. Apply for a planting permit.

Property owners must have a permit from the Bureau of Urban Forestry (BUF) at San Francisco Public Works to plant a street tree. There is no fee required for the permit. Current regulations for street tree locations are listed on the back of the permit application. Permit applications can be downloaded from BUF website here.

3. Choose a tree species.

When selecting a tree for your planting project, it's essential to consider the following factors:

- Wind direction and force
- Sun exposure
- Overhead wires and below ground utilities like gas, water, sewer, and electric facilities
- Soil type: mostly sand? Or clay? (Determine by digging in the planting location)
- How big do you want your tree to be when it is mature?
- What tree form/shape is right for your spot? (Round, weeping, spreading, or upright?)
- How about character, color, and special features? (Evergreen, deciduous, native, flowering, etc.)
- How much time do you have for maintenance?

The condition of existing trees in your neighborhood will be your best guide to picking a suitable species for your planting project. Identify trees already growing in your area, particularly those that look vigorous and healthy.

See below for resources that can help you choose the right tree for the right place:

- Friends of the Urban Forest Urban Tree Species Directory
- Cal Poly SelecTree Tree Selection Guide
- SF Public Works' Recommended Street Tree List

Sunset Western Garden Book

Trees of San Francisco

4. Select and purchase a healthy tree.

We recommend planting 15-gallon size trees (this refers to the capacity of the pot they're sold in). Anything larger is difficult to handle without special equipment; anything smaller would be too vulnerable to vandalism.

The following is a list Bay Area nurseries which offer good tree selections:

Sloat Garden Center

Flowercraft Garden Center

Flora Grubb

Yerba Buena Nursery

Wegman's Nursery

East Bay Nursery

The Urban Forest Institute at Cal Poly can help you assess the quality of nursery trees.

When inspecting a nursery tree, look for the following characteristics:

1. A straight, tapered trunk that is thicker at the base.
2. Strong central leader, or central stem. Trees that are pruned into a vase shape may have several leaders, but they should not compete with each other.
3. Natural, symmetrical shape. Branches should be well-spaced and evenly distributed around the trunk. Avoid trees that have been severely headed back — a practice of over-pruning new growth to produce a bush-like shape that leads to weak branches in later years.
4. Healthy root system. Use your finger to scratch down an inch or so below the surface of the container. Check that roots are not kinked or circling and are evenly distributed around the tree. Ensure that no roots are growing out through the bottom of the container.
5. Healthy leaf tips and limber twigs. Gently bend a twig at the end of a branch.
6. Undamaged bark. Check for scrapes, poorly healed pruning scars, or insect damage.
7. No pests or diseases. Check for evidence of pests, particularly on the undersides of new leaves.

5. Cut the sidewalk.

Rent a concrete saw or hire a private concrete contractor to cut a tree basin (the largest size possible per San Francisco Public Works) in your sidewalk at the location marked by the Public Works. Public Works has a list of concrete contractors.

6. Gather planting materials and tools.

In order to conduct a successful planting, you'll need the following tools and materials:

- shovel
- hammer

- stake driver or sledgehammer
- one 15-gallon tree
- three 8’x2″ ACQ treated stakes
- three 36″ green arbor ties (no wire!)
- three 3″x18″ crossbraces
- nails

7. Plant your tree.

Here is a video to show you how.

Tree Care

To improve your tree’s chances of reaching healthy maturity, you should provide basic care for it — including watering it — during the first few years after you’ve planted it.

Soil, Mulch & Nutrition

Your tree is more likely to thrive if you know what type of soil it’s planted in and if you mulch the basin properly. The information below will help you in both matters.

Soil

Use the following methods to find your soil type:

Ribbon Test:

- Take a small handful of soil that is damp but not too wet.
- Work it in your hands for a few minutes and squeeze a small amount between your thumb and index finger.
- Try to squeeze out a flat “ribbon” from the soil. If you can’t make a ribbon or it falls apart immediately, you have high sand content. Soils with as little as 1/3 clay will form ribbons very easily. You can also feel the texture of the various particles on your skin. Sand will feel very rough while clay will feel very smooth. Feeling the texture and measuring the size of the ribbon, you can work out an approximation of how much sand or clay you have.

Drainage Test:

- Carefully dig a fist-sized hole in your tree basin with a hand trowel.
- Fill the hole with water and watch how fast it drains out.
- Sandy soil will drain quickly while clay soil will drain slowly.

Here are some characteristics of the two extremes, sand and clay:

Soil Characteristic	Sand	Clay
How does it hold water?	Poorly	Well
How fast does water drain?	Fast	Slow
How does it hold nutrients?	Poorly	Well
How easy is it for roots to grow?	Easy	Difficult

Determine your soil type and use the following information for guidance:

Sandy Soil

Water

Water runs through sandy soil quickly, so trees in sandy soil require more watering. See tips on **Watering** below.

Nutrients

It's good to add high-nitrogen organic fertilizers every couple of months, especially before mulching.. Don't pile the lawn clippings too thick; just sprinkle a thin layer and allow to dry thoroughly. Remember that the soil cannot hold onto these nutrients so don't over-fertilize or the excess fertilizer will run off in the rain.

If you must use chemical fertilizers, go for "slow release" fertilizers such as Ozmocote or stake-type fertilizers. Keep a good layer of mulch (see "**Mulch**" below) in the tree basin at all times. Replenish the mulch as often as needed to keep a thick layer. DO NOT PILE THE MULCH UP AGAINST THE TREE TRUNK as this can cause crown rot and kill your tree.

Companion Plants (if tree basin is 2'x3′ or larger)

For the first year, mulch is the best companion for your tree. After the first year, small non-aggressive annuals may be planted in the basin, as long as the base of the tree is kept free of plants. Some good options include strawberry, small succulents, and native wildflowers. Stay away from rosemary, lavender, jade and other large or woody plants as these will compete with your tree for water and nutrients.

Sidewalk Protection

Because roots can travel easily through sand, and water tends to move downward quickly, sandy soils will have fewer problems with roots cracking the sidewalk. More info about sidewalk care is below..

Clay Soil

Water

Heavy clay soil requires less watering. See tips on **Watering** below.

Nutrients

Clay soil holds onto nutrients well. You do not need to add chemical fertilizer. An occasional top layer of organic fertilizer such as lawn clippings, fish emulsion, or kelp powder can be helpful but unnecessary. Mulch is still an important part of tree care and soil management (see “Mulch” below). Replenish your mulch as often as needed to keep a thick layer. There is less of a need to add nitrogen when mulching than with sandy soil.

Companion Plants (if tree basin is 2’x3′ or larger):

Mulch is the best companion for your tree in the first year. After the first year, small non-aggressive annuals may be planted in the basin, making sure that the base of the tree is kept free of plants. Some good options include strawberries, small succulents, and native wildflowers. Stay away from rosemary, lavender, jade, and other large or woody plants as these will compete with your tree for water and nutrients.

Sidewalk Protection

Roots have a hard time trying to grow in clay soil. Therefore, they are more likely to grow close to the surface and cause sidewalk cracking. Avoid this by planting less aggressive and smaller trees, and have as large a tree basin as possible. Get more info about sidewalk care here.

Mulch

Mulch is organic matter that is partially decomposed. Compost, which is fully decomposed organic matter, can also be used as mulch. Mulch goes on top of the soil, about 3″ deep. **Don’t pile mulch around the trunk, as this can cause trunk rot and tree death.** Leave a space around the trunk a few inches in all directions.

Benefits of mulch:

Holds moisture in the soil longer. A big benefit in our windy climate!

Suppresses weeds

Raises your tree basin to sidewalk level. When we cut the concrete, there is often a gap between the sidewalk level and the soil level. We plant the tree at sidewalk height to avoid it sinking too deeply. Depending on the size of the gap, you may need to add a bucket or two of native soil and then add the mulch.

Over time, mulch improves the soil. The mulch breaks down into organic matter over time, which benefits all soil types. Just keep refreshing the mulch layer periodically.

Looks nice. Mulch as a top dressing is much better than brick, stone, or grating. Those other materials add nothing to the soil and can wound the tree if not adjusted. Heavy clay soils can compact the soil, causing roots to grow under the sidewalk rather than in the soil.

Materials to use for mulch

Wood chips, shredded bark, and compost. Avoid sawdust and pine needles, as they take too long to decompose and can rob nitrogen from the soil.

Note: For new trees in sandy soils, it helps to add a little organic nitrogen fertilizer just before mulching. Sandy soil is already low in nitrogen, and mulch may temporarily lower nitrogen levels as it decomposes. This is not generally a concern for mature trees and plants.

Where to get mulch free or nearly free:

> **Your yard.** Grass clippings, chopped leaves, and branches make excellent mulches.
>
> **Bayview Green Waste:** 1300 Carroll Avenue, off 3rd Street. Open to the public on Saturday from 7:30 a.m. to noon.

Watering

Watering your tree is essential to its health and survival for the first few years after it's been planted. Watering slowly and deeply is better for your tree's overall health than fast and frequent watering. Watering before 10 a.m. and after 8 p.m. can reduce the amount of water lost to evaporation.

The amount of water needed will vary by tree species and soil type. Here are general guidelines.

Sandy Soil

The sandy soils in the Western half of the city generally require more frequent watering because they drain faster than clay soils. If you live in an area with sandy soils, water two or three times a week, 20-30 gallons total during the first two years after planting, followed by half as much for the 3rd year.

Water runs through sandy soil quickly, travels straight down and does not spread to the side. Therefore, it's best to move your water source around to reach all of the roots.

When sand dries out too much, it can become hydrophobic: it refuses to accept water. If this happens, add a watering agent such as Water-In to enhance soil penetration. Water-In is available at most garden stores. Do not use detergent as a substitute, as this will be toxic to the plant.

Clay Soil

Heavy clay soils drain slowly. If the water hasn't drained into the soil 10 minutes after you have finished watering, you have a heavy clay soil. Apply less water less frequently.

Water 10-15 gallons per week with a slow drip. The heavier the soil, the less water it may need. Watch to see how fast the water drains and avoid creating a swampy condition. Roots need oxygen as well as water. Try not to step on or dig in the soil when it is wet because you can squeeze the oxygen out of it. If clay soil dries out too much, water may just puddle on the surface. Try to keep the soil evenly moist without flooding it.

This is not a strict formula. If your tree-watering schedule is not working for your tree health or soil type.

There are three main methods for watering:

The Bucket Method

The bucket your tree came in holds about 10 gallons of water. You can use it to water your tree. Line it with a trash bag and fill it with water. Poke a small hole in the bottom of the bag at one of the bucket drain holes. Let the water drain out slowly near the trunk, but not on it. Fill it two times once a week every week, even when it's raining (San Francisco's average annual rainfall is only about 20 inches, and 1" of rain = about 5 gallons of water per tree).

The Watering Bag Method

This method is the same as the Bucket Method, only using a gardening product rather than reusing the bucket from planting. The watering bags usually hold around 20 gallons of water, so they only need to be filled once per week. **Be sure to install the watering bag zipped around one of the support posts for the tree rather than the tree itself.** We also recommend installing it on the uphill post so that as the water drains from the bag it will run toward the tree. Installing it on the base of the tree may cause crown rot due to the moisture that collects at the tree's base. In areas with heavy foot-traffic, it may be prudent to run a zip-tie through the hoops on the bag and around the post to deter theft.

You may purchase Treegator® watering bags from us for $25 each when your tree is planted, or you can order them online.

Garden Hose Method

Run your hose on a slow trickle for 1.5 to 2 hours once a week into the tree basin, even when it's raining.

If you have a watering tube, alternate watering between the soil surface and through the tube for the first year. Water only through the tube during the second and third years. Note: sandy soil areas do not need watering tubes.

Contact us via our website if you need help with watering schedules or determining your soil type.

Stakes, Ties & Fencing

Maintaining your stakes, cross-braces, ties, fencing, and other hardware is an often-overlooked part of tree care. In many cases, a hammer and nails are all you need. Ignoring the hardware can result in a damaged or misshapen tree.

Stakes and Ties

Stakes and ties should lightly support the tree but allow it to move in the wind. Trees need their exercise, too! A tightly-bound tree won't send out anchoring roots because there is no need, which will result in a weaker tree.

Here are some simple tips to keep your tree in peak condition:

1. **Stakes should be straight up and down and not wiggle when you shake them.**

   A wiggly stake may be broken underground and should be replaced. Stakes are most important on the side where the wind usually comes from because the tree should pull against a stake rather than lean on it for support. A three-stake system is your best bet because wind direction varies in a storm.


2. When a tree gets large, stakes are no longer needed and they may damage the tree. Remove them.

3. If the tops of the stakes rub and wound any branches, cut the stakes to shorten them. Keep in mind that taller stakes give you more options for tying and supporting the tree, so only shorten the stakes as much as necessary.

4. **Crossbraces are vital, providing strength and stability for the stakes.** They also act as spacers – protecting the whole structure from collapsing inward and wounding the tree. Replace any broken cross braces with an appropriately sized piece of wood or metal. We use recycled plywood cut by volunteers. Move any cross brace that is wounding the tree.

5. **Ties should be tight enough to hold the tree but loose enough to allow movemen**t. Remember, a tree allowed to move becomes stronger than one that is held immobile. Adjust ties as the tree grows to prevent wounding.

6. Attach ties that you can easily adjust later. The best ties are flat and wide – don't use rope, wire or string. These cut into the tree, causing severe injury and often the death of the tree or limb portion above the damage. Plastic can trap moisture and cause rot. Rubber or cloth are suitable materials.

Fencing and Other Protective Hardware

Fencing can protect a tree from vandals, car doors, and other common sources of injury. Contact the DPW Department of Urban Forestry to find out about permits for anything you build up around the tree basin.

Avoid encasing the tree from head to toe in screening.

If you build a fence, put it around the perimeter of the tree basin so the tree has room to grow.

Small metal poles placed at the curbside will prevent damage from cars.

Make sure the protective hardware doesn't eventually become part of the tree! Plan ahead and consider how to remove your protection before you install it.

Pruning

When done properly, pruning improves the safety, health and beauty of a street tree. Friends of the Urban Forest prunes young street trees for three years after being planted. After that, the tree is considered "established," and the city of San Francisco takes over responsibility for pruning it. You can find more information about StreetTreeSF, the city's street tree maintenance program, here.

If you want to prune an established street tree yourself, or hire an arborist to prune it, you must obtain permission from the Bureau of Urban Forestry (part of San Francisco Public Works). You can email them at urbanforestry@sfdpw.org.

If you prune a tree, there are three main types of cuts you can make:

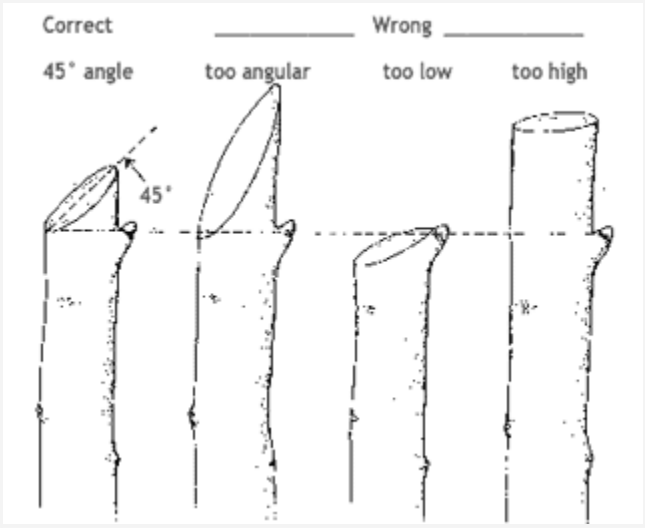
Thinning cuts

A thinning cut is the removal of a smaller branch from a larger one. The idea is to cut close to the main limb without making a flush cut or leaving a stub. Look for the branch collar, the swollen area where the smaller branch meets the larger one, and cut just to the outside of it.

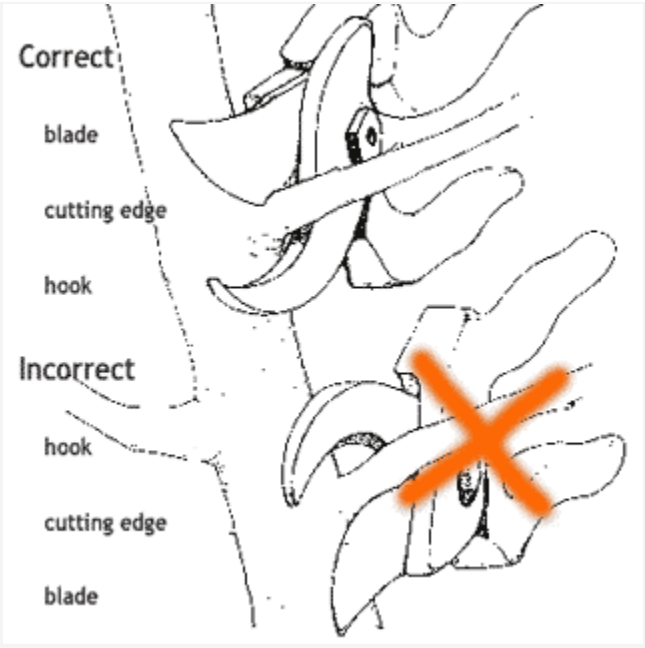
Reduction or re-leadering cuts

A reduction cut shortens a limb to a lateral branch that's at least 1/3 the diameter of the shortened limb; this causes the lateral branch to grow more vigorously. Don't cut too close to the lateral branch, but also don't leave a stub (an excessive amount of the shortened limb).

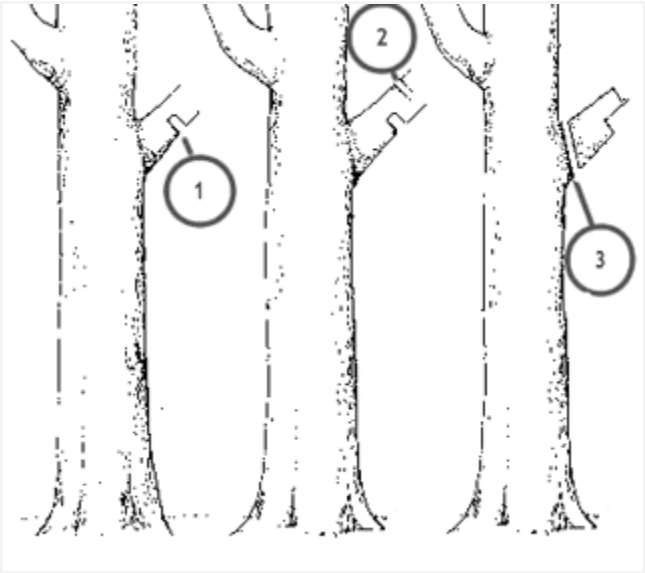
Heading cuts



A heading cut shortens a branch back to a bud. This should be a cut of last resort! A correct pruning cut has its lower point even with the top of a growth bud and slants upward at about a 45° angle.



To make a proper close pruning cut, hold the pruning shears with the blade closest to the growth that will remain on the plant. A stub results when you reverse the position and place the hook closest to the plant.



For larger limbs, use three cuts. The first is an “undercut” to keep the bark from peeling down the trunk, cut beneath the branch and a third to half way through it. Make the second cut beyond the first cut, all the way through, to remove the weight of the limb. The third is your finish cut. Here you must guide your saw just to the outside of the branch collar (ridges at the limb’s base) with clean strokes, so the final result is smooth.

Tree Topping

Topped trees on the 100 block of Roosevelt Street.

“Topping” is removing more than 30% of your tree’s foliage at any one time, cutting or removing the tallest branch, or cutting or removing the ends of all or most of the branches. Topping will severely weaken your tree and may even kill it. It will result in a high-maintenance, expensive, dangerous, and potentially ugly tree. It’s illegal in San Francisco and is punishable by a fine.

Do not top your tree!

It’s okay for tree branches to be in and around telephone wires and low voltage wires as long as there is no stress or undue abrasion. Begin training the young branches to go out and around these wires. Avoid large pruning cuts.

Sidewalk & Basin Care

The tree basin is the square – or rectangle – cut out of the sidewalk. Cover it with mulch, which retains moisture and helps prevent soil erosion.

Soil/mulch should be level with the sidewalk. Mulch should be about 3″ deep but kept away from the trunk.

If you need to add soil, it's best to add natural soil from the immediate area rather than buy soil. (see the soil section to find out why).

Don't raise the soil around your tree trunk! It can cause rot and kill the tree. If you must build a raised box around the tree, keep the tree trunk separate from the raised part. Do this with a large tube or barrier around the trunk, with plenty of airspaces, inside the box. Make sure there is room for the tree to grow.

Don't add other plants to the basin during the first year after planting; they'll compete with the tree for water and nutrients. On the other hand, bare dirt isn't good either because it doesn't hold moisture well. If you have other plants in the basin, keep them short and away from the trunk.

We recommend against covering the basin with bricks or stones; they won't help control roots and deprive the tree of water and oxygen. If you add bricks or stones, leave spaces between them and do not fill them with mortar. Consider adding only a border of flat bricks rather than covering the basin.

If the soil is sandy, the tree's roots are less likely to crack the sidewalk as the tree grows because roots travel easily through sand, and they'll tend to travel downward to chase the water that penetrates quickly through the sand. However, if the soil is clay-like, roots are more likely to grow close to the surface and crack the sidewalk. To avoid this, you can do preventive "root pruning" when the tree is young by taking a shovel and cutting around the border of the tree basin every six months or so. Using a "rootguard" for larger tree species or species with invasive roots may prevent or delay future sidewalk disruption but works better in sandy soils.

Help! My sidewalk is cracking! What do I do?

San Francisco Public Works is responsible for repairing tree-related sidewalk damage. If a tree is cracking your sidewalk, please notify SF311, the city's "customer service" department. You can submit a

report to them in any of three ways: by calling 311 from any 415 area code phone or via the web at sf311.org/new-request-main/sidewalk-defects.

Common Problems & Disorders

The best defense against tree problems and disorders is a well-maintained and healthy tree. However, should your tree develop problems, these tips may help.

Here are the basic concepts of “integrated pest management,” a practical and environmentally sensitive approach to pest management:

1. Put the right tree in the right place. Don’t force something to grow under conditions it can’t handle. FUF helps you with that decision when you plant through us.
2. Improve the “cultural conditions” for the tree (water, light, pollution, wind, and soil).
3. Know your pest. Is it a bug, disease, or something else? Find out as much as possible, so your efforts aren’t wasted.
4. Choose the least toxic method of pest control. If improving cultural conditions isn’t sufficient, then try a non-chemical method of control. Chemicals are a last resort.
5. Know your chemical. if you must use one. What precisely does it kill? What are the risks to you or the environment around you?

Here are some common problems and possible solutions:

Symptom	Possible Causes	Solution
Low vigor, wilting or leaf drop, leaf dieback (leaves die from the tip back) or very little new growth.	Water stress	See our Watering section for more info.
Yellowish leaves.	Overwatering/	Choose an appropriate species; amend the soil with organic matter to increase drainage; raise trees if possible.

However, the soil may be swampy or even smell bad.	poor soil drainage	
Leaves to appear yellowish, or chlorotic.	Nitrogen Deficiency	Adding organic nitrogen fertilizer regularly can help – but don't overdo it.
Leaves will yellow, but the veins remain green. This is known as iron chlorosis. Example image.	Iron deficiency	Wind is drying, so try increased watering if the soil drains well. Windburn is usually not fatal if the tree is generally tolerant of conditions. This is usually more noticed on young trees.
In rare cases of frost, some plants will partially or fully die back.	Frost Dieback	Don't prune off the frost-burned branches until you are sure no further frosts are expected. The outer foliage keeps the inner foliage warm. To prevent frost burn, keep plants well-watered. Cover with an old sheet or towel at night if frost is expected, trying to leave an air gap between the sheet and foliage. Uncover during the day. Outdoor-rated string lights ("Christmas lights") in the tree at night can also help, especially if it is covered. Jacaranda (Jacaranda mimosifolia) and New Zealand Christmas trees (Metrosiderus excelsus) are some of the more common San Francisco street trees subject to frost damage.
The leaves generally wilt and brown within 1-3 days and the tree does not recover.	Chemicals dumped into tree basin	This could include but is not limited to: painting chemicals, motor oil, cleaning solvents, etc. Painting chemicals seem to cause the most sudden and dramatic tree death when dumped into tree basins. Be sure that any contractors you hire understand that they are not to dump any toxins in the tree basins (including the neighbor's!) and that they are responsible for the cost of removing and replacing any trees that die if they do. If you suspect a chemical dump, gather some soil with a trowel and smell it. You may detect a chemical odor.

Resources

Free Sick Plant Clinics

The Berkeley Botanical Garden and the San Francisco Botanical Garden sometimes have plant clinics.

Books

Pests of Landscape Trees and Shrubs, published by the University of California, has excellent information with photos and tables matching symptoms to causes. It's available online and at the San Francisco Botanical Garden Bookstore.

Websites

For more information about other pests and their least-toxic control methods, visit these excellent sites:

San Francisco Department of the Environment

UC Davis Integrated Pest Management

UC Davis Integrated Pest Management En Español