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3D Landscape 2.0

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One of the best ways to get ideas for your yard is to review what others did with theirs. Browse this sampler of popular styles to start your imagination. Click on a picture below to learn more about it.

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Do you have a yard that seems too tiny to landscape? This urban oasis packs many features into its little space, with its brick patio, raised planting beds, and secluded seating. The diminutive evergreens and Japanese maples keep the yard's scale and provide year-round textural interest. It's visually inviting, even from a second-story window.

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The key to a formal backyard is symmetry. If you fold the plan in half, the sides match. In this particular garden, colors have been placed asymmetrically for a more relaxed feeling. Other hallmarks of formality are lavish fountains, urns, statues and geometrical plant beds lined with manicured hedges.

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An Informal Landscape

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{ewr MVBMP2, ViewerBmp2, fotosinforml.bmp} Balance is possible without symmetry. Although it looks spontaneous, everything in this Massachusetts cottage garden has been carefully planned--even the free-form flower bed, the rustic brick pathway, and the unkempt hedge in the back. Informal landscapes like this have no rigid, obvious plan, but their shapes, colors, and placements are all in check.

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A Yard for Contemplation

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Want to get away from it all? In this tranquil yard, a free-form patio of stone tiles makes an inviting retreat for reading or thinking. Sheltering trees and a large boulder enhance the feeling of privacy. On the lawn, stone edgings around natural-looking plantings create peaceful destinations for the eye.

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A Terraced Yard

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The owners of this house wanted a flat lawn area, yet their yard was originally a steep, continuous slope. They designed a series of terraces that provide showplaces for plants and keep the soil from washing downhill. Stone and wood retaining walls support the terraces; concrete steps connect them.

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A Cottage Garden

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{ewr MVBMP2, ViewerBmp2, fotoscottage.bmp} This English style evolved from kitchen gardens into casual, decorative ones. Cottage gardens turn intimate spaces into a sea of roses, perennials, or shades of white. Paths and other hardscape elements consist of practical local materials. Window boxes or containers bring the landscape's color to your door.

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An Italian Landscape

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{ewr MVBMP2, ViewerBmp2, fotositalian.bmp} To accommodate the dry, scorching summers in Italy, landscapers historically chose heat-deflecting white hardscape--concrete, stone or marble--and year-round greenery. Evergreen trees, shrubs, or expansive lawns maintain a balanced and geometric pattern like the one shown here. A water feature, such as a classical-style fountain, is a favorite source of refreshing coolness.

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A Modern Landscape

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{ewr MVBMP2, ViewerBmp2, fotosmodern.bmp} As with art and architecture, modern landscapes depend on minimalism and pattern. Hardscape defines geometric lines, whether curved, straight or checked, like the concrete tiles in this design. The palette is simple: here, a contrasting gray and green. Attention-getters like contemporary sculpture or distinctly shaped plants--ornamental grasses or bamboo--sometimes break the geometry.

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An Asian Landscape

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Designing Your Landscape

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Transforming your yard will improve the way you relax,entertain and play. But deciding what you want and where to put it takes thought and imagination. This chapter gives you the guidelines you'll need to design a beautiful, enjoyable landscape.

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the Right One
{ewc MVBMP2, ViewerBmp2,
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Deciding What You Want

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

A good place to begin is to list everything you want to keep, remove, move, add, or modify. Itemize the things you'll need room for, such as outdoor dining, kids' swings, a basketball hoop, a vegetable garden, flower beds, a potting bench, and trash storage. Print the list under "Step by Step," below, to get started.

Include any views to maximize and any eyesores or noise problems to minimize. Rank each element by its relative importance: 1) absolutely necessary; 2) maybe later; or 3) just an idea.

Decide what work a professional should do--either because building codes require it, or you lack the skills or time.

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Related Topics
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[macro=`JI(qchPath,"recording_what_you_have")']bitmaps.bmp}
Recording What You Have

{ewc MVBMP2, ViewerBmp2, bitmaps.shg}

[] arbor
[] barbeque
[] bench
[] boulder
[] deck
[] driveway
[] edging
[] fence
[] fountain
[] furniture
[] gate
[] gazebo
[] ground-cover
[] lawn
[] light
[] patio
[] plant bed, flowers
[] plant bed, vegetable
[] planter
[] pond
[] pool
[] raised bed
[] retaining wall
[] shed
[] shrub, flowering
[] shrub, hedge
[] sidewalk
[] sprinkler
[] steps
[] tree, flowering
[] tree, fruit
[] tree, shade
[] tree, ornamental
[] trellis
[] walkway
[] wall
[] other_____

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Where to Put It?

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

Using your yard should be an easy, pleasant experience. If it's too much trouble to get to an area, chances are you won't use it. If a fountain is out of earshot or a flower bed hidden away, you won't fully enjoy it. As you review your plan, look for logical parts to pair up: the compost bin by the vegetable garden, the outdoor dining area near the kitchen. Look for features to keep apart: the service area concealed from the patio or deck, the basketball hoop away from the swimming pool.

{ewc MVBMP2, ViewerBmp2, illustnsarrange.bmp}

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{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.shg}

Safety

Caution: Make sure you're not placing features where you shouldn't, such as too close to your neighbor's property or over an **easement**. Also check that you're not blocking future access or creating a hazard. Under power lines, for example, it's okay to put in walkways but not a pool.

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How Big to Make It?

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Now that you're designing walkways and other features that require proportions, you'll need to know the general rules for size. Landscape architects and designers use **ergonomic** and aesthetic rules of thumb to give dimensions to paths, patios, and other features. Click on one of these pictures for suggested proportions.

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tmaps.shg}
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Walkway
5-6 feet wide for 2 people to walk side by side
3 feet wide for 1 person or for wheelbarrow access
2 feet wide for minor garden paths

Gate
3 feet wide for wheelbarrow access

Patio

64 square feet per family member for multipurpose use
5- by 6-feet for two people and a small side table
12- by 12-feet for a table for 4
15- by 25-feet minimum for a table for 4, a small cooking area, and 1 or 2 lounges

Bench
16-20 inches high and 3 feet deep, plus leg room

Swimming Pool
36 feet long for laps

Fence
3-4 feet high for decoration
5 feet for a barrier
6 feet for privacy

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{ewc MVBMP2, ViewerBmp2, bitmaps.bmp}

Using Sun and Shade

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The way sunlight and shadows fall on your property will influence where you put things and what you grow.

This animation shows how shade patterns change through a day. The south side of the house gets sun most of the day. In a cool climate, you'd probably want your pool or patio there. The north side is mostly shady. In hot climates, that's where you'd want to put these outdoor living areas.

Sun and shade patterns also shift with the seasons.

{ewc MVMCI2, ViewerMCI, [device MMMovie][noframe][stdcontrol]moviessunyard.mmm}
In winter, houses and trees throw long northerlyshadows. In summer, the sun is higher and shadows are shorter.

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{ewc MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath, "using_sun_and_shade_design")']bitmaps.bmp}

{ewc MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath, "using_sun_and_shade_seealso")']bitmaps.bmp}

{ewc MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath, "using_sun_and_shade_shg")']bitmaps.bmp}

Design Tip

Use the Shadow tool to test shade patterns around patios, pools, and other activity areas. Also try stretching trees or shrubs to their mature size and checking the shadows they cast.

Related Topics
{ewc MVBMP2, ViewerBmp2,
[macro=`JI(qchPath,"light_levels")']bitmaps.bmp} Light Levels

{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.bmp}

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{ewc MVBMP2, ViewerBmp2, bitmaps .bmp}
Screening for Privacy

{ewc MVBMP2, ViewerBmp2, bitmaps .bmp}

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

Ugly buildings, garish signs, power poles, or nosy neighbors' windows are things you'll want to cover up when designing your landscape.

Use this calculator to determine where and how tall to build a privacy screen. Enter your distance from the offending area and its estimated height. You can change any number and the other numbers will change accordingly. Things you'll want to screen include:

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"eyesores_or_prying_eyes")']bitmaps.bmp} Eyesores or prying eyes {ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"utility_areas")']bitmaps.bmp} Utility areas

{ewl EYESORE2, ScreenEyesorePane, unused}

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Eyesores or Prying Eyes

To screen these out, use trees, tall shrubs, hedges, masonry walls, fences, arbors and trellises placed overhead or vertically.

Utility areas

Solid screens such as board fences are ideal for hiding garbage cans, compost heaps, and dog runs. Use **latticework** if you want light and air to circulate.

Related Topics
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"fences")']bitmaps.bmp} Building Fences
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"garden_walls")']bitmaps.bmp} Garden Walls
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"how_big_will_it_get")']bitmaps.bmp} How Big Will It Get?

Rule of Thumb

{ewr MVBMP2, ViewerBmp2, illustnseyesore.bmp}Use this rule to estimate the height of an eyesore: Stand a friend next to it and walk away until your thumb at arm's length matches your friend's height. Mark off the eyesore in thumb lengths and multiply the total by your friend's height. For example, if your friend is 6 feet tall and the eyesore is six thumbs high, then its height is 36 feet.

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{ewc MVBMP2, ViewerBmp2, bitmaps.bmp}

Buffering Noise

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

If you live close to a busy street or loud neighbors you can make the noise less grating by masking it. Try the pleasant sound of a splashing fountain. To hear the difference a fountain makes, click on the "Before" and "After" buttons.

A concrete-block wall is a good sound buffer. The closer it is to the noise the better, so it can deflect sound near the source.

Wind carries sound, so buffering wind will also cut down on noise.

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{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.shg}

More

Trees, shrubs, and trellises won't buffer noise, but they can help psychologically by hiding the source.

Related Topics
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"concrete_block_walls")']bitmaps.bmp} Concrete-Block Walls

{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.bmp}

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{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.bmp}

{ewc MVBMP2, ViewerBmp2, bitmaps.bmp}

Buffering Wind

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A windy yard is inhospitable to both people and plants. For the best buffering, plant several rows of evergreens on the windward side of areas you want to protect. Or build a fence with spaces between the slats. It may seem contradictory, but solid barriers are actually poor buffers because wind crashes down on the other side with even greater force.

To place windbreaks effectively, know the directions of **prevailing winds** and storms.

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{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.shg}

Design Tip

In the Designer, add arrows showing the direction of summer and winter winds. If you're not sure about the way they blow, ask your neighbors what they've observed, or call your local **Cooperative Extension** office.

More

Place tall plants or structures downwind if you want summer breezes to cool your patio or deck. If you already have a solid fence, you can lessen the wind's force by planting shrubs on one side of it in a stepped pattern.

Safety

If you plant trees as a windbreak, don't put them too close to your house.
A tree may topple or lose branches in a heavy storm .

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Seeing Your Yard in New Ways

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The best gardens solve practical problems--yet they're also magical places, full of mystery and delight. How do you create such a garden? By taking the time to see your yard in new ways. A favorite theme or style can be your starting point, or start from a defect you want to correct. In this example, the landscaper softened a rectangular lot by adding a curved border of plants arranged informally. If you'd like a second opinion, you can pay a professional for ideas, then implement them yourself.

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{ewc MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath, "seeing_your_yard_in_new_ways_design")']bitmaps.bmp}
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Designer Tip

Print out several versions of your ideal landscape and show them to friends and family. Keep them handy to make notes on as you leaf through books and magazines.

Related Topics

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"gallery_of_ideas")']bitmaps.bmp} Gallery of Ideas

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"plant_shapes")']bitmaps.bmp} Plant Shapes

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"continual_color")']bitmaps.bmp} Continual Color

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"designing_for_texture")']bitmaps.bmp} Designing for Texture

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Recording What You Have

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

To design your new landscape you first need a record of what's already there--including the sizes and locations of structures, walkways, driveways, fences, trees and shrubs, planting beds, and utility easements.

Here's an an easy way to measure these, using your house as a reference point. Always measure at right angles to your house and the lines you've established. This record is a top view. If your yard slopes, stretch a string level across it (use a line level to help) and measure the horizontal distance.

{ewr MVMCI2, ViewerMCI, [device MMMovie][noframe][stdcontrol]moviesmeasurg.mmm}

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"recording_property_lines")']bitmaps.bmp} Recording Property Lines

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"recording_underground_utilities")']bitmaps.bmp} Recording Underground Utilities

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{ewc MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath,

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"recording_what_you_have_tools")']bitmaps.bmp} MVBMP2, ViewerBmp2, [macro=`PopupID(qchPath, "recording_what_you_have_seealso")']bitmaps.bmp}

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Related Topics
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"does_your_yard_slope")']bitmaps.bmp} Does Your Yard Slope?

Tools and Materials

clipboard
paper map from the Designer
pencil
100-foot tape measure

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Recording - **Property Lines**

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{ewc MVBMP2, ViewerBmp2, [macro=`JumpID(qchPath, "designing_your_landscape")']bitmaps.bmp}

Use a **plat map** of your property to locate its boundary lines, *outlined in red at right*, buildings and **easements** accurately. If you can't find one among your real estate records, get a copy from your city or county.

If your plat map shows no landmarks, use **survey markers** to locate your property lines. Look for a plaque or an iron stake at the corners of your property. If you still can't find your boundary lines and don't want to risk overrunning a neighbor's property, have a **licensed surveyor** locate them.

Once you have located your easements and boundaries, record them in the Designer.

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By the Book

Look for any **covenants** and restrictions in your real estate records -- most often, they're recorded on the deed. They may specify where and how you can build and landscape.

Related Topics
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"finding_the_right_one")']bitmaps.bmp} Finding the Right Professional

{ewc MVBMP2, ViewerBmp2, [dither]bitmaps.bmp}

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Recording - **Underground Utilities**

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Find your **utility lines** and **septic systems** to avoid digging them up or interfering with them. Look for clues -- the line going into your electric meter, a grate over a sewer vent, or access covers to gas and water valves. In many areas, call to have your utility companies come out and mark lines and **easements.** Each company will locate or mark its own.

When you're done, record where your utilities run in the Designer.

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Related Topics
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Does Your Yard Slope?

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Your yard slope determines how you'll build and what you'll plant. To measure slope, divide it into sections. The combined height of the sections gives you the total height of the slope ("rise"). The combined length of the sections is the total length of the slope ("run"). To calculate the percent of slope, divide rise by run. For example, a slope that rises 6 feet over 18 feet of run has a slope of 1 to 3, or 33 percent.

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Evaluating Drainage {ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"landscaping_slopes")']bitmaps.bmp}
Landscaping Slopes
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When you're taking stair-step measurements, hook a **line level** onto the string and adjust the string until it's level.

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Slope - **Evaluating Drainage**

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With your slope measurements in hand, look over your property to see how it channels water. The **drainageways** should have no obstructions or low spots that collect water. If you see either of these problems, note them in the Designer.

Also note areas where water doesn't drain well. They may indicate heavy, poorly drained soil or **hardpan**. If you plan to garden in these areas, you'll need professional advice about improving the drainage.

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More

To keep your house from flooding, the soil around it should slope away in all directions, at a minimum of 1/4 inch per foot for at least 6 feet out from the foundation. Downspouts also should drain away from your house. If you suspect a problem, hire a landscape architect or soils engineer to evaluate before you landscape.

Related Topics

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Slope - Landscaping Slopes

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Let the steepness of your slope help determine how you landscape it. This illustration shows the best uses for various degrees of slope.

To control erosion, plant bare slopes with groundcovers or shrubs--ideally deep-rooted, spreading types. Keep **drainageways** planted with grass or lined with rocks.

To create extra planting space, terrace moderate slopes with low retaining walls.

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Tip From the Pros

To make a slope seem steeper, plant at the top. To minimize it, plant large shrubs at the bottom.

Safety

Consult an engineer before regrading or building on a steep slope.

Related Topics

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Working with Pros

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Sometimes the situation calls for a pro. For instance, many communities require a licensed professional to design or install some features such as tall decks and retaining walls, swimming pools, and structures that shelter people.

If your plan calls for complex changes of grade, you'll definitely want an expert to help you avoid problems like flooding or erosion. Your landscaping job may be so big that you'd rather leave parts of it to a specialist. Or, before building, you may want aesthetic advice.

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Pros - Finding The Right One

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Various types of professionals can help you with your landscape project. **Landscape architects** and **landscape designers** provide design services. So do some **landscape contractors**, although their primary function is installation.

You may decide to be your own contractor and hire skilled tradespeople, such as bricklayers, carpenters, and masons, to install your plan. Other professionals you may need include **land surveyors** and **soils engineers.**

To find the right individuals, get recommendations from friends or local nurseries, or contact professional associations. Click on the toll-free numbers button to find relevant associations.

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Pros - **Writing Specs**

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Before getting bids, draw up the job specifications. List everything you want done so the bids are comparable. Request an itemized cost breakdown, not a package price. Request references so you can check on quality. Ask for copies of licenses and insurance policies.

Ask the contractor to spell out start and completion dates, liabilities, warranties, and the pay schedule. You may want to be shown receipts for materials. Specify **lien waivers** as you pay for each stage of the job.

Also write in a delay of two or three weeks after completion for final payment, so the contractor has an incentive to fix any problem. You might want to add a penalty for late work, or a bonus if work is done ahead of time.

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Specifications Checklist
What to provide:
__finished plan
__list of hardscapes to be installed (dimensions, materials)
__planting list (botanical names, quantities, sizes)

What to ask for:
__detailed description of each aspect of the job and materials to be used, including recommendations for irrigation, drainage, and lighting
__itemized cost breakdown
__start and completion dates
__warranties on work and materials
__pay schedule (ask for delay before final payment)
__lien waivers!
__receipts for materials
__copies of licenses and insurance policies
__list of references
__site cleanup

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Pros - Negotiating Contracts

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In preparing a contract, be sure it conforms to your written specs or prior discussions, and that it itemizes services and materials your contractor will provide. Ask enough questions to feel satisfied before accepting a dramatically lower bid.

Check safeguards in state law, such as your ability to back out of the contract within a certain number of days, or not having to pay anything until work commences on-site.

Click on "Step by Step" to see a sample proposal. You can print it out to make notes on, or you can copy and paste it into your word processor.

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Sample Proposal

Contractor:

Proposal submitted to:
Phone:
Date:
Street:
City, State, and ZIP code:
Date of plans:
Job name:
Job location:
Job phone:

We propose hereby to furnish material and labor--complete in accordance with specifications below, for the sum of: SEE PRICE BREAKDOWN BELOW

Payment to be made as follows: TERMS: 20% DOWN UPON START OF WORK, 40% MIDWAY, BALANCE WITHIN 14 DAYS OF COMPLETION

All material is guaranteed to be as specified. All work to be completed in a workerlike manner, according to standard practices, on or before _____. Any alteration or deviation from specifications below involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado, and other necessary insurance. Our workers are fully covered by Worker's Compensation Insurance.

Authorized signature:_____

Note: This proposal may be withdrawn by us if not accepted within_____ days.

We hereby submit specifications and estimates for an itemized cost breakdown, which includes debris removal as per our discussion at site meeting.

1. Front driveway concrete--break out, remove debris, and leave said area graded.....$975

2. Front entry hardscape--remove and dispose, including steps and flatwork. Portion behind the overhang will be by hand, balance with tractor.....$1,275

3. Two stone entry planters--remove and dispose.....$295

4. Side and rear yard concrete--remove and dispose.....$5,625

5. Front, rear, and side yards--landscape area per landscape plan prepared by _____. Scope of work includes selective tree removal as per owner direction, all shrubs, junipers, lawn area, south side fence, raised garden lumber, removal of said material and offhauling to dump site. Also includes grading to accept new fencing, hardscape, and landscape.....$9,830

6. Drainage system. These are two separate drain systems that will be in the same trench and tie together approximately 6 feet from their entry through the curb.....$4,625

A) French drain system--said system would have 3" perforated pipe in a 3/4" drain rock envelope, and a filter fabric membrane to prevent soil entry into drain rock. This pipe would be 12" below the footing depth at the rear and sides of the home. Where necessary, said pipe would tie into 3" solid line and would discharge the water into the curb.

B) Solid drain system--said system will pick up all downspouts from roof gutters. System would also have stubs above grade in all key regions to be used as area drains. This would be 3" PVC tight line, with all appropriate fittings. It would discharge into the curb.

Acceptance of Proposal-- The above prices, specifications, and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of acceptance:_____
Signature: _____
Signature: _____

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Pros - Checking the Work

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Your local building department will inspect work that requires a permit, but don't rely solely on the people there to ensure good work. Check periodically to see that your plans and specifications are being followed. Make sure that dimensions and locations are correct, especially before forms are built and concrete is poured. If you requested receipts for materials, check purchases against specs.

If the contractor wants to change your plan, ask for an explanation. If you discover you made a mistake, discuss remedies with your contractor. A change may involve extra cost, requiring an addendum to your contract.

Try to evaluate the situation before work begins. If the workers don't explain things or answer questions, halt the work until you get satisfactory responses.

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Preparing the Site

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Got your wheelbarrow, shovel, and tape measure ready? Here's how to lay the groundwork for your new landscape.

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Discarding Debris
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Before You Start

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It's a fine weekend day, you've drawn up your plans, and you're ready to get to work. First, though, take care of the following:

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"have_you_checked_local_ordinances_and_building_codes_and_obtained_permits")']bitmaps.bmp} Check local ordinances and building codes and obtain permits

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"have_you_told_your_neighbors_about_your_plans")']bitmaps.bmp} Tell your neighbors about your plans

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"have_you_considered_how_long_the_project_will_take")']bitmaps.bmp} Consider how long the project will take

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"do_you_have_the_right_materials_and_equipment_on_hand")']bitmaps.bmp} Have the right materials and equipment on hand

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"can_you_do_the_job_yourself_or_will_you_need_help")']bitmaps.bmp} Determine if you can do the job yourself, or if you need help

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"make_arrangements_to_haul_away_debris")']bitmaps.bmp} Make arrangements to haul away debris

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These projects are often governed by local ordinances or require building permits: grading, erosion control, spas and swimming pools, fences, retaining walls, sprinklers, lighting and electrical systems, patio roofs, gas piping, and **off-grade** or **cantilevered decks.** Getting a building permit can be as simple as a one-time visit to your local planning department. Or you may need detailed drawings and lengthy design review. Fees vary, depending on location and complexity. An inspector may visit the construction site to make sure everything is being done properly. Your local planning department can advise you of its requirements.

Fences, trees, or other features you modify may adversely affect your neighbors' homes and yards. The landscaping process may also inconvenience them. Explain what you're planning and what impact it will have.

A muddy, torn-up yard or a driveway blocked by building materials will be hard to take for long. If the project is extensive, tackle it in stages.

You may be forced to halt work if you don't have the tools and supplies you need. Double-check your plan to be sure. If in doubt, consult your supplier.

Many landscaping projects involve heavy lifting that may require helpers. Some jobs, such as complex bricklaying, call for skills you may lack. To find qualified professionals, check the classified ads of your newspaper or phone book. Or ask a nursery for recommendations.

Your garbage-disposal company may rent you a debris box. Or you can re-use some materials, such as broken concrete, in your building projects.

By the Book

Be sure to obtain all the permits you need. Failure to do so can result in steep penalties or costly changes in your finished landscape.

Related Topics

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Clearing the Area
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Working with Pros

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Marking Easements and Utility Lines

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Before breaking ground on your project, use special landscape paint (or powdered chalk, sprinkled flour, flags, or stakes and string) to mark the locations of all **easements**, pipes, cables and other **utility lines**. If you don't, you may cause damage or accidents.

Underground utilities lie at different depths, from a few inches to several feet. Ask your utility company about the depths as well as the locations of buried lines--otherwise simple landscaping tasks, like trenchdigging, may prove hazardous

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Tip from the Pros

Use different shades of landscape paint to color-code your utility lines. Also mark their depths on stakes. Utility companies can tell you standard depths, but take care when digging -- someone may have changed the grade and made them shallower.

Related Topics

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"recording_property_lines")']bitmaps.bmp} Recording Property Lines

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Protecting Plants and Structures

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Fence off everything you want to keep intact--including trees and shrubs, structures, pathways, and surfaces. Use plastic fencing (lower right), hay bales, or colorful tape--anything that will keep equipment or vehicles away.

Protect the root systems of trees by fencing around their **driplines**, or farther out if possible. If you'll be disturbing the ground inside a dripline, consult a **certified arborist** for ways to safeguard the tree.

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Related Topics
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bmp} Transplanting Shrubs and Trees

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Clearing the Area

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Once you've marked and protected what you're going to keep, move everything else out of the way. This heavy work can take longer than you think, especially if you have lots of plants and paving. Consider organizing a family work party or hiring people to help you. You'll probably want to tackle it in stages.

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Clearing - Transplanting Shrubs & Trees

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To move a shrub or small tree, use a shovel to sever the roots about 18 to 24 inches away from the trunk. If you can do this a month or two before transplanting, the growth of new feeder roots will help the plant adapt.

Next, dig around the **rootball** and undercut the bottom. Bunch a large piece of burlap in the bottom of the hole. Gently rock the rootball as you pull the burlap around it. Wrap and tie the burlap around the rootball. For large plants, place two planks on either side. Use a person on each end to gently lift the rootball onto the planks and transfer it to the ground.

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You'll do less damage to a plant if you move it in cool weather, when its growth is less active. In cold-winter climates, this time is just as the ground thaws in spring. In milder areas, the best time is fall.

If you can't replant immediately, **heel in** the plants in a cool, shaded area.

Tip From the Pros

If a plant is too heavy to lift or carry on a wheelbarrow, rock it onto a tarp and drag it to its new location. Be careful not to break the rootball.

Safety

Avoid injury to people and property by hiring a **certified arborist** to remove large trees. Never attempt to remove or prune a tree growing near power lines.

Tools and Materials

shovel or spade
pruning shears
wheelbarrow
burlap or cloth sheeting
string
twine

Related Topics
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} Planting Trees and Shrubs

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Clearing - Removing Rocks

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Rocks can be surprisingly heavy for their size. A rock the diameter of a bowling ball may weigh 50 pounds.

To move a rock that's embedded in the ground, dig around it with a shovel or pick. Pry it out with a board or pry bar and lever. As you pry it up and out, keep it in place by wedging smaller rocks or pieces of wood underneath.

Try rolling a heavy one away, or dragging it off on a sturdy tarp or a rolling dolly. Or use several logs or thick dowels as rollers, constantly moving the last one to the front as the rock rolls forward. You'll probably need help.

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If rocks are too big or numerous to move by yourself, hire helpers or rent a tractor with a front-end loader and backhoe.

Safety

When lifting rocks, avoid injury by keeping your back straight and your knees bent. Wear thick gloves. When rolling large rocks, keep your fingers and feet away. On sloping ground, don't let the rock get away from you and harm people or property below.

Tools and Materials

pry bar
tarp
shovel
wheelbarrow

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Clearing - Breaking Up Concrete

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{ewr MVMCI2, ViewerMCI, [device MMMovie][noframe][stdcontrol]moviesbreakcn.mmm} There's no easy way around it--removing existing concrete patios, driveways, and pathways is hard work. Whether or not you can do it by yourself depends on the thickness of the concrete and the strength of your back.

If the concrete is under 3 inches thick, you can break it up with a sledgehammer. Go to an edge and with a shovel dig a short distance under the concrete. Pry it up, then swing away. A pry bar will help you separate the pieces.

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For bigger jobs, rent an electric jackhammer or **pneumatic** jackhammer.

Safety

Wear safety goggles, thick gloves and heavy work boots.

Tools and Materials
shovel
scoop shovel
wheelbarrow
sledgehammer
steel rake

Related Topics
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Discarding Debris

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Clearing - Removing Large Roots

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Large tree roots near the surface can get in the way of building and planting. To remove one, start at the end nearest the stump and with a shovel expose as much of it as you can. Cut it into small sections with an axe or a **mattock**, *tool at right*, and pry it out with a pry bar.

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Safety

Before removing a large live root, consult a **certified arborist** to make sure you won't harm the tree or increase its chance of falling.

Tools and Materials

shovel
pick
pry bar
axe or **mattock**
wheelbarrow

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Clearing - Removing Stumps

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Perhaps you have an old stump that's in the way. The easiest way to remove it is with a stump grinder, *right*, which abrades it down to 6 to 12 inches below the soil. Or you can expose the larger roots with a shovel or **mattock**, then dislodge the stump with a tractor or bulldozer.

Chemical stump removers are another alternative, but they take a long time to work.

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Tip from the Pros

If you're paving over a ground stump, try to take the roots out. Otherwise, the pavement may settle and crack as they decay.

Tools and Materials

axe
pry bar
shovel or **mattock**
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"stump_grinder")']bitmaps.bmp} Stump Grinder
tractor or bulldozer

Related Topics
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Removing Large Roots

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Clearing - Removing a Lawn

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Taking out a lawn is like laying sod in reverse--you undercut it with a shovel and lift it out. If you have a vigorous, **warm-season grass**, kill it first with a **systemic herbicide**. Otherwise it will regrow.

For larger lawns, rent a **sod cutter**, *right*, from a tool-rental company.

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Tip From the Pros

To make digging easier, make sure the lawn is moist before you start.

Safety

Read the label of an herbicide before you use it, and follow the instructions to the letter. Don't spray on a hot or windy day, and don't let the spray touch desirable plants -- it'll kill them.

Tools

spade
steel rake
wheelbarrow
spray tank
sod cutter

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Clearing - Discarding Debris

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Installing a new landscape can create a lot of debris, especially around an older home with existing plants, pavings, and structures. Ask your garbage company about renting a large debris box, or look in the Yellow Pages under "Rubbish Containers & Hauling." A week's debris box-rental can cost several hundred dollars--so schedule your work time to fill the box efficiently.

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Money-Saving Tip

Instead of throwing away debris, re-use it. You can turn plant materials into **compost** or rent a **chipper** to chop them into **mulch**. Broken concrete can become a small retaining wall or a new patio.

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Controlling Weeds

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You'll avoid problems later if you eliminate tough **perennial** weeds like **Bermuda grass** and quack grass.

Spray them with a **systemic herbicide**. It will be most effective in warm weather and when the weeds are growing actively. To eliminate weed seeds that will sprout later, water the area to make them germinate. Once they sprout, in a week or two, remove them with a hoe or spray them with herbicide.

Repeat the cycle until no more weeds grow. The entire process may take 8 to 12 weeks.

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Safety

Read the label of an herbicide before you use it, and follow the instructions to the letter. Don't spray on a hot or windy day, and don't let the spray touch desirable plants--it'll kill them.

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Rough Grading

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{ewr CUTFILL2, CutFillPane, unused} If your yard slopes, creating a flat space can require a lot of earth moving. Use the calculator, *right*, to determine how much dirt you'll be moving.

Enter the length and width of the flat space you want. Next, enter the depth of soil to cut (a retaining wall over 3 feet may require a permit). Finally, enter the total **rise** of the section you'll be working on.

Ideally, the volume you cut will equal the volume you fill so you won't need to buy or dispose of extra soil.

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Step by Step: Rough Grading

Rough grading creates the basic contours of your landscape. You can do it with just a shovel, or with a landscape contractor and a bulldozer. Follow these steps:

1. Mark out features on the ground. Use **landscape paint**, sprinkled flour, or stakes and string. At high and low points, place stakes marked with the number of feet to cut or fill.
2. Create terraces by cutting and filling.
3. Make cuts for footings. The **footing** depth depends on what you're building and how deeply the soil freezes in your area. Consult your local building department.
4. Grade for walkways, patios, lawns and plant beds. Soil under these features should slope at 1/4 inch per foot to guide rainwater away from your house or toward **catch basins**. Mark the grade with stakes, string and a **line level**, then dig and rake accordingly, removing enough to allow for the thickness of the pavement

Tools

shovel
steel rake
wheelbarrow
tractor with front-end loader and rear scraper
backhoe

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Improving Drainage

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A properly draining yard is critical to a good landscape. Make a mistake here, and you could flood your house or wash away parts of your yard.

Check to be sure that the ground around your house--including paving--slopes away at least 1/4 inch per foot, for a distance of at least 6 feet from the foundation. If you suspect a problem, call a **landscape architect**, **landscape contractor**, or **soils engineer**.

Also provide drainage at the bottom of hillsides, from behind retaining walls, and away from low spots.

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Building a French Drain

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Installing a Catch Basin

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Constructing Drainage Swales

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Related Topics
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More

If you live on a steep slope or if your home is lower than other parts of your property, have a **landscape architect** or **soils engineer** design your drainage system.

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Drainage - Building a French Drain

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A French drain picks up subsurface water from near your house, or from poorly drained parts of your yard. Its destination is usually the street or a **dry well**.

The drain consists of a sloping trench lined with **soil-filter fabric** and filled with gravel. For more efficient drainage or longer runs, lay perforated drain pipe along the bottom and connect it to a solid drain line.

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Step by Step: Building a French Drain

1. With a shovel or **trencher**, dig a trench. As you dig, maintain a slope of at least 1 foot per 100 feet (use a **line level**) so it will drain properly.
2. If you are installing pipe, line the trench with **soil-filter fabric**. Lay pipe on top of the fabric with perforations in pipe facing down. Fill in **drain rock** above. Wrap fabric over the drain rock and cover the top with 2 - 6 inches of soil or gravel.
3. If you use only gravel, your trench should be no longer than 50 feet. Fill the trench with soil-filter fabric and drain rock. Don't cover with soil.

Tools and Materials
4-foot mason's level
line level
soil-filter fabric
perforated drainpipe
drain rock
gravel
hacksaw
wheelbarrow
shovel
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Drainage - Installing a Catch Basin

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{ewr MVBMP2, ViewerBmp2, illustnsctbasin.bmp} A catch basin collects water from poorly drained or low-lying areas and disperses it through solid pipe.

It works best in a patio or in a spot you have graded to collect runoff.

Buy plastic catch basins at home centers. The basin is usually covered with a removable grate so you can clean it out.

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Step by Step: Installing a Prefabricated Catch Basin

1. At a low point or where water accumulates, dig a hole deep enough so that the basin's top grate will be about 1/4 inch below grade.
2. Place basin in hole.
3. Dig a trench deep enough to accommodate a drainage pipe connecting to the basin. Using string and a **line level**, establish a slope of at least 1/8 inch per foot for proper drainage.
4. Connect basin to drainpipe.
5. Backfill trench and around basin with soil.

Tools and Materials

shovel
wheelbarrow
prefabricated catch basin
drainpipe
hacksaw
line level
string
shovel
drainpipe glue

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Drainage - Constructing Drainage Swales

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One simple way to make water drain where you want it is to contour the ground into swales, or long depressions that guide surface **runoff**. Water in swales moves naturally toward its intended destination, usually the street. A **dry creek bed** along the swale can make an attractive landscape feature.

Keep in mind that swales work only after the soil is completely saturated.

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Step by Step: Constructing A Drainage Swale

1. Cut or grade a long V-shaped depression in the soil.
2. Adjust the grade so there's at least a 1-foot drop for every 50-foot length of swale.
3. Check with a **line level** if necessary.

Tools and Materials

shovel
line level
mason's line
stakes
steel rake
wheelbarrow

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Water gushing from downspouts can damage your foundation and erode soil from around plants. If downspouts empty too close to your house, try placing **splash blocks** beneath them. Or lead downspouts into **tight-line drains** or **catch basins**.

On gentle slopes, cut lengths of **landscape fabric** and pin them to the ground to keep soil from washing away. Or use **mulch**, or **soil-holding plants**.

On steep or terraced slopes, get help from a landscape architect or soils engineer.

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Choosing Drip Irrigation

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Drip is the most efficient way to water your yard, without the expense of high-pressure sprinkler system parts. Unlike sprinklers which deliver 5-8 gallons of water per minute, the low-pressure, low-volume drip system provides water to trees, shrubs and ground covers slowly so water soaks into the ground and doesn't run off. Tubes at the base of each plant deliver water only to the roots. This keeps leaves dry and therefore less susceptible to disease, and minimizes evaporation. Drip also discourages weeds since surfaces between plantings remain dry. It is especially good in drought conditions or for any poorly drained soil.

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The biggest drawbacks: Drip irrigation requires maintenance and you can't use it for lawns.

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Using an Underground Sprinkler System

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For large yards, lawns, or sprawling ground cover, spray watering is the best option. And if you want to spend time enjoying your yard rather than watering it, an underground sprinkler system is an investment that will pay off handsomely in the years ahead.

If you want to buy your materials from a discount home supply store, take advantage of the installation instructions and toll-free help lines provided by most parts manufacturers. You may find, however, that the additional personal service you get from a dedicated sprinkler parts distributor makes up for the higher cost. A knowledgeable sprinkler distributor can help you choose the right sprinkler configuration and avoid errors.

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Sprinklers - Making a Design

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{ewr MVBMP2, ViewerBmp2, illustns/3covrage.bmp} Your first goal in the design process is to position sprinkler heads for overlapping or head-to-head coverage. This is known as head-to-head coverage. Each spot of ground should be covered by the **throw** of at least two sprinklers.

Next, divide the system into **circuits**. These are the rules: (1) Don't put plants with different watering needs--lawns and shrubs, for instance--on the same circuit. (2) The combined flow of all the heads on a single circuit must not equal more than 75% of the total flow rate available. (3) All the heads on a circuit must be of the same type. For instance, don't mix spray heads with single-stream heads.

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This will be a trial and error process, so use the Designer to try different sprinkler configurations. Then print your plan and note sprinkler head types and water requirements as shown..

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Step by Step: Making a Design

1. Pick a time of day when you plan to run your sprinkler system--probably early morning--when no water is in use in your house. Then, measure the pressure and flow rate at a fully opened outdoor hose bib. Gauges for both tasks are often available for loan where you buy sprinkler parts. You can also measure flow by seeing how long it takes to fill a two-gallon bucket. If it takes 15 seconds, the flow rate is 8 gallons per minute.
2. Reproduce your property layout in the Designer. It should be accurate to about one foot. Note the location of lawns, trees, flower beds, walkways, patios, etc.
3. Place sprinkler heads to cover rectangular sections of your yard first, then place heads to cover any remaining, irregularly-shaped areas. Adjust the throw to achieve head-to-head coverage. Try a number of different configurations to find the one that works best.
4. Print your plan.
5. Divide the system into circuits. Each circuit must be composed of heads of one type and assigned to water only one type of planting. The combined flow rate of all the heads on a circuit should be no more than 75% of the total flow available.
6. Map out the pipe route from tap-in point to the first valve manifold. From there, mark the routes of the lines for each circuit served by the manifold to the heads, and the route of lines to any additional manifolds. Heads should be supplied by pipes branching off a main circuit feeder pipe, rather than by a single pipe that wanders from head to head. A wandering pipe layout causes a drop in water pressure. Although you can tunnel under obstacles such as walkways, avoid them if possible.

Tools

Pressure gauge
Flow gauge or 2-gallon bucket

Rule of thumb

For full coverage in a rectangular area, first place quarter-circle heads in the corners. Then place half-circle heads midway along each side. If necessary, set one or more full circle heads along the centerline of the area's length.

Tip from the Pros

Use more sprinkler heads than you think you need! Plan to adjust your heads for less than maximum **throw**. That way, if it turns out that your water pressure is lower than you thought, you can compensate by increasing the throw distance of the heads. Also, design your system so that all the heads on a single circuit are at approximately the same elevation.

Related topics

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Sprinklers - A Parts Primer

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There is a bewildering array of sprinkler parts, pipe and paraphernalia available. How should you choose?

Local code and climate dictate how some parts of your system must be constructed. Once you've identified the necessities, decide how much automation you want and how much you're willing to spend.

Click on these pictures to familiarize yourself with the options for pipes, heads, valves, and other accessories.

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Money-Saving Tip

If you can't fit automation into this month's budget, run the necessary wires before you backfill your trenches and select valves that can be operated either manually or automatically. Then automate your system whenever you're ready.

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Sprinklers - Tapping In

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In areas where winter temperatures dip below freezing, home water meters are usually located in the basement--and that's where you'll have to tap in to your pipe.

If freezing isn't a problem, **tap in near an outdoor water meter**, or feed the system from a tee installed just before an **outdoor hose bib** (outside faucet). Only use the bib method if the total length of pipe from the street to the bib is less than 125 ft., and the entire length is composed of at least ¾-in. pipe.

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Regardless of which tap-in method you use, if the connecting pipe from the water meter to the first valve manifold is less than 100 feet, use the same size connecting pipe as the service line. If the distance is greater than 100 feet, use one size larger pipe for the connecting line.

A hose bib tap-in.

{ewr MVBMP2, ViewerBmp2, illustns/3three.bmp} In a non-freezing area, one of the simplest ways to supply a sprinkler system is from the line leading to a hose bib--an outdoor faucet with a threaded nozzle. First, turn off the water supply. If the hose bib and supply line are galvanized metal, unscrew the bib and install a tee as shown. If the line is copper, cut it and install a tee.

Tapping in near an outdoor water meter.

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Shut off the water supply at the meter. Dig a hole to access the service line at a convenient spot downstream of the meter. Remove a 1 ½-in. section of the service line and install a slip-type compression tee. Install a separate shutoff valve for the sprinkler system line as shown, so you won't have to turn off all the water to your house if you ever need to repair the sprinkler service line.

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Step-by-Step: Tapping In

Basement tap-in:

1. Shut off the water supply at the valve next to the water meter.
2. Downstream of the water meter, cut out a 1 ½ in. section of the service line with a tube cutter if the service line is copper, or a hacksaw if it is PVC or galvanized pipe.
3. To install PVC pipe, slip a compression tee onto the service line and tighten the compression nuts.
4. Install fittings, pipe, a shut-off valve, and a drain cap as illustrated. Leave enough room to slide a bucket beneath the drain.
5. Run pipe out to where you plan to install your backflow prevention valve and valve manifold. If you plan to mount the control box in the basement, run any necessary wiring, too.

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Sprinklers - Installation

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{ewr MVBMP2, ViewerBmp2, illustns/3five.bmp} Installing a sprinkler system isn't a complex job, but it can be time-consuming. It pays to work methodically and avoid mistakes. This means making sure you have all the parts, materials and tools you'll need on hand, double-checking that sprinkler heads are located properly, and testing each circuit before you backfill the trenches.

And remember, any yard that is big enough to need an underground sprinkler system is big enough to warrant renting a trenching machine. Your back will thank you.

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Related Topics

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Tip from the Pros

Before you install sprinkler heads on completed circuits, it's critical that you run water through the assembled pipe to flush out particles that clog heads.

Safety

Don't even think of digging near streets or sidewalks without identifying and marking the location of underground utility lines. Call Underground Service Alert at (800) 642-2444.

More

If your sprinkler system has more than one valve manifold, remember to run wires with the supply pipe from the first manifold to any others before you backfill the trenches.

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Step-by-Step: Installation

Installing a sprinkler system.

This is the basic sequence of steps for most systems. For details, refer to the instructions provided by your parts manufacturer.

1. Mark the location of all sprinkler heads with stakes or flags, and all trench routes with flour or builder's chalk. Double-check the layout and make adjustments.
2. Dig trenches 6- to10-in. deep.
3. Assemble valve manifolds and attach them to the water supply.
4. Assemble piping for circuits and flush debris from the lines.
5. Attach sprinkler heads.
6. Test each circuit for coverage and adjust sprinkler heads as necessary.
7. Run wiring from first valve manifold to any additional valve manifolds.
8. Install control system.
9. Test again.
10. Backfill trenches.

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Building Projects

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You've cleared the way for your landscape and decided which projects to tackle yourself. Now what? Landscape contractors usually start with the projects that require moving the most earth and then go on to smaller projects. The projects here follow the order in which a professional would build them.

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Retaining Walls

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A retaining wall holds back soil and groundwater where you've cut or terraced a slope. Unmortared stone walls, *right*, are one of many kinds you can build.

To relieve the pressure of water against the wall's back side, a drainage system is a must. It usually consists of a perforated drainpipe, embedded in gravel and enclosed in **soil-filter fabric**.

These kinds of retaining walls are the easiest to build:

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By the Book

Because the retained soil can weigh a great deal, walls over 3 feet high usually require a building permit. You may also be required to consult a licensed soils or structural engineer. The building instructions in this program are for walls 3 feet or under.

Related Topics
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Working with Pros

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Retaining Walls - **Wood**

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Retaining walls of wood (shown in cross section, *right*) are probably the least expensive and easiest to build. Because the wood contacts the soil directly, you'll need a rot-resistant type such as redwood, cypress or pressure-treated wood rated for ground contact (the longest lasting of the three).

Most walls have posts made from 4 by 4s, 4 by 6s or landscape timber. They are set in a deep, concrete-lined hole to provide support. A perforated pipe behind the wall provides drainage.

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By the Book

Building codes for retaining walls vary. Check local code requirements before you begin.

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Step by Step: A Wood Retaining Wall

This wall is 34 1/2 inches above grade.

1. Dig and clear a level area.

2. Use stakes and **mason's line** to mark the locations of the wall and posts. The back of the wall should stand 12 inches from the bottom of the cut into the slope.

3. **Dig postholes** 42 inches deep **on center**, and 3 feet 10 inches apart for the 4-by 4-inch posts. After **aligning the posts**, add 1 inch of soil or gravel to each hole around the bottom of each post, and fill with concrete. The top of the concrete should sit 2 inches above grade and should be rounded to help water drain away from the post.

4. Nail horizontal 2 by 6s to the soil side of the posts. Space 2 by 6s 1/8 inch apart to allow for expansion.

5. Use a handsaw to trim the post tops flush with the top board, then center a 2-by 8-inch cap over the posts and wall boards.

6. **Install drainage** behind the wall.

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Wood Retaining Wall

Description: 8 feet long, 3 feet above grade. Constructed with 3 pressure-treated (for ground contact) 4- by 4-inch posts positioned every 3 feet 10 inches on center and sunk 42 inches below grade; 2- by 6-inch pressure-treated (for ground contact) lumber nailed to posts; a 2- by 8-inch cap; and a drainpipe laid at the base.

Material	Use	Quantity	Comment	Cost
wood stakes	layout	5		$ 1.55
pressure-treated 4"x4"x8'	post	3	includes both ends	$ 22.32
pressure-treated 2"x8"x8'	cap	1		$ 8.80
pressure-treated 2"x6"x8'	side	6		$ 36.48
16d hot-dipped galvanized nails		2 lb		$ 2.00
perforated drainpipe		10'	includes 1' at ends	$ 4.00
pea gravel	at drainpipe	1/2 cu yd		$ 15.00
soil-filter fabric		10'x 6'		$ 10.20
concrete mix	to anchor posts	eight 90-lb bags		$ 26.40
TOTAL COST				**$126.75**

Cost Variables

Size: Each additional 8-foot length will increase the cost by about $200.

Materials: Redwood may cost 50 percent more than pressure-treated lumber.

Tools
4-foot mason's level
combination square
mason's line
posthole digger
hand or circular saw
shovel
wheelbarrow

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Retaining Walls - **Gravity-Stack Concrete**

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Relatively new on the scene, **gravity-stack concrete modules** can make a durable retaining wall. In place of the traditional mortar and rebar, they lock together with pins, lips or by their weight and shape. They're faster to install than standard concrete blocks.

The modules come in different sizes. The largest that are practical for a homeowner weigh about 90 pounds.

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Safety

Lifting concrete blocks or modules is tough on backs, arms and hands. Have strong helpers transport the materials to your site. Work slowly, wearing leather workgloves.

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Step by Step: A Gravity-Stack Retaining Wall

This 3-foot-high wall uses one of several brands of gravity-stack modules. Each brand looks somewhat different, but building steps are similar for all.

1. Mark-off the wall line and dig a trench the width of a block and 8 inches deep (or the depth specified by the manufacturer). Level the bottom with compacted gravel.

2. Set-in the bottom layer of blocks, checking that each is level in both directions.

3. Stack each successive layer (for a total of 6), making sure to stagger the vertical joints. Design of modules establishes the proper setback.

4. Glue precast cap modules to the top of the wall, according to the manufacturer's instructions.

5. **Add drainage line** and backfill.

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Gravity-Stack Concrete Block Retaining Wall

Description: 8 feet long, 3 feet above grade. Using gravity-stack blocks set on a gravel or compacted sand footing 8 inches deep, with a drainpipe laid at the base.

Materials	Use	Quantity	Comment	Cost
gravel	base	3 cu ft	300 lb	$ 3.80
8"x12"x16" block stretchers		24		$ 110.40
8"x12"x16" block corners		12		$ 62.40
8"x4"x16" cap	cap	6		$ 12.00
construction adhesive	fasten cap	3 tubes		$ 10.50
perforated drainpipe		10' piece	includes 1' at ends	$ 4.00
pea gravel	backfill at wall, at drainpipe	1 cu yd		$ 30.00
soil-filter fabric		12' x 12'		$ 24.50
TOTAL COST				**$257.60**

Cost Variables

Size: The cost for each additional 8-foot section will be about the same as for this first section.

Maufacturers: This estimate is based on prices for the Allan Block system; prices for other locally available systems may vary.

Tools
4-foot mason's level
mason's line
shovel
wheelbarrow

Related Topics
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Retaining Walls - **Brick Veneer**

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This hybrid wall combines the strength and economy of concrete block with the more traditional look of brick. Bricks are mortared to the front, top and sides of concrete blocks reinforced with **rebar** that do the actual retaining.

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Safety

Wait five days for the mortar to dry before backfilling any masonry wall.

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Step by Step: A Brick Veneer Retaining Wall

This 3-foot-high, 1-foot-thick wall consists of concrete blocks joined to a brick facing with mortar and **brick ties**. Bricks also cover the top and sides.

1. Lay out, excavate, level and build a reinforced 24-inch-wide, 10-inch-deep footing with a top 6 inches below ground. (Footing dimensions will vary with local building code and height of wall.) Before pouring, add **rebar** crossbars every 32 inches, securing them to the long pieces with tie wire. Create vertical reinforcement by bending a 55-inch length of rebar into an L-shape whose foot is 10 inches long. Starting 8 inches from end of wall, place an L every 32 inches along the wall. With tie wire, bind the foot of each L along the center length of rebar. The Ls will poke up through the hollow cells in concrete blocks.

2. On the cured footing, mark-off the front edge for the brick veneer. Measure back the width of the brick (plus 1/2 inch for mortar) for the base of the concrete block.

3. On the footing, **throw a line of mortar** along the front and back edges where concrete blocks will go, and along both end joints. Lay first layer of block, making sure it is aligned and level.

4. Lay rebar over the first layer through notches in blocks. Apply mortar and start the second layer with a half block. Set brick ties into mortar every 12 inches along top of second layer, then start the third layer with a full block. Alternate between rebar and brick ties until the wall is 7 layers high.

5. Allow a day for mortar to cure. Then mix mortar or **concrete grout** and fill all concrete-block cells with it. Poke down through the grout with a piece of rebar to force out any air pockets.

6. Lay out the face of the brick veneer with stakes and **mason's line**. Deposit a brick-wide bed of mortar along front of the block wall. Then lay the first layer, buttering the back and one end of each brick with mortar before setting it in place. Check that bricks are aligned and level.

7. Lay the remaining layers, starting every other layer with a half brick. Brick ties protruding from concrete-block wall will protrude into mortar between layers of brick.

8. As you work, tool joints in bricks before the mortar becomes too firm.

9. Lay a brick cap across both walls, setting the front row of brick perpendicular to the face of the wall. Edges of bricks should be flush with wall or overhanging it slightly. Lay a back row of bricks parallel with length of wall.

10. To finish the sides, lay staggered layers of 1 1/2 bricks each.

11. After 5 days, apply **masonry waterproofer** on the back of wall. Install drainage pipe at the base, then backfill.

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Brick Veneer Retaining Wall

Description: 8 feet long, 12 inches thick, 3 feet above grade. Constructed of brick on open side and attached to a mortared concrete block wall; cores reinforced with rebar and filled with grout; set on and tied to a poured concrete footing 10 inches deep and 30 inches wide with a drainpipe laid at the base.

Material	Use	Quantiy	Comment	Cost
ready-mix concrete 3000 psi	footing	0.62 yd	pay for full yard	[$125.00]
or				
hand-mixed concrete using:	footing	0.62 yd		$ 43.15
portland cement		3 bags	total price	$21.90
sand & gravel mix		1 ton		$21.25
2"x6"x12'	forms	2		$ 16.56
form stakes	forms	12		$ 3.72
8d duplex nails	forms	1 lb		$ 0.80
16d duplex nails	forms	1 lb		$ 0.80
common bricks, 4 x 8 x 2 2/3	wall	210		$ 94.50
mortar mix	wall	six 80-lb bags		$ 28.20
nonshrink grout	wall	twelve 50-lb bags		$ 144.00
8"x6"x16" concrete block stretchers	wall	42		$ 69.30
8"x6"x16" concrete block corners	wall	6		$ 9.90
8"x6"x8" half block corners	wall	4		$ 4.40
#4 rebar, 20' lengths		4		$ 18.00

construction grout,	fill cores	twelve 80- lb. bags	8 cu ft	$ 60.00
6 mil polyethylene membrane	waterpro of	4' x 10'	buy 10'x25' roll	$ 7.00
perforated drain pipe		10' piece	includes 1' at ends	$ 4.00
pea gravel	at drainpipe	1/2 cu yd		$ 15.00
brick ties		36		$ 7.20
soil-ilter fabric	at drainpipe		10' x 6'	$ 10.20
TOTAL COST				**$536.73**

(cost of ready-mix delivered concrete not included in total)

Cost Variables
Size: Each additional 8-foot length will increase the cost by about $470-$480.
Materials: Cost of ready-mix concrete depends on location and difficulty of delivery. Footings may need to be deeper under some conditions.

Tools
shovel
hammer
hand and circular saws
hand sledge
stake and **mason's line**
4-foot mason's level
brick chisel
trowel
wheelbarrow
rebar bender

Related Topics
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Retaining Walls - **Stone**

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The colors and textures of rock add a natural, handcrafted look to a wall. Build either a dry stone wall (without mortar) or a wet stone wall (with mortar). A dry wall, *right*, relies on the weight of the rock and an angled **batter** to hold it in position. You simply pile the rocks in layers, wedging soil between rocks to steady them.

Mortar allows you to use rounder rocks that would otherwise tumble down. Neither type needs a concrete footing if you keep it under 3 feet high.

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More

To help support the wall, stones stacked dry should angle back 2 inches for every foot of wall height. Mortared walls should angle back 1 inch per foot. To help you check and maintain the angle, build a **batter board**.

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Step by Step: A Dry-Stack Stone Retaining Wall

This 3-foot-high dry wall uses **fieldstones** or **flagstones**. The wall is 12 inches wide at the top, 16 inches at the base.

1. With stakes and string, lay out a 16-inch-wide trench and dig it 10 inches deep. Compact the soil at the bottom, and level the trench by adding 4 inches of compacted sand.

2. Set the largest rocks into the trench as the bottom layer, working from corners to center.

3. Fill voids with soil before laying next layer. With your **batter board**, check that the wall angles into hill at 2 inches per foot of height. Use a 4-foot mason's level to hold the batter board plumb.

5. Every 2 or 3 layers, extend longer rocks into the hillside to add more anchoring.

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Dry-Stack Stone Retaining Wall

Description: 8 feet long and 3 feet above grade. Dry-stacked, battered wall built of fieldstones or flagstones on a 4-inch sand base.

Material	Use	Quantity	Comment	Cost
stones		1.4 cu yd	approx. 2 tons	$200.00
sand	base	4 cu ft	4" layer	$ 6.00
TOTAL COST				**$206.00**

Cost Variables

Size: The cost for each additional 8-foot section will be about the same as for this first section, unless there is a price break for larger quantities of stone.

Materials: Cost of the stone may vary widely with quality, geographical location and difficulty of delivery.

Tools
batter board
4-foot mason's level
wheelbarrow
shovel
mason's line
rubber mallet

Related Topics

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Patios

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A patio can be used for any purpose you'd like--an outdoor dining room, a private sitting area off a bedroom or bath or a sunny island in your yard. For proper drainage, slope your patio away from the house at 1/4 inch per foot. You can bury a **French drain** along the low edge to carry away runoff. These make good patios:

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Patios - Concrete

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It may not be the world's most glamorous patio material, but concrete is practical, durable and inexpensive. The picture shows a concrete patio in cross section.

If you want a large patio, break it into 10-foot-square or smaller modules. That way you can complete each section in a single pour.

Separate the modules with dividers made from rot-resistant 2 by 4s. These serve both as **forms** for the wet concrete and as **expansion joints** between modules.

For added interest you can color concrete, score it with patterns or seed it with **aggregate**.

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Safety

The ingredients in concrete are caustic. Wear gloves to protect your hands.

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Step by Step: A Concrete Patio

This patio consists of 10-foot squares separated with rot-resistant wood dividers.

1. **Lay out the perimeter** and height of the paving with stakes and **mason's line** (leveled with a **line level**). To allow for proper drainage, adjust the line so that each 1-foot run of patio slopes 1/4 inch away from the house or toward a **French drain** or **catch basin**.

2. Excavate for a 2-4 inch compacted pea gravel base plus a 4-inch-thick slab. Consult your local building code for prescribed thicknesses.

3. Line the perimeter with 2 by 4s and nail them to form stakes set at 3-foot intervals. The sides of the patio should follow the slope established by the mason's line.

4. Divide the patio into 10-foot squares. Lay out a grid for the wood dividers by stretching mason's line across the forms.

5. Lay the dividers on edge, flush with mason's line. Every 3 feet, nail them to stakes with 8d nails and then trim the stake tops 2 inches below tops of the dividers. Use 16d nails to fasten the 2 by 4s together at the corners. To keep dividers from popping up from the concrete, run short pieces of rebar through holes drilled in the dividers, or drive hot-dipped galvanized 16d nails into both sides.

6. Cut two 7- by 9 1/2-foot rectangles of 6-inch-square concrete reinforcing mesh, and lay them inside each module with the curled edges down. Extend rectangles into a 9 1/2-foot square at the center of each module. Support the mesh on 1 1/2-inch **dobies** so it will be centered inside the slab.

7. **Pour and finish** one square at a time.

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Concrete Patio

Description: 10- by 10-foot section, 3 1/2-inches thick; laid on 2-inch pea gravel base; reinforced with 6- by 6-inch welded wire mesh; divided with redwood or pressure-treated 2 by 4s.

Material	Use	Quantity	Comment	Cost
5 sack, 3/4" rock, ready mix concrete	slab	1.33 cu yd	includes a little extra	$150.00
pea gravel	base	3/4 cu yd	2" layer	$ 28.00
concrete wire mesh	reinforcement	100 sq ft	250 sq ft roll	$ 38.00
2" dobie spacers	support mesh	25		$ 5.00
6 mil polyethylene	cure slab	10'x25' roll		$ 7.00
pressure treated 2"x4"x12'	perimeter	4		$ 22.60
2"x4"x16'	screed board	1		$ 8.00
8d galvanized nails		1 lb		$ 1.00
16d galvanized nails		1 lb		$ 1.00
18" lengths #3 rebar	connect sections	two 20' lengths	if you are pouring more than 1 square	$ 6.00
form stakes		24		$ 7.44
TOTAL COST				**$ 274.04**

Cost Variables

Size: Each additional 10- by 10-foot-section will increase the cost by about $200-$230.
Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery. Hand-mixed concrete may be considerably less in locations where ready-mix delivery is difficult. Footings may be needed under some conditions. Redwood may cost 50 percent more than pressure-treated lumber.

Tools

bolt cutter or rebar cutter
combination square
electric drill with 1/2-inch bit
framing square
hammer
hand sledge
line level
mason's line
hand or circular saw
shovel
50-foot tape measure
wheelbarrow
concrete finishing tools:
- **screed** board or bull float
- hand float
- **concrete trowel**
- **edger**
- **jointer**
- concrete finishing broom

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Patios - **Brick**

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You can set bricks in a variety of patterns on a base of sand or concrete. Sand is easier and less expensive, but weeds grow through it and it tends to settle as water trickles through. To reduce this problem, mortar the bricks together.

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Tip from the pros

Bricks vary in size. Before laying out your patio, find out the exact size of the brick you'll be using. To allow space for mortared joints, start setting bricks from two adjacent patio edges. Set the last edges when you're done laying the bricks.

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Step by Step: A Brick-on-Sand Patio

This is a 10- by 10-foot patio on a sand base, with 1/2-inch gaps between the bricks for mortar.

1. **Lay out the perimeter** of a 10- by 10-foot patio using stakes and leveled **mason's line**.

2. Establish slope away from the house. (A 10-foot run should drop 2-1/2 inches.)

3. Excavate enough for at least 1 1/2 inches of sand plus thickness of brick. Check to see whether your community recommends a different depth. Compact the soil.

4. Build perimeter forms with staked 2 by 4s, following the slope established by mason's line. Add a temporary, staked 2 by 4 in the center to support a **screed**.

5. Add sand and level it with a screed. Wet and compact.

6. Working from one corner, set bricks on sand, spacing them with strips of 1/2-inch plywood. Remove center screed board, fill stake holes, and continue working across. Adjust the opposite forms as needed to accommodate actual size of brick.

7. Brush dry mortar into the joints, then tamp down with a plywood spacer held edgewise. Repeat.

8. Sweep the surface clean, then spray it lightly two or three times to dampen the mortar mix. You may have to scrub the bricks clean with rags and water. The form stays in place as a border.

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Brick-on-Sand Patio

Description: 10- by 10-foot section. Bricks laid on 2-inch sand base; perimeter is staked redwood or pressure-treated 2 by 4s.

Material	Use	Quantity	Cost
common bricks, 4x8x 2 2/3 in.		approx. 450	$ 202.50
sand, 2" layer	base	0.75cu yd	$ 15.00
mortar mix		six 80-lb bags	$ 28.20
pressure-treated 2"x4"x12'	perimeter	4	$ 22.56
2"x4"x16'	screed board	1	$ 8.00
18" redwood stakes		24	$ 4.80
8d hot-dipped galvanized nails		1 lb	$ 1.00
16d hot-dipped galvanized nails		1 lb	$ 1.00
TOTAL COST			**$283.06**

Cost Variables

Size: Each additional 10- by 10-foot section will increase the cost by about $275-280.

Materials: The cost of brick pavers may vary with quality and location. Redwood may cost 50 percent more than pressure-treated lumber.

Tools

brick chisel
1/2-inch plywood spacer
4-foot mason's level
50-foot tape measure
combination square
garden hose with spray nozzle
hammer
hand sledge
line level
mason's line
hand or circular saw
rubber mallet
shovel
vibratory plate compactor
or
vibratory rammer
wheelbarrow

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Patios - **Stone**

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Stone patios are elegant, but expensive--up to five times as costly as concrete. The one shown here uses sawcut 1 1/2-inch-thick stone tiles that butt together without mortar. Instead of tiles, you could use randomly shaped flagstones and fill the voids between them with mortar. You could also fill with soil and low-growing plants.

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Step by Step: A Stone-Tile Patio

This 10-foot-square patio uses 12- by 12-inch stone tiles mortared to a concealed concrete footing around the perimeter; inner tiles lie on a sand base.

1. **Lay out the perimeter** with stake and **mason's line**, using the actual size of tiles plus joints as a guide.

2. Establish slope away from house; 1/4 inch per foot of run.

3. Build forms for a **concrete perimeter footing** (12-inches wide and 10-inches deep). When figuring the finished surface height, allow for the depth of the tile and a 1/2-inch-thick **mortar bed**.

4. Place two lengths of **rebar** on **dobies** 2 inches from edges of forms. Pour concrete footing and **screed** the top.

5. Remove inner form and let the concrete cure. Then excavate the center to allow at least a 2-inch-deep compacted sand bed that will put the tiles flush with those mortared to the perimeter footing. Use the outer form as a base for the screed board. Screed sand to level and compact it.

6. The next day, remove the outer form board. Mortar tiles to the top of one corner of the footing.

7. At the same corner, lay tiles on the sand base, working diagonally across the sand bed toward the untiled footing.

8. When sand bed is almost covered, check that the remaining space is sufficient for the remaining tiles. Then mortar tiles to remaining exposed footings. Finish laying tiles on sand.

9. Sweep dry sand into the joints to lock tiles in place.

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Stone-Tile Patio

Description: 10- by 10-foot section of 12- by 12-inch stone tiles laid on 2-inch sand base; perimeter is concrete footing 12 inches wide and 10 inches deep with tiles mortared to it.

Material	Use	Quantity	Comment	Cost
12" x 12" stone tiles		104	a few extra	$ 572.00
sand	base & between tiles	0.75 cu yd	2" layer	$ 15.00
concrete	footing	1.5 cu yd		$ 165.00
#3 rebar, 20' lengths		5	eight 10' pieces eight 2'-6" pieces	$ 15.00
mortar mix		two 80-lb bags		$ 9.40
2"x4"x12'	forms	4		$ 24.00
form stakes		24		$ 7.44
form release		1 gal		$ 7.00
8d duplex nails		1 lb		$ 1.00
16d duplex nails		1 lb		$ 1.00
TOTAL COST				**$ 816.84**

Cost Variables

Size: Each additional 10- by 10-foot section will increase the cost by about $750-$780.

Materials: The cost of the 12- by 12-inch stone pavers may vary with quality and location. The cost of ready-mix concrete will vary depending on location and difficulty of delivery. Footings need to be deeper under some conditions and more shallow under others (6 inches deep is minimum in warm dry climates).

Tools
50-foot tape measure
bolt cutter or rebar bender/cutter
concrete finishing broom
combination square
hammer
hand sledge
line level
mason's line
mason's trowel
hand or circular saw
rubber mallet
shovel
sledgehammer
wheelbarrow

Related Topics
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Walkways

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Walkways should harmonize with the style of your landscape, the terrain they cover and the type of traffic they will carry.

For example, the brick walk at the right has a rich, warm patterning that makes it more inviting than concrete. Its graceful curves hug the ground's contour and its width is sufficient for two people to walk side-by-side. Raised edgings help keep the bricks in place.

Here are some walkway materials you can choose:

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Walkways - **Concrete**

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Concrete makes the sturdiest base for a walkway. The cross section, *right,* shows the rugged thickness of the concrete and the edge of the embedded reinforcing mesh.

Don't limit yourself to a plain, flat surface. Yours can be scored, sandblasted, colored or seeded with **aggregate**. Or cover the top with brick or stone. Pouring a walkway is a job for at least two people: one to transport the concrete in a wheelbarrow and another to spread it inside the forms.

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Safety

The ingredients in concrete are caustic. Wear gloves to protect your hands.

Related Topics
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Step by Step: A Concrete Walkway

This walkway is 6 feet wide. The 4-inch-thick concrete is reinforced with 6-inch-square wire mesh. (Thickness, however, may vary locally.)

1. Outline the path with **mason's line** and stakes. Excavate enough to allow a 4-inch slab and a minimum 2-inch bed of pea gravel. Follow your local code for depth.

2. Build 2 by 4 forms with tops true to line and sloped to one side for drainage at 1/8 inch per foot (On a 6-foot-wide walk, that's 3/4 inch). Nail forms to concrete stakes on the outside face of the form.

3. Lay the gravel bed, then place 6-inch-square concrete reinforcing mesh on 2-inch **dobies**, spaced closely enough to keep the mesh an even height above the base. The mesh should be 2 inches narrower and shorter than the concrete. Cut it with **bolt cutters** or a hacksaw.

4. Pour concrete in 6-to 8-foot sections so you can finish each in one pour. Use form sides as base for screed board, which you work side-to-side down the length of the path.

5. Smooth surface with a wooden float followed by a concrete trowel, then use tools for edging and adding **control joints** across the walk at intervals.

6. Continue working with a concrete trowel. Finally, use a concrete finishing broom to texture the surface. This hides trowel marks and provides traction. Cure slab and remove forms after three days. Then pour the next section to butt against it.

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Concrete Walkway

Description: 6- by 25-foot section, 4 inches thick; laid on a 2-inch gravel base; reinforced with welded wire mesh; formed with 2 by 4s.

Material	Use	Quantity	Comment	Cost
concrete	slab	2.0 cu yd		$ 200.00
pea gravel, 2" layer	base	1.0 cu yd		$ 30.00
#10 6"x6" welded wire mesh	reinforcement	150 sq ft	buy 7' x 25' roll	$ 26.25
2" dobie spacers	support mesh	52		$ 10.40
2"x4"x16'	forms	4		$ 32.00
form stakes	forms	32		$ 9.92
2"x4"x8'	screed	1		$ 4.00
form release		1 gal		$ 7.00
8d duplex nails		1 lb		$ 1.00
16d duplex nails		1 lb		$ 1.00
TOTAL COST				**$ 321.57**

Cost Variables

Size: Each additional 6- by 25-foot section will increase the cost $245-$275.

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery (cost of hand-mixed concrete may be considerably less in locations where delivery is difficult).

Tools

50-foot tape measure
bolt cutter
concrete finishing tools:
- screed board or bull float
- hand float
- steel trowel
- edger
- jointer
- concrete finishing broom

hammer
hand sledge
jointer
mason's level
mason's line
hand or circular saw
shovel
sledgehammer
finishing trowel
wheelbarrow
wood float

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Walkways - **Brick**

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Long brick walkways extend over a larger area than most brick patios, so you may want a style that's comparatively fast to build. This one sits on sand, is not labor-intensive concrete and has no mortar--the bricks simply butt together with sand swept between them. Two by fours (rather than brick or concrete) line the sides to contain the bricks and resist horizontal movement.

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Step by Step: A Brick-on-Sand Walkway

This straight 6-foot-wide walkway is bordered by 2 by 4s that hold the sides in place. It has butted joints. Be sure to measure the actual width of the brick before laying out walkway.

1. **Lay out path** with stakes and **mason's line**. Excavate for at least 1 1/2 inches of sand plus the thickness of brick. Check whether your community requires a different depth. Compact the soil.

2. Set border of rot-resistant 2 by 4s (redwood or pressure-treated wood). Make the top level with the finished height of walk. Saw off stakes at an angle, with tops flush with 2 by 4s.

3. Lay sand base. Screed, using edging as a guide for the screed board. Dampen the sand, roll or tamp it down, add more sand and repeat until base is firm and level.

4. Starting in one corner, place bricks on sand--**cutting** as necessary-- and set them with a tap of a rubber mallet.

5. When all bricks are laid, spread dry sand across top. Sweep into cracks to fill them. Wet the surface. Repeat, adding sand as needed.

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Brick Walkway

Description: 6' x 25' section, bricks laid on 2" sand base; perimeter is staked redwood or pressure-treated 2"x4"s.

Material	Use	Quantity	Comment	Cost
common brick 4"x8"x2 2/3"		approx. 700		$315.00
sand, 2" layer	base	1.0 cu yd		$ 21.25
pressure-treated 2"x4"x16'	perimeter	4		$ 30.08
2"x4"x6'	screed	1		$ 3.00
redwood stakes, 18"	perimeter	30		$ 6.00
8d hot-dipped galvanized nails		1 lb		$ 1.00
16d hot-dipped galvanized nails		1 lb		$ 1.00
TOTAL COST				**$ 377.33**

Cost Variables

Size: Each additional 6- by 25-foot section will cost about the same as this first section.

Materials: The cost of brick pavers varies with quality and location. Redwood may cost 50 percent more than pressure-treated lumber.

Tools
4-foot mason's level
50-foot tape measure
framing square
garden hose with spray nozzle
hammer
hand sledge
mason's line
hand or circular saw
shovel
rubber mallet
sledgehammer
wheelbarrow

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Walkways - **Flagstone**

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The free-form shape of flagstones has a classic appeal, especially when their edges run wild into grass or ground cover. Cut from slate, limestone, granite or local rock, they are more expensive than other paving materials, because of the labor involved in producing flagstones.

Lay flagstones on a sand or concrete base, seating them as level and evenly as possible. You can also use more formal-looking stone tiles, which are precut into squares and rectangles.

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Step by Step: A Flagstone Walkway

This 6-foot-wide walkway is laid on sand.

1. Lay out 6-foot-wide path with **mason's line** and stakes.

2. Install temporary form of 2 by 4s and excavate interior. Allow for the 2-inch thickness of flagstone and a 2-inch base of sand over the compacted soil. Check whether your community requires a different depth for the base.

3. Since rocks vary in thickness, lay a puddle of wet mortar directly on the sand under each stone. Work stone to a level position.

4. Fill in voids between stones with potting soil.

5. Remove temporary form, dig away outside sand, backfill with soil and compact.

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Flagstone Walkway

Description: 6- by 25-foot section, 2-3 inches deep. Flagstones laid on 2-inch sand base; mortar used to level uneven stones; center voids filled with soil.

Material	Use	Quantity	Comment	Cost
2"-3" thick flagstone	150 sq ft	approx 1 1/2 tons		$480.00
sand, 2" layer	base	1.0 cu yd		$ 21.25
mortar mix		four 80-lb bags		$ 18.80
2"x4"x16'	forms	4		$ 30.08
form stakes	forms	24	buy bundle of 25	$ 7.44
8d duplexnails		1 lb		$ 0.80
potting soil mix	fill between stones	four 50-lb bags		$ 8.00
TOTAL COST				**$566.37**

Cost Variables

Size: The cost for each additional 6- by 25-foot section will be about the same as for this first section, unless there is a price break for larger quantities of the paving stone.

Materials: The cost of flagstone pavers may vary widely with quality, geographic location and difficulty of delivery.

Tools
4-foot mason's level
50-foot tape measure
garden hose with spray nozzle
mason's line
mason's trowel
rubber mallet
shovel
wheelbarrow

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Walkways - **Gravel**

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The easiest walkways to install are gravel paths. Pleasantly informal, they are great for leading you through the garden or into wooded areas. Instead of round pea gravel, use crushed rock with broken edges, which lock the stones together for more stable footing.

To keep gravel from shifting onto lawns or beds, edge the walkway with wood. The wood border here (shown in cross section) is a 4 by 4 held in place by stakes along the sides. You can substitute thinner or thicker lumber if you prefer.

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Money-Saving Tip

Use inexpensive rock as a base, and top it with a 2-inch layer of better-quality rock.

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Step by Step: A Gravel Walkway

This straight 6-foot-wide walkway has a border of pressure-treated 4 by 4s.

1. Establish line of walkway with stake and **mason's line** set parallel and 6 feet apart.

2. Excavate, level and compact the defined area to a 3-inch depth.

3. Set stakes every 3 feet on alternating sides of walkway. Nail 4 by 4s to stakes, level and true to mason's line. Trim tops of stakes with an angled cut.

4. Place **soil-filter fabric** on compacted soil to inhibit weed growth.

5. Fill the walk with gravel to within 1/2 inch of top of wood edging.

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Gravel Walkways

Description: 6- by 25-foot section; bordered with 4 by 4s; center is crushed gravel over compacted soil with soil-filter fabric for weed control.

Material	Use	Quantity	Comment	Cost
crushed rock	walk	1.5 cu yd		$ 45.00
pressure-treated 4"x4"x16'	border	4		$ 53.12
redwood stakes, 18"	border	24	buy bundle of 25	$ 4.80
soil-filter fabric		150 sq ft		$ 7.50
8d hot-dipped galvanized nails		1 lb		$ 1.00
TOTAL COST				**$111.42**

Cost Variables

Size: The cost for each additional 6- by 25-foot section will be about the same as for this first section.

Materials: For the perimeter, redwood may cost 50 percent more than pressure-treated lumber.

Tools
4-foot mason's level
50-foot tape measure
combination square
hammer
mason's line
hand or circular saw
shovel
wheelbarrow

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Stairs

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There are two kinds of stairs in a landscape: those cut out of a slope (such as the stone-and-gravel staircase, *right*), and free-standing stairs that descend from a deck or landing.

Though you build them differently, both should follow the same practical guidelines for the dimensions of **risers** and **treads.** Work backward from these measurements, and from the **rise** and **run** of the staircase, to calculate the number of steps to build.

For a unified look, build stairs of the same materials as adjoining features. Some options:

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More

To find the number of stairs you'll need, divide the total **rise** of the stairway by the riser height you've chosen. Choose a height between 4 and 8 inches. The result gives you the number of risers to use.

To find the tread depth, divide the total **run** by the number of risers. Remember, you may have one more riser than tread.

Safety

In most locations, building codes require a railing for stairways of 4 or more risers.

By the Book

Most building codes prescribe certain tread depths and riser heights, based on **ergonomic** principles. Usually, the depth of the tread plus two times the riser height should equal 26 to 28 inches. For example, a stair with 15-inch-deep treads needs risers 6 inches high. There are limits within this formula: risers should be no taller than 8 inches and no shorter than 4 inches. Treads should be no shallower than 11 inches.

Related Topics
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Stairs - **Wood**

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The backbone of every wooden stairway descending from a porch or a deck is the **stringer**. Narrower stairs use two stringers; stairs more than 3 feet wide need more to support the tread boards. They attach to a vertical wall face beneath the top tread. At the bottom, they tie to a length of pressure-treated wood that's secured to a broad concrete footing. The footing extends into the ground and stops the outward forces caused when you walk on the stairs.

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To determine the rise, lay a straight board on the top surface and hold or stake it level. Measure the distance from the board to the place on the ground where the stairs will end. Assume a 15-inch tread depth and adjust if needed.

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Step by Step: Wood Stairs.

This is a 6-foot-wide stair mounted to a deck that is 18 inches above ground level.

1. Divide the **rise** by a **riser** height that will yield a whole number of risers. Calculate the tread depth. In this case, you'll need two 6-inch risers and two 15-inch treads. The deck frame functions as a third riser.

2. **Lay out** risers and treads on a stringer. Cut out the stringer and use it as a template for two more.

3. Build a 66-inch wide, 6- by 8-inch concrete footing using 2 by 6s. The footing's outermost edge should be 27 inches from edge of porch or deck. Center a backnailed 2 by 6 pressure-treated nailer board into the top of the footing, and press it down into the wet concrete. Be sure the board is level.

4. Mount stringers to a **ledger** on deck frame or edge of porch, placing one along the middle of the stairway and the others 30 inches from its center. Attach stringers to the ledger with **joist hangers**. Toenail other ends to 2 by 6 nailer board in footing.

5. Center and nail on the treads. You'll use two 2 by 6s and one 2 by 4 per step. Leave a 1/8-inch space between them, and between inner 2 by 6 and the riser.

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Wood Stairs

Description: 6-foot width, 18-inch change in elevation; three 6-inch risers and two 15 inch treads; three 2- by 12-inch stringers; open risers set on concrete footing with block. Wood handrails included.

Material	Use	Quantity	Comment	Cost
pressure-treated 2"x12"x10'	3 stringers	1		$ 9.96
pressure-treated 2"x6"x12'	treads	2		$ 9.12
pressure-treated 2"x4"x12'	treads	1		$ 5.64
pressure-treated 2"x6"x12'	ledger/block	1		$ 9.12
16d hot-dipped galvanized nails		1 lb		$ 1.00
concrete mix	footing	3 90-lb bags	2 1/4 cu ft	$ 9.90
#3 rebar, 10' length	footing	1		$ 1.50
joist hangers		3		$ 1.50
joist hanger nails		1/4 lb		$ 0.25
1/2" diameter x 4" lag bolts, nuts, washers		8		$ 6.40
1/2" x 4" lag bolts, washers	fasten ledger	4		$ 2.48
pressure-treated 2"x6"x8'	handrail	1		$ 6.08
pressure-treated 2"x4"x10'	railing	1		$ 4.70
pressure-treated 2"x4"x8'	bottom rail	1		$ 3.76
pressure-treated 4"x4"	posts	2		$ 14.88
concrete mix	anchor posts	2 90-lb		$

	bags	7.00
TOTAL COST		**$ 93.29**

Cost Variables
Size: The cost for each additional step is about $20.
Materials: Redwood may cost 50 percent more than pressure-treated lumber. Concrete footing may be unnecessary in some site conditions. One set of handrail posts may be unnecessary if handrail can be attached to an existing deck railing or adjacent structure.

Tools

crescent wrench (for bolts to ledger)
electric drill with 1/2-inch bit
framing square
hammer
hand or circular saw
4-foot mason's level
rebar bender/cutter
shovel
hand sledge
50-foot tape measure
wheelbarrow

Related Topics

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Stairs - **Landscape Timber**

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A sloping site is ideal for stairs made with **landscape timber,** a modern replacement for the railroad ties that were once used extensively in landscaping. These broad pieces of wood become the riser and the front part of a deep tread. You fill in behind them with gravel. If the slope is gentle, the graveled tread can be quite long and can have a shallow pitch. To hold the ties or timber in place, drill holes through their tops and drive lengths of **rebar** or 3/4-inch galvanized pipe 18 to 24 inches into the ground.

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Step by Step: Stairs of Landscape Timber

This 6-foot-wide stairway uses 6 by 8 timber for risers and 2 by 6s for sides.

1. Center and predrill 2 evenly spaced holes through the 8-inch-side of each timber.

2. Start from the bottom of slope and work up. Cut, level and compact a base pad with 3-inch-tall back wall. Anchor the lowest timber, at grade, with rebar stakes through holes.

3. Butt 1-foot-long 2 by 6s into back outside edges of timber, run them back into the slope, level with timbers. Stake and nail them in place. (The 2 by 6s should be shorter for steeper slopes, longer for gentler slopes. This will produce more or fewer steps, respectively.)

4. Excavate tread area to make sure there's at least 3 inches of depth for gravel.

5. Level pad for next timber and repeat steps 2-4.

6. Fill excavated treads with crushed gravel.

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Landscape Timber Stairs

Description: 6-foot width, 18-inch change in elevation (3 risers); three 6- by 8- inch timber treads retaining a 12 inch gravel tread; 3 inches deep with 2- by 6-inch headers on side to retain gravel.

Material	Use	Quantity	Comment	Cost
6"x8"x6' landscape timbers	treads	3		$ 54.00
pressure-treated 2"x6"x8'	headers	1		$ 6.11
30" lengths #4 rebar	stake timbers	6	buy one 20-ft length	$ 4.50
redwood stakes, 18"	stake headers	12		$ 2.40
crushed rock		4.5 cu ft		$ 7.50
8d hot-dipped galvanized nails		1 lb		$ 1.00
TOTAL COST				**$ 75.51**

Cost Variable

Size: Each additional step will cost about $25.

Tools

combination square
electric drill with 1/2-inch bit
framing square
hammer
level
hand or circular saw
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"rebar_bender_cutter")']bitmaps.bmp} rebar bender/cutter
shovel
sledgehammer
50-foot tape measure
wheelbarrow

Related Topics

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Stairs - **Concrete**

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To build concrete stairs, you almost have to build a set of wooden ones first -- the formwork is that complex. You'll need forms to brace the sides and risers, and also for a footing that extends into the ground. You may decide that this is a job for a pro.

Use concrete stairs to lead to a lawn from a stone or concrete patio. Before starting, consult your local building department about the depth for the footing and the placement of **rebar** in the concrete.

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Safety

The ingredients in concrete are caustic. Wear gloves to protect your hands.

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Step by Step: Concrete Stairs

This cast-concrete stairway is 6 feet wide and rises 18 inches in 3 steps with 14-inch treads. The risers are faced with pressure-treated 2 by 6s that also function as forms.

1. Determine the stair location and build footing form as part of the bottom step. Footing is continuous across width of stairs; depth is per local code. Add gravel.

2. Mark out risers and treads in pencil on both sides of both 2 by 12 stringers. Allow a 1/4-inch slope for drainage, from the inside to the outside of each tread.

3. **Stake stringers** in position. Set the brace stakes at an angle against the forms to keep them from bulging when filled.

4. Align 2 by 6 risers to location drawn on stringers and nail in position with duplex nails through forms. Also, drive lag bolts into backs of risers to extend into concrete. If the top and bottom of the footing abut the pavement, also add an **expansion joint** to match the depth of the pavement.

5. Add rebar per code. Paint insides of form--not risers--with **form release**.

6. Working from bottom to top, pour concrete for the entire staircase. Use a wood float to level each tread. Finish treads by tooling edges, steel troweling the tops and sweeping them with a broom to add traction.

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Concrete Stairs

Description: 6-inch width, 18-inch change in elevation; three 2- by 6-inch risers; formed, poured concrete over a 2-inch base.

Material	Use	Quantity	Cost
ready-mix concrete	stairs	1.5 cu yd	$162.50
2"x12"x12'	stringers	1	$ 19.92
pressure-treated 2"x6"x6'	risers	3	$ 13.68
#3 rebar, 20' lengths		3	$ 9.00
gravel	base	6 cu ft	$ 6.00
2"x8"x10' Douglas fir	forms	2	$ 19.80
2"x4"x10' Douglas fir	form bracing	4	$ 20.00
form stakes, 24"	forms	10	$ 3.10
#12 wire for tying rebar		one 50' roll	$ 1.00
8d duplex nails		1 lb	$ 1.00
16d duplex nails		1 lb	$ 1.00
12 1/4"x3" lag bolts			$ 3.00
form release		1 gal	$ 7.00
TOTAL COST			**$267.00**

Cost Variables

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery (alternatives include hand-mixing the concrete and using modular forms). Footings may need to be deeper under some conditions. Risers made from redwood may cost 50 percent more than pressure-treated lumber.

Tools

bolt cutter or rebar cutter
combination square
concrete edging tool
framing square
hammer
hand or circular saw
shovel
hand sledge
sledgehammer
soft-bristle concrete broom
concrete trowel
50-foot tape measure
wheelbarrow

Related Topics
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Stairs - **Brick**

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Brick stairs are the logical choice for joining two brick paving surfaces, such as a brick patio and path. Despite appearances, they aren't solid brick--they have a concrete core that you cover with brick for a richly patterned surface.

Brick stairs are the most complicated type to build. You may want to hire a contractor to install them. In planning dimensions for the steps, take into account the width and thickness of the brick you've selected.

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Tips From the Pros

Dampen bricks with water before mortaring them to the concrete core. A dry brick pulls moisture from the mortar and weakens the bond.

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Step by Step: Brick Stairs

This 18-brick-wide (72-inch) stairway has 3 steps, each 2 brick thicknesses (6 inches) tall with treads 1 1/2 bricks (12 inches) deep. It meets a brick walkway at the bottom.

1. Determine the stair location and build a footing form at least 6-inches deep. Local codes may require a deeper footing. Footing is continuous across width of stairs; depth is per local code.

2. Mark out risers and treads in pencil on both sides of both 2 by 12 stringers. Don't notch the stringers.

3. **Stake stringers** in position. Angle the brace stakes to keep the forms from bulging when filled.

4. Align 2 by 6 risers to location drawn on stringers and nail in position with duplex nails through forms.

5. Add rebar per code. Paint the interiors of all forms with **form release**.

6. Working from bottom to top, pour concrete and level with wood float. Don't tool or sweep the edges--a float finish is all you need.

7. Build risers from 2 by 8s ripped to the proper width (in this case, 6 inches).

8. Mortar tread with **headers** facing base of stairs.

9. Continue to top, starting brick for next riser on the brick tread below.

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Brick Stairs

Description: 6-foot width, 18-inch change in elevation (3 steps). Brick steps laid over concrete footing, poured over a 2-inch gravel base.

Material	Use	Quantity	Cost
common brick 4x8x2-2/3"	treads & risers	140	$ 63.00
mortar-mix		three 80-lb bags	$ 13.10
ready-mix concrete, delivered	stairs	1 cu yd	$125.00
2"x12"x12'	stringers	1	$ 19.92
pressure-treated 2"x6"x6'	risers	3	$ 13.68
# 3 rebar, 20' lengths		3	$ 9.00
gravel	base	4 cu ft	$ 6.00
2"x8"x10'	forms	2	$ 19.80
2"x4"x10'	form bracing	4	$ 20.00
form stakes, 24"	forms	20	$ 6.20
#12 wire for tying rebar		one 50' roll	$ 1.00
8d duplex nails		1 lb	$ 1.00
16d duplex nails	forms	1 lb	$ 1.00
form release		1 gal	$ 7.00
TOTAL COST			**$305.70**

Cost Variable

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery (alternatives include hand-mixing the concrete and using modular forms). Footings may need to be deeper under some conditions.

Tools

bolt cutter

or

rebar bender

combination square

framing square

hammer

hand or circular saw

shovel

hand sledge

50-foot tape measure

mason's trowel

wheelbarrow

wood float

Related Topics

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Stairs - **Stone and Gravel**

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If you want a stairway that blends subtly into a hillside, build it from stone. The stones act as mini-retaining walls that hold back the deep gravel treads.

Your supply of fieldstones will weigh hundreds of pounds, so be prepared to lift. You may need to hire someone with a small tractor and front-end loader to move the pile away from the curbside.

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More

For a stone stairway that's easier on your back, use flagstones. Use a circular saw with a masonry blade to cut them into narrow strips. Stack mortar between them to form risers, and pave the treads with broad flagstones.

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Step by Step: Stone and Gravel Stairs

To build this 6-foot-wide stairway, select fieldstones 14 to 16 inches long or wide that are of uniform thickness. A 6-inch thickness would be ideal. Look for stones that are flat on the top and bottom--they'll be easier to stack and walk on.

1. Lay out the stair location and excavate leveled pads with 6-inch risers that angle back slightly. You may need to adjust the tread depth for the slope of the site.

2. Dig a 6-inch-deep trench, the width of the stone, at the base the each riser. Level the bottom with sand. Starting at the bottom riser, place and adjust a row of stones into the trench. Their tops should extend above the top of riser by a uniform 3 inches across the width of the next level. Lean them against the riser, and butt them together as closely as possible. Fill voids with soil.

3. After stones are in place, cut in header board to contain gravel on sides. Stake and nail headers. Backfill trench with soil and cover path below stairs (or each subsequent tread) with a 3-inch layer of compacted crushed gravel. This leaves a 6-inch rise of exposed stone.

4. Repeat steps 2 and 3 for each subsequent step, adding and compacting gravel before moving on.

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Stone and Gravel Stairs

Description: 6-foot width;18-inch change in elevation (3 steps); large rocks as treads retaining a bed of gravel 12 inches wide and 3 inches deep.

Material	Use	Quantity	Cost
rocks approx. 12"x12"x6"	treads	approx. 18	$180.00
pressure treated 2"x6"x6'	headers	1	$ 4.56
18" redwood stakes		12	$ 2.40
sand for leveling		3 cu ft	$ 3.00
gravel		4 cu ft	$ 5.00
8d galvanized nails		1 lb	$ 1.00
TOTAL COST			**$195.96**

Cost Variables

Size: Each additional step will cost about $65.

Materials: The cost of the crushed rock may vary with quality and location.

Tools

4-foot mason's level
flat-blade shovel
hammer
mason's line and stakes
50-foot tape measure
wheelbarrow

Related Topics

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Fences

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Fences are more than boundary markers. They provide privacy, buffer wind, screen off utility areas or keep in children or pets.

Choose a style that complements your house and neighborhood. Some options:

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By the Book

Before buying materials, check with your local building department about restrictions such as **setback lines** and fence heights.

More

Some fence styles, such as picket fences and solid panels with decorative lattice tops, are sold at home centers in prefabricated sections. They're great time savers. Simply nail them to posts spaced according to the width of the panels.

Related Topics

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Fences - Board

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Privacy can be hard to come by in a small yard. One popular solution is a 6-foot board fence made from 1 by 6s or 1 by 8s. You can line up the boards along one side of the rail or alternate them in various patterns. For a more decorative look--such as around a pool or front yard -- shorten the boards and add latticework at the top, or build a trellis on top to train vines.

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Step by Step: An Interlap Board Fence

Also known as a "good neighbor" fence, an interlap fence looks the same from both sides. The advantage is that no one has to see the post-and-rail (bad) side. This one stands 6 feet tall and has 1 by 8 boards spaced 6 inches apart on both sides.

1. Establish the fence line with stakes and **mason's line**. Mark post locations with stakes spaced 8 feet **on center**.

2. **Dig postholes** 24 inches deep and 12 inches wide.

3. Set posts in holes on a few handfuls of gravel and add 4 inches of gravel around the bottom of the post for drainage. Align the posts and stake them in two directions. Fill holes with concrete, mounding it 1 inch above ground level so water drains away from the post.

4. Trim the post tops level, 66 inches from the ground. Use mason's line with a **line level** as a guide.

5. Add the rails. The top rails will need to be 16 feet long to span the tops of three posts. Center and bottom rails are 8 feet or shorter. Bottom rails lie 6 inches above the ground and middle ones are centered. **Fit, cut and toenail rails** in place with 16d nails.

6. Add the boards. On one side of the rails, **space the boards**, plumb and nail with 8d nails. Repeat for other side, centering boards over gaps on first side.

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Interlap Board Fence

Description: 16-foot section, 6-foot height. Constructed with three 4- by 4-inch posts, 8 feet on center; horizontal 2- by 4-inch rails, 30 inches on center; and interlapped 1- by 8-inch boards every 12 inches on center.

Material	Use	Quantity	Cost
4"x4"x10'construction heart redwood (or pressure-treated lumber)	posts	3	$ 31.49
2"x4"x16' construction heart redwood (or pressure-treated lumber)	rails	3	$ 36.00
1"x8"x6' construction heart redwood (or pressure-treated lumber)	fence boards	32	$ 144.00
8d hot-dipped galvanized nails		1 lb	$ 1.00
16d hot-dipped galvanized nails		1 lb	$ 1.00
concrete mix	post anchors	six 90-lb bags	$ 19.80
pea gravel		1 cu ft	$ 2.00
TOTAL COST			**$ 235.29**

Cost Variables

Size: The cost for each additional 16- by 6-foot section will cost about $220.
Materials: Redwood may cost 50 percent more than pressure-treated lumber**.**

Related Topics

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Tools

4-foot-long level
hand or circular saw
combination square
line level
posthole digger
shovel
mason's line and stakes
50-foot tape measure
wheelbarrow

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Fences - **Wood Rail**

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White-painted post-and-board fences evoke images of open country, farms and horses. Consisting of posts with three horizontal boards nailed to their sides, these low fences are one of the cheapest and easiest types to build.

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Step by Step: A Wood Rail Fence

This fence stands 4 feet high. To make it stronger, don't let the boards all meet and butt together on the same post. Instead, stagger the joints on the middle boards.

1. Set line of fence with **mason's line** and stakes. Mark and space the location of postholes 8 feet **on center**. (The first and last posts in a long fence line should be 7 feet 10 inches on center from the next post.) **Dig postholes** 24 inches deep.

2. Place a few handfuls of gravel in each hole for drainage. Align and stake posts. Add 4 inches of pea gravel to hole, then fill with concrete.

3. Mark points on first and last posts that are 48 inches from ground. Stretch and snap a **chalk line** across all the intervening posts. Cut the tops level (or equidistant from the ground).

4. Nail first board flush with tops of posts. Leave a 9-inch space between each of the next two boards. (Start the middle row with an 8-foot length, so breaks between boards won't all occur on the same post.) The bottom 1 by 6 should be approximately 12 inches from the ground.

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Wood Rail Fence

Description: 16-foot section, 4-foot height. Constructed with 4- by 4-inch posts, 8 feet on center; horizontal 1- by 6-inch rails, 9 inches on center from ground.

Material	Use	Quantity	Cost
4"x4"x8' construction heart redwood (or pressure-treated lumber)	posts	3	$ 35.76
1"x6"x16' construction heart redwood (or pressure-treated lumber)	rails	5	$ 48.80
8d hot-dipped galvanized nails		1 lb	$ 1.00
concrete mix	post anchors	six 90-lb bags	$ 19.80
pea gravel		1 cu ft	$ 2.00
TOTAL COST			**$ 107.36**

Cost Variables

Size: The cost of each additional 16- by 4-foot section will be about $87.

Materials: Redwood may cost 50 percent more than pressure-treated lumber.

Tools
4-foot mason's level
chalk line
hand or circular saw
combination square
hammer
mason's line
posthole digger
shovel
wheelbarrow

Related Topics

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Fences - Picket

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Picket fences have a classic look that blends with many landscape styles. They're best for a front yard that needs separation from the bustle of the street.

The tops of pickets can take many forms: rounded, angled, pointed, heart- or spade-shaped, flat-topped or with cut-out sides. A coat of paint enhances their visual appeal.

You'll find ready-made picket fence panels--unpainted or white--at home centers. Some lumber yards may offer precut pickets, but if you're building from scratch you'll probably have to cut your own.

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Picket Fence

Description: 16-foot section, 4-foot height. Constructed with 4- by 4-inch posts, 8 foot on center; horizontal 2- by 4-inch rails, 6" from top and bottom; and 1- by 4-inch pickets +/- 4 1/2" on center.

Material	Use	Quantity	Comment	Cost
4"x4"x8' construction heart redwood (or pressure-treated lumber)	posts	3		$ 35.76
2"x4"x16' construction heart redwood (or pressure-treated lumber)	rails	2		$ 24.00
1"x4"x6' construction heart redwood (or pressure-treated lumber)	pickets	43		$113.52
4"x4'x1/4"piece tempered hardboard	template	1	or use scrap lumber	$ 0.00
8d hot dipped galvanized nails		2 lbs		$ 2.00
16d hot-dipped galvanized nails		1 lb		$ 1.00
concrete mix	post anchors	six 90-lb bags		$ 19.80
pea gravel		1 cu ft		$ 2.00
TOTAL COST				**$198.08**

Cost Variables

Size: Each additional 16- by 4-foot section will cost about $175.

Materials: Redwood may cost 50 percent more than pressure-treated lumber. Precut gothic-shaped pickets 2 1/2 inches wide may cost 50 percent more than making your own.

Tips From the Pros

To save time and make identically shaped pickets, cut a template for the tops out of a scrap piece of **hardboard**, heavy cardboard, or thin plywood.

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Step by Step: A Picket Fence

This 4-foot-tall fence has pickets cut from 1 by 4s.

1. Cut 1 by 4s to a length of 48 inches.

2. Cut a template shaped like an **isosceles triangle**, with a base equal to the width of the 1 by 4. On each fence board, use a combination square to draw a line 3 1/2 inches (the height of the template) from the top and parallel to it. Place the base of the template on the line, trace its top and cut the angled sides.

3. Establish the fence line with stakes and **mason's line**. Dig 24-inch-deep holes for the fenceposts spaced 8 feet **on center**. (The first and last post should be just 7 feet 10 inches from their neighboring posts so boards will fully overlap them.)

4. Place a few handfuls of gravel in each hole for drainage. Align and stake fenceposts. Add 4 inches of pea gravel, then fill holes with concrete.

5. Mark points 40 inches from ground on the two end posts. Stretch and snap a **chalk line** between these points. Cut post tops level.

6. Nail a 16-foot-long 2 by 4 to top. (It will span the tops of three posts.) Cut the lower 2 by 4 eight feet long and toenail it to posts so it is 6 inches from the ground. Repeat for each 16-foot section of fence.

7. Nail the first and last pickets to the rails so their bottoms are 3 inches from ground. (Nail the last picket only part way so you can remove it.) Stretch mason's line between their tops to align intervening pickets. Cut a 1- by 48-inch piece of wood to use as a spacer, then nail on the pickets. As you work, check that pickets are vertical.

Tools and Materials

4-foot mason's level
chalk line
combination square
hammer
hand or circular saw
line level
mason's line
shovel
sledgehammer
wheelbarrow

Related Topics
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Before You Start
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Fences - Chain Link

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Fast and inexpensive to install, steel chain link fences make secure enclosures for dogs' and children's play areas. They may not be the world's most beautiful fences, but they're durable and practical.

In addition to the standard galvanized gray, chain link fencing comes coated in black or green **PVC** that makes it less visible in the landscape. You can also weave wooden strips through the links, or train a vine such as ivy up the fence to mask it.

Look for fence components at home centers. Note that the first and last posts will be thicker than the others, since they must take more pressure and tension.

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Chain Link Fence

Description: 20-foot section, 4-foot height. Constructed with 2 3/8-inch-diameter terminal posts and 1 5/8-inch-diameter line posts, 10 feet on center; 1 3/8-inch diameter top rail; 11-gauge chain link.

Material	Use	Quantity	Cost
18-gauge galvanized 2 3/8" diameter x 7'	terminal posts	2	$ 6.00
18-gauge galvanized 1 5/8" diameter x 7'	line posts	1	$ 6.20
20-gauge galvanized 1 3/8" diameter x 10'	top rail	2	$12.50
11-gauge chain link fabric 4' high x 10' roll		2 rolls	$27.00
4' galvanized tension bar	ends	2	$ 3.04
2 3/8" diameter plain dome cap	terminal posts	2	$ 1.40
2 3/8" diameter top rail sleeve	terminal posts	2	$ 1.76
1 5/8" x 1 3/8" diameter loop cap	line posts	1	$ 0.84
2 3/8" diameter clips	terminal posts	6	$ 2.70
14-gauge wire ties	line posts	3	$ 0.12
fence post concrete mix	post anchors	six 90-lb.bags	$ 19.80
carriage bolts, nuts, washers		8 sets	$ 6.40
TOTAL COST			**$87.76**

Cost Variables

Size: Purchase of partial roll lengths of chain link fencing could result in additional cost per linear foot of 30 percent or more.

Materials: A gate may cost over $36.

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Step by Step: A Chain Link Fence

The finished fence stands 4 feet high.

1. Establish line for fence with **mason's line** and stakes. Mark and dig 24-inch-deep holes for posts spaced 10 feet **on center**. Terminal post holes should have a 12-inch diameter, line post holes should have an 8-inch diameter.

2. Set thicker terminal posts at ends, then align the posts in between. Stake and brace posts, making sure their tops are level. (Stretch a line level between the end posts as a guide.) Fill holes with concrete that extends 1 inch above ground level and slopes away from posts.

3. To hold and tension the wire fabric, slip 3 prefabricated clips over the terminal posts. Next, slip the **top rail sleeves** on the **terminal posts**, and the **loop caps** on the thinner **line posts** between them. Add the horizontal top rails.

4. Unroll the metal fabric and weave a **tension bar** vertically through one end. Space the clips on one terminal post, slip the tension bar between their ends, and close the clips with nuts, bolts and washers.

5. Stretch the fence to reach the other terminal post. Weave the tension bar through at a point closest to the post. To draw the fencing taut, use a come-along winch to pull the tension bar into the clips. Close clips with nuts, bolts and washers, then cut off any excess fencing.

6. Use wire ties to secure fencing to line posts and top rail.

Tools
4-foot mason's level
bolt cutter
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"come_along")']bitmaps.bmp} Come-Along Winch
crescent wrench
line level
mason's line
pliers
posthole digger
shovel
wheelbarrow

Related Topics

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Building and Hanging a Gate

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If you've built a wall or fence, you probably need a gate. Some home centers sell them ready-made in standard dimensions, such as for a 36-inch opening. Or you can have one custom built. For privacy, choose a solid gate. To offer a view, chose an open style.

You can hang your gate with any of four basic styles of hinges(*click on hot text to see illustrations*): **butt**, **T**, **strap** or **gate**. You can also choose latches: **thumb latch**, **ring latch**, **strike latch**, **slide bolt** or **lever latch**.

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Gate

Description: 4 feet wide, 6 feet high. Constructed with a 2- by 4-inch frame and 1- by 6-inch vertical fence boards.

Material	Use	Quantity	Cost
2"x4"x8' construction heart redwood (or pressure-treated lumber)	frame & brace	2	$ 12.00
2"x4"x6' construction heart redwood (or pressure-treated lumber)	frame	2	$ 9.00
1"x6"x6' construction heart redwood (or pressure-treated lumber)	fence boards	8	$ 29.28
8d hot-dipped galvanized nails		1/2 lb	$ 0.50
16d hot-dipped galvanized nails		1/2 lb	$ 0.50
heavy-duty exterior butt hinges		2	$ 10.00
strike latch		1	$ 5.00
TOTAL COST			**$ 66.28**

Cost Variables

Size: Lumber cost for a smaller gate will decrease in proportion with size.

Materials: Redwood may cost 50 percent more than pressure-treated lumber.

Tip from the Pros

To keep a gated wooden fence from sagging, set the gateposts deeper than the fenceposts--or build the gateposts from stouter 4 by 6s or 6 by 6s.

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Step by Step: Building and Hanging a Gate

This basic wooden gate can be sized to any opening up to 4 feet. (For a wider opening, use double gates.) Build the frame of 2 by 4s, then cover it with wood. It should fit between the gateposts with clearance from 1/2 to 3/4 inch.

1. Measure distance between gateposts at both top and bottom. Subtract clearance allowance, then cut top and bottom crosspieces. Cut fence boards to cover the frame.

2. Assemble the frame on a flat surface. Butt and nail the crosspieces over ends of uprights. Use a **framing square** to check that corner joints are square. Also check that both diagonal measurements are equal.

3. Add diagonal brace from bottom of hinge side to top of latch side.

4. Nail on the outside fence boards.

5. Mount hinges on gate frame, predrilling holes for screws.

6. Support frame on blocks of wood so it fits in opening. Use holes in hinges to mark positions of screw holes in posts. Drill holes and screw hinge to posts.

7. Add latch to gate and catch to post.

Tools and Materials

circular or hand saw
combination square
electric drill
framing square
hammer
screwdriver
tape measure

Related Topics

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Garden Walls

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A wall of brick, stone, or concrete blocks can reinforce your design and echo the texture of patios and paths. Low walls can turn into informal benches or places to display potted plants.

Although you can build masonry walls more than 6 feet high, the heavy materials are easier to work with if you keep the wall low. A wall under 3 feet probably won't require a permit or an engineered design. Check with your local building department to be sure.

In general, masonry walls need a reinforced **footing** that is twice the thickness of the planned wall.

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Garden Walls - Brick

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Brick walls don't have much lateral strength, so you'll need to reinforce them with **pilasters**. Pilasters can be solid brick, or they can have open cores filled with **rebar** and mortar. Wall panels (either one or two bricks thick) attach to them with **brick ties** or with bricks that run into the pilasters.

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Brick Wall with Pilasters

Description: 9 feet long, 3 feet high. Constructed with brick pilaster, 9 feet on center connecting an 8 foot long, single-width brick wall laid over concrete footing.

Material	Use	Quantity	Comment	Cost
common bricks	2 pilasters	120		$ 54.00
common bricks	wall	150		$ 67.50
16"x16"x2" pre-cast concrete	cap pilasters	2		$ 2.00
mortar mix		six 80-lb bags		$ 28.20
brick ties		20		$ 3.00
#3 rebar, 20' length		2		$ 6.00
gravel	levelling	approx. 300 lb		$ 5.00
concrete mix	footing	twelve 90-lb bags	make 8 cu ft	$ 39.60
2"x6"x8'	footing form	4		$ 22.08
form stakes, 24"		25		$ 7.75
8d duplex nails		1 lb		$ 1.00
TOTAL COST				**$236.13**

Cost Variables

Size: Each additional 9- by 3-foot section will cost $200-$210.

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery. Footings may need to be deeper in some conditions.

Safety

Hire an engineer to design brick walls over 3 feet high.

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Step by Step: Brick Wall with Pilasters

This 3-foot-high, single-thickness wall has 12-inch-square **pilasters** spaced 9 feet on center.

1. Lay out the wall with stakes and **mason's line**.

2. Excavate the **footing** to the depth required by local building code. Level the bottom with gravel. The top of the footing will be 8 inches below grade.

3. Build forms for the footing. It has two different sizes: under the wall sections, make it 10 inches wide and 6 inches deep; under each pilaster, make it 20 by 20 inches and 10 inches deep. Check whether your community requires different depths. Footing should include two pieces of #3 rebar running parallel under wall panels. They tie to a length of rebar in the center of each pilaster.

4. Pour concrete and **screed** top.

5. Center and dry-set bricks on footing to determine spacing. Allow 1/2 inch between bricks for mortar. Use a mason's line to align bricks.

6. Mortar the first layer of bricks for each pilaster. Then lay the first layers of panel bricks. For the second layers in pilasters, lay bricks in an opposite pattern so that no **joints** align vertically. Set **brick ties** from pilaster to wall section every third layer.

7. After 14 layers (12 are above grade), fill core of pilaster with mortar. Mortar **concrete cap** on each pilaster. You can special-order caps at the brickyard.

Tools

4-foot mason's level
bolt cutter or rebar cutter
brick chisel
hammer
hand or circular saw
hand sledge
jointer
mason's corner block
mason's line
mason's trowel
shovel
50-foot tape measure
wheelbarrow
wood float

Related Topics
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Garden Walls - Stone

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Rock walls instantly age a garden and blend easily with plants. Select flat rocks such as fieldstone, flagstone or quarried granite that will stack easily. Get supplies from a local stone yard.

For stability, a stone wall needs a wider **footing** than other masonry walls, and its sides should taper toward the top. You'll need a **batter gauge** to help you maintain the wall's inward pitch as you build. Don't build a mortarless wall more than 3 feet high, or it may not stand.

Stones that lack flat sides, such as river rocks or rounded fieldstones, may need mortar to bond them together. Up to a third of the wall's volume may be mortar.

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Stone Wall

Description: 10 feet long, 3 feet high. Rises from 6- by 16-inch trench, **battered** 2 inches per foot on both sides; center filled with mortar.

Material	Use	Quantity	Cost
fieldstones		approx. 1 1/2 tons	$ 200.00
sand	mortar/levelling	approx. 1 cu yd	$ 21.25
portland cement	mortar	four 94-lb bags	$ 29.20
hydrated lime	mortar	four 50-lb bags	$ 7.40
TOTAL COST			**$257.85**

Cost Variables

Size: Each additional 10-foot section will cost the same as for this first section, unless there is a price break for larger quantities of the stone.

Materials: The cost of the stone may vary widely with quality, geographical location and difficulty of delivery.

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Step by Step: A Dry-Stack Stone Wall

This fieldstone wall stands 3 feet tall. For the lowest layer, select **bond stones** wide enough to span the full width of the **footing**. As with bricks, you stagger the stones.

1. Dig a 6-inch-deep, 16-inch-wide trench for the footing. Compact the soil at the bottom. Level the bottom of the trench with 2 inches of compacted sand.

2. Place a bond stone at each end of the footing trench. Lay rocks between them, along both sides of the trench. Fill voids with mortar, but don't let it show between layers.

4. Build the subsequent layers as two independent **wythes**, using your **batter gauge** to check the pitch as you go. Add mortar as needed to fill center gaps and level the rocks.

5. Periodically span the two wythes with long bond stones to tie them together.

6. Cap the wall with broad stones.

Tools

4-foot mason's level
batter gauge
mason's line and stakes
mason's trowel
rubber mallet
shovel
50-foot tape measure
wheelbarrow

Related Topics
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Garden Walls - Concrete Block

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If your first thought is of a boring, ugly gray wall, think again! Concrete blocks also come in tan and brick shades or with **split-faced** textures or a **slumpstone** shape. If you don't like what's available, you can sandblast plain blocks or color them with concrete stains. Or mask the blocks with a colorful stucco coat or a veneer of brick or tile.

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Concrete Block Wall

Description: 10 feet long, 3 feet high. Constructed of 4 layers of 8- by 8- by 16-inch or 8- by 8- by 8-inch half-block and a 4-inch solid cap set on a reinforced concrete footing 18 inches wide and 12 inches deep with rebar rising every 32 inches.

Material	Use	Quantity	Cost
8"x8"x16" stretcher		28	$ 46.20
8"x8"x8" half-block end		4	$ 4.40
8"x4"x16" solid cap		8	$ 8.00
mortar mix, 1.5 cu ft approx.		two 80-lb bags	$ 9.40
ready-mix concrete, delivered	footing	approx. 1 cu yd	$ 125.00
#3 rebar, 20' lengths	footing & wall	4	$ 12.00
gravel	leveling forms	1/2 ton	$ 12.00
non-shrink grout	to fill block cores	twelve 50-lb bags	$ 144.00
2"x6"x12'	footing form	1	$ 8.28
form stakes, 24"		25	$ 7.75
8d duplex nails		1 lb	$ 1.00
TOTAL COST			**$ 378.03**

Cost Variables

Size: The cost for each additional 10-foot section will be about the same as for this first section.

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery. Footings may need to be deeper under some conditions.

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Step by Step: A Concrete Block Wall

This 3-foot high wall consists of four layers and a precast, 4-inch-thick concrete cap. Each even-numbered layer starts with a half-block.

1. Lay out and build a 16-inch-wide, 8-inch-deep, reinforced concrete **footing** on a compacted 2-inch sand base. The footing should have two lengths of **rebar** running horizontally. L-shaped pieces of rebar should rise at 32-inch intervals to extend through the hollow cores of the blocks. Bend each L so the foot is 10 inches long and the leg is 2 inches shorter than the wall. Every 32 inches, tie a crossbar to join the twin lengths of rebar in the footing, then tie the L-shaped rebar to that.

2. Use **mason's line** to set a line for the wall. Mortar the bottom layer to the footing. Check vertical and horizontal alignment with a 4-foot mason's level.

3. Start next layer with a half block. Check level.

4. Fill cores of blocks with mortar or **concrete grout mix**. Poke down through the mortar or grout with a piece of rebar to force out any air pockets.

5. Cap the wall with solid, 4-inch-thick **cap units**.

Tools
4-foot mason's level
bolt cutter or rebar cutter
hand or circular saw
jointer
mason's line and stakes
mason's trowel
shovel
50-foot tape measure
wheelbarrow

Related Topics

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Raised Beds

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{ewr MVBMP2, ViewerBmp2, fotosplant.bmp} Raised beds are good for plants--and your back. Plants thrive in them because they contain improved, fast-draining soil. Your back benefits because the beds lift the plants up to within easy reach. With a wide cap around the edges, a raised bed also becomes a bench you can sit on while you garden. The bottom of the bed is open to the ground.

Make raised beds 12 to 18 inches high. They are easy to build and are usually inexpensive. Fill them with topsoil, sold by the cubic yard at landscape supply centers.

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Raised Beds - **Wood**

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These are the simplest and fastest to build. Since they'll be resting directly on the soil, use redwood, cedar, cypress or pressure-treated lumber rated for ground contact. To prevent rust, nail the bed together with hot-dipped galvanized nails. Extend the bed's life by lining the walls with **builder's felt** or polyethylene sheeting. If you wish, paint or stain the bed's exterior to match other architectural features.

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Wood Raised Bed

Description: 4- by 10-foot top dimension, 16-inch height. Constructed around 4- by 4-inch posts to which two 2- by 8-inch sides and 2- by 6-inch cap are attached.

Material	Use	Quantity	Cost
pressure-treated 4"x4"x18'	posts	1	$ 16.74
pressure-treated 2"x8"x8'	ends	2	$ 17.60
pressure-treated 2"x8"x10'	sides	4	$ 44.00
pressure-treated 2"x6"x16'	cap	2	$ 24.32
16d hot-dipped galvanized nails		1 lb	$ 1.00
pea gravel		8 cu ft	$ 10.00
TOTAL COST			**$ 113.66**

Cost Variable

Materials: Redwood may cost 50 percent more than pressure-treated lumber.

Tips From the Pros

In soft woods, **ring-shanked nails**, galvanized deck screws, or hex-headed **lag screws** have better holding power than common nails, although they are more expensive.

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Step by Step: A Raised Bed of 2 by 8s

This 4- by 10-foot wood bed has 2 by 8 sides nailed to six 4 by 4 posts. Build it on your driveway or other flat surface, then have someone help you carry it to the garden.

1. Build the first end. Cut two 45-inch-long 2 by 8s and overlay them to two 36-inch-posts. The first 2 by 8 should be flush with the top and outside edge of the post. Nail the two 2 by 8s in place.

2. Build the second end as you did the first.

3. Cut four 10-foot long 2 by 8s and nail two to connect each side of end units. Tack scrap wood across corners to **keep frame square**.

4. Nail the two remaining 36-inch posts inside centers of side boards.

5. Take frame to your garden site, place it with posts down, mark their location and **dig 8-inch-diameter postholes**. Lower the posts into the holes, level the frame, then backfill holes with gravel.

6. Cut mitered corners for 2 by 6 cap and nail to top of frame. Outside edges of cap should overhang frame by 1/2 inch.

Tools

4-foot mason's level
50-foot tape measure
combination square
framing square
hammer
hand or circular saw
posthole digger
shovel
wheelbarrow

Related Topics

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Raised Beds - Concrete Block

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Although you can build raised beds from poured concrete, it's far easier and faster to use concrete blocks. They tie to a reinforced concrete **footing** with **rebar** rising through the holes in the blocks. Top the blocks with wood, stone or cast-concrete caps.

For a more textured surface, use **split-faced blocks**. You can special-order them at building supply yards.

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Concrete Block Raised Bed

Description: 4- by 10-foot top dimension, 8-inches thick, 16-inches high. Constructed of 2 layers of block laid over 8- by 16-inch concrete footing.

Materials	Use	Quantity	Cost
8"x8"x16" concrete blocks, stretcher		30	$ 49.50
8"x8"x16" concrete corner blocks		8	$ 13.20
8"x4"x16" solid cap		20	$ 20.00
mortar mix	set block, fill cores	twenty-one 80-lb bags	$ 122.20
ready-mix concrete	footing	approx. 1 cu yd	$ 125.00
#3 rebar, 20' lengths	footing	11	$ 33.00
sand	leveling forms	1/2 ton	$ 12.00
2"x6"x16'	footing form	2	$ 22.08
2"x6"x10'	footing form	2	$ 13.80
form stakes, 24"		50	$ 15.50
8d duplex nails		1 lb	$ 1.00
TOTAL COST			**$ 427.28**

Cost Variable

Materials: The cost of ready-mix concrete will vary depending on location and difficulty of delivery. Footings may need to be deeper in some conditions.

Safety

The ingredients in concrete are caustic. Wear gloves to protect your hands.

More

As an alternative to concrete blocks, build raised beds from precast "gravity stack" modules or from chunks of broken concrete salvaged from former patios and driveways.

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Step by Step: A Concrete-Block Raised Bed

This durable planter measures 4 by 10 feet and consists of 2 layers of **split-faced blocks** that stand 16 inches above grade. Top the walls with a solid cast-concrete cap.

1. **Lay out**, excavate and form a reinforced concrete **footing** measuring 16 inches wide, 8 inches deep and set with its top 4 inches below grade. Cut 30-inch lengths of rebar and bend them into L shapes 12 inches from the ends. Starting 8 inches from a corner of the bed, tie a short crossbar to join the twin lengths of rebar in the footing. Then bind an L-shaped piece of rebar to the crossbar. The top should protrude 14 inches. Place another crossbar and L every 32 inches along the footing.

2. Align a first layer of concrete blocks and **mortar to footing**. Use full-sized **corner blocks** at each corner. Check level in both directions.

3. Lay a second layer of concrete blocks, starting each corner with a full-sized corner block. Stagger the joints.

4. Fill hollow cores with mortar and mortar solid concrete caps on top.

Tools
4-foot mason's level
bolt cutter or rebar cutter
hammer
jointer
mason's line and stakes
mason's trowel
hand or circular saw
shovel
wheelbarrow

Related Topics

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Raised Beds - **Brick**

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A raised bed of brick can tie in beautifully with brick pathways, patios or edgings. The one-brick-thick sides are mortared to a concrete **footing**. As with other raised beds, the bottom is open to the ground.

If you use a **stretcher-bonded** pattern for the bed, *as in illustration to right*, you'll save the trouble of having to cut bricks. The ends of the bricks will serve as half-brick offsets to stagger the bricks in the adjoining wall.

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Brick Raised Bed

Description: 4- by 10-foot top dimension, 12 inches high. Constructed of 5 layers of brick laid over 6-inch-wide by 8-inch-deep concrete footing.

Material	Use	Quantity	Cost
common bricks		200	$ 81.00
mortar mix, 2 cu ft approx.		four 80-lb bags	$ 18.80
ready mix concrete	concrete footing	fourteen 90 lb bags	$ 46.20
#3 rebar, 20' lengths	concrete footing	3	$ 4.50
2"x6"x16'	footing form	2	$ 22.08
2"x6"x10'	footing form	2	$ 13.80
form stakes, 24"		50	$ 15.50
8d duplex nails		1 lb	$ 1.00
TOTAL COST			**$ 202.88**

Cost Variable

Materials: Footings may need to be deeper under some conditions.

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Step by Step: A Brick Raised Bed

This 4- by 10-foot planter is five layers (about 12 inches) tall. It's mortared to a 6-inch-wide reinforced **footing**.

1. Dig a trench for a footing with a top 3 inches below finished grade (check local building codes for depth). Line trench with a 2-inch sand base.

2. Lay out and build forms for footing. Include **rebar**. Pour concrete.

3. Draw a line on the footing, indicating the outside dimension of the planter. Dry-set the bottom layer of bricks (to establish spacing), and mark their location.

4. Starting from one corner, **mortar three bricks** end-to-end along the short side of the footing. Then mortar three bricks along the long side so that you have a right angle. Pull a **mason's line** across both faces of brick for proper alignment, and continue laying the first layer.

5. Start the second layer by placing a corner brick at right angles to the one below it. Check that the corners are level in each direction and plumb. Use mason's line to align layers vertically and horizontally.

7. Add the top three layers.

8. After 5 days, apply masonry waterproofer onto the back of walls to prevent mortar from discoloring the brick.

Tools
4-foot mason's level
50-foot tape measure
hammer
hand or circular saw
jointer
mason's line
mason's trowel
shovel
wheelbarrow

Related Topics

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Raised Beds - Stone

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A stone planter fits well in country-style gardens. Since its walls are low, the soil inside exerts minimal outward pressure. As a result you probably won't need to mortar the stones together. This unmortared style, called "dry stacked," doesn't require a **footing**. Use flat-sided fieldstones rather than less stable rounded river rocks.

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Dry-Stacked Stone Raised Beds

Description: 4- by 10-foot top dimension, 12-inches high. Constructed of 3 layers of stone laid in a 12-inch-wide by 6-inch-deep trench .

Material	Quantity	Cost
fieldstone	approx. 1 ton	$ 125.00
sand	5 cu ft	$ 6.00
TOTAL COST		**$ 131.00**

Cost Variable

Materials: The cost of the stone may vary widely with quality, geographical location and difficulty of delivery.

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Step by Step: A Dry-Stacked Stone Raised Bed

This 4- by 10-foot bed has tapered, 1-foot-high walls rising from a 1-foot-wide trench.

1. Outline the bed with stakes and **mason's line**.

2. Dig a 6-inch-deep trench for the base. Level the bottom with 2 inches of sand.

3. Lay the longest and broadest stones for the corners, butting them against the outside wall of the trench. Lay other stones of about the same thickness around the perimeter.

4. After completing each layer, backfill the bed with soil and compact it to steady the stones. Then start the next layer, using a **batter gauge** to angle stones inward at 2 inches per foot of rise. Be sure to stagger joints.

Tools

4-foot mason's level
hammer
mason's line and stakes
shovel
wheelbarrow
batter gauge

Related Topics

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Edgings

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Edgings outline garden beds and help keep out invasive grasses and ground covers. They also serve as a guide for edging tools and lawn mowers.

Most frequently made of wood, concrete, brick or stone, edgings can be straight or curving. To help you visualize the edging's shape, use a garden hose, string or sprinkle flour to outline its position in the garden.

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Edgings - Wood

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Wood edgings range from broad, straight-edged lumber to graceful ribbons of **benderboard**. The most popular materials are 2 by 4s, 2 by 6s, 4 by 4s, or **landscape timber**. For a more rustic look, use logs with bark or pressure-treated **peeler core** logs. Both kinds are sold at landscape supply centers. Half-bury them horizontally in a trench, or cut them into 12- to 24-inch lengths, and stand them in upright rows.

Since the wood will come in contact with the soil, choose redwood or other rot-resistant wood, or pressure-treated woods rated for in-ground use.

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4 by 4 Wood Edging

Description: 10-foot length of 4 by 4s, staked at 3-foot intervals.

Material	Quantity	Cost
4"x4"x10' pressure-treated	1	$ 9.30
redwood stakes, 24"	5	$ 1.00
8d hot-dipped galvanized nails	1/2 lb	$ 0.50
TOTAL COST		**$10.80**

Cost Variable

Materials: Redwood may cost 50 percent more than pressure-treated lumber.

Tips From the Pros

Hold lumber in place with rot-resistant stakes spaced every 3 feet along the sides. To secure broader timbers or ties, drive lengths of **rebar** or galvanized pipe through holes drilled through the tops.

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Step by Step: 4 by 4 Wood Edging

Construct this edging with 10-foot lengths of 4 by 4.

1. Mark the perimeter with **mason's line** tensioned between stakes. Set string at finished height (1 inch).

2. Excavate 4 inches deep, slightly beyond the area defined by the string.

3. Position 4 by 4s with tops flush and aligned with string. Check level.

4. Use a **hand sledge** to drive rot-resistant stakes every 3 feet, along alternate sides of 4 by 4.

5. Nail stakes to 4 by 4s, then trim the stakes below top of edging.

Tools

4-foot mason's foot level
hammer
hand or circular saw
hand sledge
mason's line and stakes
shovel
wheelbarrow

Related Topics

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Edgings - Concrete

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A poured-concrete edging creates a bold outline for a path, lawn, driveway or patio. Leave it in its natural state, color it with dyes, texturize it or cover it with bricks, **pavers** or stones.

It starts with a form that has two parallel and level sides to provide a bearing surface for a **screed**. If you'll be adding a top layer of brick or other material, make a screed that provides for the material's thickness, plus a 1/2 inch for the mortar bed.

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Concrete Edging

Description: 10 feet long, 7 inches wide concrete band laid over a 2-inch sand base.

Material	Use	Quantity	Cost
concrete mix, 2 cu ft	edging	two 90-lb bags	$ 6.60
#3 rebar, 20' length	reinforcement	1	$ 3.00
sand	base	1 cu ft	$ 1.50
2" dobie spacers	support for rebar	3	$ 0.60
2"x4"x12'	forms	2	$12.00
form stakes, 24"	forms	12	$ 3.72
8d hot-dipped galvanized nails		1 lb	$ 1.00
form release		1 gal	$ 7.00
TOTAL COST			**$35.42**

Safety

The ingredients in concrete are caustic. Wear gloves to protect your hands.

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Step by Step: A Concrete Edging

This section of edging is a straight, single band measuring 7 inches wide.

1. Outline and excavate a 6-inch-deep, 10-to 12-inch-wide trench. Level the bottom with a 2-inch bed of compacted sand.

2. Stake two lengths of **mason's line** 7 inches apart down the middle of the trench.

3. Align inside faces of 2 by 4 form boards on string line. They should be parallel and 1/2 inch above grade. Stake and nail them in place.

4. Lay #3 **rebar** down the center of the form. Use **dobies** to prop the rebar off the ground. Paint the form's inside faces with form release, then **pour concrete** and **screed**.

5. Finish the top with a wood float, concrete trowel and **edging tool**. Use an edging tool along the sides. Use a **jointer** to make **control joints** at 10-foot intervals. Remove forms when set.

Tools
4-foot mason's level
50-foot tape measure
edging tool
hammer
jointer
mason's line
shovel
mason's trowel
wheelbarrow
wood float

Related Topics

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Edgings - Brick

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A band of brick along a path, patio or a lawn adds a subtle geometric patterning and warm colors to a garden. Set bricks on sand between wood frames, or mortar them to a more permanent concrete **footing**. You can set bricks flat, on edge or on end to create patterns.

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Brick Edging

Description: 10 feet long and 8 inches wide. Brick laid over concrete footing.

Material	Use	Quantity	Cost
common bricks	edging	30	$ 13.50
mortar mix,1 cu ft approx		one 80-lb bag	$ 4.70
concrete mix, 1.7 cu ft	edging	three 90-lb bags	$ 9.90
#3 rebar, 10' length	reinforce-ment	1	$ 2.00
2" dobie spacers	support for rebar	3	$ 0.60
sand	base	1 cu ft	$ 1.50
2"x4"x12'	forms	2	$ 12.00
form stakes, 24"	forms	12	$ 3.72
8d duplex nails		1 lb	$ 1.00
TOTAL COST			**$ 48.92**

Tips From the Pros

Since brick sizes vary, measure the brick to establish the width of the footing.

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Step by Step: A Brick Edging

This edging is 8 inches wide, with a finished height 1/2-inch above grade. The single layer of brick is mortared to a concrete footing.

1. Excavate a trench 18 inches wide and 7 inches deep (or the depth required by local code), and **form a concrete footing** 8 inches wide and 4 inches high. The top of the footing should lie below finished grade by the thickness of a brick.

2. Lay **rebar** on **dobies** down the center, paint insides of forms with form release and pour concrete. No need to finish--merely **screed** the top.

3. Remove form boards and stakes.

4. Wet the bricks and set them flat on a 1/2-inch-thick bed of **mortar**. Check that bricks are level and true to line in both directions.

Tools

4-foot mason's level
50-foot tape measure
hammer
hand or circular saw
mason's line
mason's trowel
shovel
wheelbarrow

Related Topics

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"mortar")']bitmaps.bmp} Mortar

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Edgings - Stone

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Stone for edgings can range from rustic uncut rocks or irregularly shaped flagstones to precise stone tiles. The tiles come in thicknesses of 3/8 inch to about 1 1/2 inches and must be mortared to a concrete **footing**. Avoid polished marble or granite, which are slippery when wet.

For the least expensive and most natural-looking border, partially bury uncut rocks and boulders in shallow trenches. Hold them in position with soil, sand or concrete. They blend easily with densely planted beds or make an attractive border for gravel or **seeded-aggregate** concrete paving.

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Stone Edging

Description: 10 feet long and 8 inches wide (approx.). Stones, laid into a 10-inch- wide by 5-inch-deep trench.

Material	Quantity	Comment	Cost
10"-12 " diameter stones	about 15	sold by the pound or ton	$31.50
TOTAL COST			**$31.50**

Cost Variable

Materials: The cost of stone will vary.

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Step by Step: A Stone Edging

Build this edging with stones about 10 to 12 inches in diameter.. Look for lichen-covered fieldstones for added color and texture.

1. Define a meandering edge with a garden hose.

2. Dig a trench 5 inches deep or deep enough to bury about 60 percent of each stone.

3. Set rocks in trench, trying to keep their tops a constant height above grade.

4. Backfill with tamped soil.

Tools

50-foot tape measure
garden hose
shovel
wheelbarrow

Related Topics

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"mortar")']bitmaps.bmp} Mortar

laying out the perfect right angle

To check that a corner is square, use the "3-4-5" technique. For example, measure down one leg 6 feet (that is, 3 times 2), then measure down the other leg 8 feet (4 times 2). The distance across the triangle should be exactly 10 feet (5 times 2). Repeat for all corners.

To double-check squareness, measure the distance between opposite corners of the rectangle. Both diagonals should be identical.

digging postholes

To cut a hole, drive the blades of a posthole digger sharply into the ground. When loose soil collects in the hole, pull the handles apart to scoop it out. Try to dig a bell-shaped hole--larger at the bottom than the top. It may help to soak the soil before you dig postholes. If you hit small roots, cut them with garden snips. Try to relocate the hole if you find large roots.

Tip from the pros: Digging postholes is strenuous work. To avoid back strain, bend your knees and use your legs to help lift and drive the post hole digger. Or rent a gas-powered **post hole auger** and have a strong person help you use it.

fitting rails

To make a rail *fit* tightly, don't measure. Instead, hold it in place and mark where it meets the post. Use a combination square to draw the line, then *cut* the rail.

When setting bottom and middle rails, clamp a block of scrap wood to one post to support one end of the rail while you *toenail* or screw the other end to its post. It's like an extra set of hands.

spacing boards

Nail a fence board with its top at 6 feet from the ground, using a 4-foot level to check that it is plumb. Temporarily nail another at same height to other end of fence. Stretch a **mason's line** between them to align tops of fence boards. Rip a piece of scrap wood 6 inches wide. Butt it against first fence board to space next one. Check plumb every 4 boards.

aligning posts

Use **mason's line** and stakes to establish line for posts. Set the two end posts first, staking them from two directions to hold them vertical. Check two adjacent sides with a bubble level. Stretch and tension a mason's line between them, flush with the outside face. Use this as a guide for setting other posts in line. Make sure the other posts are flush to the line, but don't bow it.

drainage behind a retaining wall

To move water from behind a retaining wall, lay perforated drain pipe along the back of it. Line a trench behind the wall with **soil-filter fabric**, lay pipe along cloth, and backfill with **drain rock** to within 6-12 inches of the top. Wrap the ends of the cloth over the top of the rock layer and fill the remainder of the trench with gravel or soil.

//Not used//

Keeping Cap Rails From Cupping

Long lengths of wood nailed to tops of posts can tend to warp or cup because of sun and moisture. To help them lie flat, rip two or three 1/4-inch-deep grooves down the length of their undersides.

Warp in cross-section, creating a bow across the grain.

laying out a stair stringer

Use a **framing square** to mark out stair notches on the **stringer** board. Be sure to take the thickness of the tread board into account. You can make the stringer cutouts with a circular saw, but to finish the inside corner you'll need a hand saw or jigsaw.

If you're using wide boards for treads, angle the treads about 1/8 inch from back to front to make sure they drain easily.

//not used//
Holding wood dividers in place

Here's how to keep wood dividers from popping up from the concrete: Before you pour, run short pieces of rebar through holes drilled midway along the 2-by-4s, or drive hot galvanized 16d nails into both sides of the wood every 12-18 inches.

cutting a brick

If there are only a few bricks to cut, use a broad bladed **brick chisel** and a **hand sledge**. The brick chisel has a beveled edge you position away from the part of the brick you want to use. Use the brick chisel to lightly score a groove across all four sides of the brick. Lay the brick on flat sand, position the brick chisel on the scored line and hit the brick chisel sharply with the sledge.

If there's a lot of cutting to do for a patio, lay all the full-size bricks first and put aside the bricks you want to cut. Rent a diamond-bladed **tub saw** to cut them all at once. Or estmate the numbers ahead of time and have the supply yard cut them.

screeding

The trick to making concrete or sand level and flat is called screeding. When you fill forms with concrete, simply lay a board across the tops of the forms and pull it down their length, working it back and forth to settle the concrete.

If you'll be screeding a base of sand or concrete for bricks or stone tiles, you build forms with their tops at the finished level--the top of the brick or tile. But this time you cut the screed board 2 inches shorter than the forms and nail a short piece of 1-by-2 stake to the top edge of the screed board.

With sand it helps to wet, tamp, and add more sand so the surface is almost rock hard.

//this isn't used//

Cutting Stones to Fit Together

This technique is useful for laying freeform pieces flagstones in patios, stairs, and pathways. You'll need safety goggles, gloves, a brick chisel, a hand sledge, a length of pipe, and a pencil. A circular saw with a masonry bit is optional.

First, overlay the edge of one stone on another and trace the outline onto the lower rock. Then use a brick chisel (or circular saw with masonry bit) to score a shallow groove along the traced line. Position pipe under the lower stone so the scored line overhangs it. Strike the brick chisel sharply along scored line.

pouring and finishing concrete

After you pour concrete, the next step is to level and finish the surface before it dries. A careful finish is especially important for visible flatwork such as patios and sidewalks, less so for concrete that will be hidden under brick or stone. Follow these steps:

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{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"2_finish_the_edges_and_make_control_joints")']bitmaps.bmp} 2. Finish the edges and make control joints

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"3_finish_smoothing_the_surface")']bitmaps.bmp} 3. Finish smoothing the surface

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"4_let_the_concrete_cure")']bitmaps.bmp} 4. Let the concrete cure

Level the surface by drawing the edge of a straight board along the top of the forms in a back-and-forth sawing motion. This smoothes out the bumps and low spots.

On concrete that will remain exposed, such as sidewalks or patios, you'll need to neaten the edges and guide the cracking that will occur as the concrete expands and contracts.

First, butt and run a steel **edging tool** against the forms to round over the edges. Next, use a **jointer** at intervals to score the concrete with grooves.

Use a wood float to further smooth the concrete after water has come to the surface and evaporated. Wood floats give a coarse finish good for traction on exterior surfaces. For a dense, hard, and smooth surface, finish the concrete with a concrete trowel.

Other surfaces include
Broom finish
Sand
Rock salt
Seeded aggregate.

Spray the surface with water and cover it with plastic sheeting to keep it damp. Remove the plastic after 3 days. After 5 days, the concrete has reached 90% of maximum hardness.

building a concrete footing

A concrete footing keeps a heavy wall or raised bed from sinking into the ground. Its exact depth and width are prescribed by local building code or practice. In general, it must lie below the **frost line**, must be at least 6 inches thick, and must be twice as wide as the structure it supports. You must add horizontal reinforcement of steel **rebar**, spaced 8 inches **on center**, for every 12 inches of footing width.

Vertical rebar should tie to the horizontal rebar.

Follow these steps to build a footing:

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{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"2_excavate_and_level_a_trench")']bitmaps.bmp} 2. Excavate and level a trench

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"3_build_the_forms")']bitmaps.bmp} 3. Build the forms

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"4_add_rebar")']bitmaps.bmp} 4. Add rebar

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"5_pour_and_screed_concrete")']bitmaps.bmp} 5. Pour concrete

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"6_smooth_the_top_surface_with_a_wood_float")']bitmaps.bmp} 6. Finish top surface with wood floats

Outline the footing with stakes and **mason's line**. Make your outline the width of the footing plus the thicknesses of the form boards.

Dig a trench wide and deep enough for the finished footing, the form boards, and the stakes, plus room enough to swing a hammer. Fill the bottom with gravel to make it level.

Set stakes along the string line. On the stakes, mark the position of the top of the forms. Check that the lines are level, then nail on the form boards and trim off extending parts of stakes.

Lay **rebar** at least 2 inches from each side of the form. In wide footings, lay additional rebar parallel to it every 8 inches **on center**. Use **dobies** to prop it midway from bottom of footing. To reinforce concrete-block walls, bind L-shaped lengths of vertical rebar to horizontal pieces with tie wire. If there's no horizontal piece running down the center of the footing, add short rebar crossbars and tie the vertical rebar to those. The vertical rebar runs through the cells in concrete blocks every 32 inches (or at the spacing required by your local building department).

Pour concrete into forms and draw a board across tops of forms to level the concrete. Tap the sides of forms with a hand sledge to settle the concrete, or rent a mechanical vibrator.

Draw a **wood float** over the top to level the bumps and pits. A troweled finish isn't necessary.

mortaring brick and concrete block

Mortar is the glue that binds bricks or concrete blocks together in a wall. It also holds stones or tiles to poured concrete slabs. On these flat surfaces it compensates for uneven thickness so the top will be level.

You can mix your own ingredients or buy prepackaged mortar mixes, which save time but are more costly. The proportions of the mix will vary slightly with the type of job, so check with your building supply store when ordering the mix. Follow these steps:

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"1_wet_the_bricks")']bitmaps.bmp} 1. Wet the bricks

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"2_mix_the_mortar")']bitmaps.bmp} 2. Mix the mortar

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"3_on_flat_slabs_lay_and_screed_a_bed_of_mortar")']bitmaps.bmp} 3. On flat slabs, lay and screed a bed of mortar

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"4_for_vertical_walls_throw_a_line_of_mortar")']bitmaps.bmp} 4. For vertical walls, throw a line of mortar

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"5_butter_the_bricks_stones_or_tiles")']bitmaps.bmp} 5. "Butter" the bricks, stones, or tiles

{ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"6_tool_the_joints")']bitmaps.bmp} 6. Tool the joints

Wet bricks several hours before setting them. This keeps them from absorbing too much water from the mortar mix and weakening the bond.

For small jobs, use a wheelbarrow, hoe and shovel. For larger ones, rent a **power mixer**.

Covering about 10 square feet at a time, spread a 1/2-inch mortar bed for bricks, 1 inch for stone or tile. Use the concrete forms as guides for the **screed** boards.

Use an 8- or 10-inch pointed **mason's trowel** to throw a line of mortar about an inch thick. Throw the first line on the concrete footing, subsequent lines on the top of the last layer.

With your mason's trowel, coat the ends of each brick or block with mortar. Use a 1/2-inch thickness for bricks, a 1-inch thickness for concrete blocks. For vertical walls, lay them on the line of mortar and settle them by tapping with the end of the trowel handle. With a 4-foot mason's level, check that the bricks are aligned, plumb, and level. Lay a complete layer of bricks or blocks before starting the next.

Tooling gives the mortared joints a neatly rounded indentation. When the mortar has hardened enough to show a thumbprint clearly, use the edge of a trowel to cut it flush with the bricks or blocks.After mortar sets up but is still soft enough to work, use a **jointer** (or a 4- to 12-inch length of 1/2-inch pipe) to scrape along the joint. Do the horizontal joints first.

power mixer

A tilted drum with a motorized blade or spiral that mixes mortar.
Run it for 3 to 5 minutes to thoroughly combine the materials.
Longer mixing weakens mortar.

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Selecting Plants

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"plant_shapes")']bitmaps.bmp} Plant Shapes {ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"shapeplants")']bitmaps.bmp}

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"designing_for_texture")']bitmaps.bmp} Designing for Texture

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"continual_color")']bitmaps.bmp} Continual Color

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"local_conditions")']bitmaps.bmp} Local Conditions {ewc MVBMP2, ViewerBmp2, [macro=`PI(qchPath,"consider_environment")']bitmaps.bmp}

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Trees, shrubs, and ground covers form the "backbone" of your landscape. These plants will be with you for years, so choose the ones that will look the best and thrive. Here's how.

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Professional landscapers choose plants by their shape first, to fulfill a particular function. Only then do they select the species. Here's how to choose plant shapes.

For shade, select a broad-spreading or vase-shaped tree for lawns or a small round tree for patios. If you want sun to come through in winter, select a **deciduous** tree.

For a screen or windbreak, plant a group of pyramidal or columnar trees in a large yard, or choose shrubs with a horizontal form.

If you like the look of a sheared hedge, choose shrubs with an upright-vase shape.

You might choose a tree or shrub as an accent or **specimen** plant, for its striking shape alone. If so, plant it where you can enjoy the view.

Now go on to the next two screens. There you'll find plant shapes represented in the Designer and their definitions.

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"tree_shapes")']bitmaps.bmp} Tree Shapes

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Tip from the Pros

Try to blend similar plant forms. Extreme contrasts or too much variety can make a landscape confusing.

Related Topics

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Plant Shapes - **Trees**

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broad spreading

Broad-spreading trees are as wide as they are tall. They help to connect horizontal land or building forms and provide shade for a large area. They can also add contrast to columnar plants.

columnar

Columnar trees have upright, narrow forms that lead the eye skyward. They provide height and accent when used with round or spreading forms. Alone they can frame a favorite view. Planted along property lines, columnar trees make a good windbreak or a natural screen to block unsightly views.

irregular

Irregular trees are picturesque and can be uniquely sculptural in shape. They are best used as specimen or accent plants, because they are conspicuous and bring focus to their location.. Too many irregular tree forms in one area, however, create a busy scene.

oval

Oval trees are similar to round trees in design qualities. Because their nondirectional form does not lead the eye, oval trees can be used repeatedly and still provide a neutral setting for more striking tree forms. Oval trees can add a formal touch to your landscape with their symmetrical shape.

pyramidal

Pyramidal trees have a distinct conelike outline. Their sharp form adds striking contrast when used among spreading or rounded plants.

round

Round trees have a nondirectional, spherical shape that does not lead the eye. They can be used repeatedly and still provide a neutral setting for more striking tree forms. Round trees can add a formal touch to your landscape with their symmetrical shape.

vase

Vase-shaped trees have high, spreading branches. They often produce the best shade.

weeping

Weeping trees have downward-arching branches that lead the eye toward the ground. They can be used effectively near ponds or streams. They also add contrast when used among columnar plants, which carry the eye skyward.

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Plant Shapes - **Shrubs**

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mounded

Mounded shrubs have a broad, rounded compact form. They provide a neutral setting for more striking plant forms.

round

Many rounded shrubs will spread up to six feet by maturity. They can be used in informal, or more natural, borders.

vase

Vase-shaped shrubs have erect vertical lines. They make good accent plants and bring the eye to a focal point of interest. These upright shrubs can be sheared and used for formal hedges.

prostrate
Prostrate shrubs are low and make good ground cover. Although these plants are flat, they tend not to trail over an embankment.

arching

Arching shrubs have graceful, fountainlike branches. They add a restful touch to landscape design. Arching shrubs make good specimen plants because they provide interest in a particular area.

trailing
Trailing shrubs are low-spreading plants that will cascade over an embankment.

horizontal

Horizontal shrub branches spread widely. They help to connect horizontal land or building forms. When planted in a row, they provide a natural screen or windbreak.

pyramidal

Pyramidal shrubs have a distinct conelike appearance. They provide visual accents when planted with lower round or mounded shrubs.

cactus

Cacti range in height from a few inches to over 40 feet. Larger species can be used to create desert landscapes, while smaller species are grown in rock gardens. They often have brightly colored flowers and fruit. Most have spines to protect themselves from animals.

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Designing for Texture

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The distinctive textures of leaves, stems, buds and bark will add variety and contrast to your landscape. Textures can range from fine and airy to coarse and dense. Some design tips:

Don't alternate abruptly between coarse and fine. Shift gradually to maintain continuity.

Think about how plant textures will combine with the textures of building materials, decking, and paving.

Keep in mind that deciduous plants change in texture as their leaves come and go.

Remember that the farther a plant is from you, the finer its texture appears.

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Tip from the Pros

Fine-textured trees or shrubs can make a small area seem larger. Coarse textures can make a large area seem smaller.

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Continual Color

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{ewr MVMCI2, ViewerMCI, [device MMMovie][noframe][stdcontrol]moviescolrgdn.mmm} The colors in your yard are like movements in a symphony, shifting in mood and tempo throughout the year. Orchestrating color can be fun as well as challenging.

When you're choosing trees at the nursery, look at leaf color. Leaves are present for most or all of the year, whereas flowers and fruit are transitory. Plan color for each season. Think about fall foliage color and colorful stems, bark, or berries for winter. Use colors that harmonize with your house and its surroundings. Keep your palette simple, or the effect may be confusing.

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Tip from the Pros

Use color to change your yard's apparent size. Warm colors (orange, red) appear to come forward, making your yard seem smaller. Cool colors (blue, green) appear to recede, making your yard seem larger.

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Local Conditions

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If you want your plants to live a long and healthy life, choose those already adapted to the conditions in your yard. For example, if you live in the Southwest, you'll do best with plants that tolerate drought, bright sun, **alkaline** soil, and--at higher elevations--cold winters. In the Northeast, plants that can withstand freezing winters and hot, humid summers will do best. Environmental factors include:

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Local Conditions - **Cold Hardiness**

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{ewc MVBMP2, ViewerBmp2, illustnshardnes.shg} The **USDA** Plant Hardiness Zone Map divides the U.S. and Canada into zones based on minimum winter temperatures. The higher the number, the warmer the zone.Your trees and shrubs should be **cold hardy** in your climate--otherwise they may freeze to death and leave an unwanted hole in your landscape.

Click on a zone number in the right part of the map for temperatures.

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Tip from the Pros

Microclimates in your yard can make it warmer or colder than its USDA zone indicates. For example, the sunny south side of your house is typically warmer in winter than the shady, wind-driven north side. You could grow plants from a warmer zone on the south side but you might need plants from a colder zone on the north side.

More

USDA zones don't consider such factors as humidity and rainfall. Thus a plant that thrives in the Arizona desert will likely perish along the humid southeast coast--even though both are in zone 8. In the West, many gardeners use a 24-zone system that considers rainfall, elevation, and marine influence. Unfortunately, there's no similar system in the East--you have to rely on local knowledge.

Zone 1
Minimum annual temperature: below -50 degrees F.

Zone 2
Minimum annual temperature: -50 to -40 degrees F.

Zone 3
Minimum annual temperature: -40 to -30 degrees F.

Zone 4
Minimum annual temperature: -30 to -20 degrees F.

Zone 5
Minimum annual temperature: -20 to -10 degrees F.

Zone 6
Minimum annual temperature: -10 to 0 degrees F.

Zone 7
Minimum annual temperature: 0 to 10 degrees F.

Zone 8
Minimum annual temperature: 10 to 20 degrees F.

Zone 9
Minimum annual temperature: 20 to 30 degrees F.

Zone 10
Minimum annual temperature: 30 to 40 degrees F.

Zone 11
Minimum average temperature: above 40 degrees F.

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Local Conditions - **Light Levels**

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The level of light in your yard probably varies -- from dense shade under leafy trees to bright sun in the open. The number of sunny hours in each area will also vary as shadows shift throughout the day and year.

Fortunately, you can find plants adapted to every light level, whether **full sun**, **part sun**, **shade** or **deep shade**. The Plant Selector in the Design Board can help you choose the right plants for each part of your yard.

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More

The patterns of sun and shade in your yard will change over the years as trees grow and spread. As this happens, you may have to replace some sun-loving plants with shade plants.

Related Topics

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"using_sun_and_shade")']bitmaps.bmp} Using Sun and Shade

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"how_big_will_it_get")']bitmaps.bmp} How Big Will It Get?

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Local Conditions - **Water Needs**

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Landscapers classify plants according to four levels of water use: **high**, **medium**, **low** and **drought tolerant**. If you don't have water to waste, look for plants that are compatible with nature's watering system. Often these are either the plants that grow wild in your area, or cultivated varieties of them. A local nursery can help you find these.

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Water-wise landscaping -- xeriscaping -- has become increasingly popular, especially in dry climates. Some xeriscaping tips:

Choose drought-tolerant trees and shrubs native to your area.

Get rid of your thirsty lawns and cover the ground with **mulch** or decorative paving. If that's too drastic, replace your lawn with a low-water ground cover, or plant a more drought-resistant species of lawn grass.

Add organic matter, such as compost, to the soil to help it hold moisture.

Cover the soil between plants with mulch.

If you have an irrigation system, install a timer or **moisture sensor**.

Tips from the Pros

Group plants according to their water needs. This makes watering simpler and easier.

Related Topics
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Local Conditions - Soil Types

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{ewr MVBMP2, ViewerBmp2, fotossoil.bmp} Rich, workable soil is only a dream for most landscapers, since it takes constant effort to maintain. You'll have far better success if you choose plants that can tolerate the soil you already have. Here's how to determine your soil's characteristics:

First, find your soil's **pH** by testing it with a kit or sending it to a lab. Most plants do best in neutral to slightly acid soil, but some have more extreme needs.

Next, detemine whether your soil is **clay**, **loam**, or **sand**. Pick up some damp soil and squeeze it. If it holds together tightly and feels sticky, it is mainly clay. If it holds together loosely but isn't sticky, it's loam. If it's gritty and won't stick together, it's sand. Loam is ideal for many plants.

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Other conditions affect the soil. Your yard may have low spots that stay wet all year, or may be rich or poor in **organic** content. Some plants tolerate these conditions better than others.

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Testing the Soil
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Local Conditions - Pests and Diseases

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} These invaders can devastate your plants in a short while, costing time and money and potentially exposing you to toxic pesticides.

To avoid these problems, select plants that resist pests or diseases in your region. Start with strong, healthy plants and water them carefully while they become established.

Nearby nurseries or your local **Cooperative Extension** service can help you find resistant varieties. If you can't find a resistant variety, choose another kind of plant.

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Minimizing Maintenance

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Take a hard look at the plants you've chosen -- and at how much effort they'll take to maintain. Here are ways to cut maintenance time:

Select a slow-growing lawn grass so you won't have to mow as often. Plant a smaller lawn to save on mowing, weeding, fertilizing and watering. Take out the lawn and plant a low-maintenance ground cover, *right*, cover the ground with **mulch**, or build a patio or deck.

If you don't like to prune, plant a natural shrub border instead of a hedge. Or build a fence.

Plant trees that don't drop lots of fruit or leaves, *right*. You'll spend less time raking.

Choose healthy plants adapted to your environment. You'll have fewer battles with pests and diseases.

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How Big Will it Get?

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{ewr MVMCI2, ViewerMCI, [device MMMovie][noframe][stdcontrol]moviesmatrsiz.mmm} Before deciding on a plant, find out how big it will grow and how fast it will reach its mature size. Don't plant a tree where you only want a shrub.

Think ahead. Will the tree you planted in the middle of your yard end up casting too much shade and destroying all sense of proportion? Will a shrub grow to block a view, or require hours of pruning?

On the other hand, you may want shade or privacy in a hurry. If so, look for plants that mature rapidly.

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Tip from the Pros

To temporarily fill in spaces between young or slow-growing shrubs, plant bulbs, **annuals**, **perennials**, or plant additional fast-growing shrubs you can remove in a few years.

Related Topics

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Choosing a Lawn Grass

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You've designed a lawn for parties, football or just color. Grasses can answer more than one need. This calculator will help you choose the right grass for your lawn. Some things to consider:

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Tips from the Pros

If you're still in doubt about which grass to choose, check with your local nursery or your County **Cooperative Extension** office.They can tell you about new **cultivars** that may be even better for your needs.

In southern states, most people plant "warm-season" grasses, such as Bermuda grass. These grasses thrive in hot summers and go dormant and brown in winter. In the North, most people plant "cool-season" grasses, such as Kentucky bluegrass. These grow best in spring and fall but stay green when given summer watering.

Some grasses fill in more quickly than others, spreading rapidly by **rhizomes** or **stolons**. If you want a lawn instantly, lay **sod** instead of sowing seeds.

In areas with little or no summer rainfall, look for drought-tolerant grasses.

If you don't have much time, avoid grasses that need heavy fertilizing, must be mowed closely (and therefore frequently), or are susceptible to diseases. Newer dwarf varieties need less mowing and fertilizing than traditional grasses.

Some grasses tolerate shade better than others. If your lawn area is shady, plant a shade-tolerant grass or a **mixture** or **blend** that includes one.

You'll need a more wear-resistant grass for a lawn where children play or people walk frequently.

More

If a single grass can't solve all of your problems, plant a **mixture** or **blend**, or plant different grasses in your front and back yards

Related Topics
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Planting Techniques

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Once you've graded your yard, built any landscape structures, and chosen the plants, it's time to complete your project by planting. Spring or fall is usually the best time, depending on your climate and what you're planting. You'll find helpful techniques in this chapter.

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Testing the Soil

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A soil test tells you what the soil needs for your plants to grow well. You may need to change the soil's **pH,** or add fertilizer or **organic** matter. Soil test kits, sold at nurseries and **garden centers,** usually measure only pH. For a more complete diagnosis, have a professional lab test your soil--it's inexpensive and worth it. Look in the Yellow Pages under "Soil testing," or check with your County **Cooperative Extension** office. The lab will tell you how to take samples for testing.

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Related topics
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Tools

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Improving the Soil

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Your plants and lawn will grow better if your soil is in top shape. Add **organic matter** to make your soil more workable and to help it hold water and nutrients. Lay it 2 inches deep around trees, shrubs, and woody ground covers. For lawns and beds, use 3 to 6 inches.

If your soil has tested too acid or alkaline, adjust its **pH** by adding **limestone**, **sulfur** or **an equivalent.** A soil pH of 6.5 is the goal. If you test the pH yourself, use this pH **amendment** calculator to see how to adjust your soil.

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Step by Step: Improving the Soil

1. If the soil is sticky wet, wait until it dries. If it's bone dry, soak it and wait a few days. It's just right when a handful feels crumbly and somewhat moist.
2. Rake the soil clear of weeds and debris.
3. Using a wheelbarrow, shovel and rake, spread **organic matter** evenly over the soil.
4. If you need to add limestone or **sulfur**, scatter it evenly.
5. Also scatter a **10-10-10 fertilizer** at the rate of 20 pounds per 1,000 square feet.
6. With a spade or spading fork, mix all amendments into the top 8 inches or so of soil. For large areas, use a rotary tiller and make a second pass at right angles to the first.
7. Rake the soil until it is smooth, removing any rocks and breaking up any clods.

More

Soil tends to return to its original pH. You'll save work down the road by confining your pH changes to small areas. Better yet, choose plants that tolerate the existing pH in your yard.

Safety

Soil sulfur can be caustic. Wear rubber gloves when applying it, and follow the directions on the label.

Related Topics

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Testing the Soil

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"soil_types")']bitmaps.bmp} Soil Types

Tools

shovel
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rotary tiller
spade
spading fork
wheelbarrow

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Buying Plants

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{ewr MVBMP2, ViewerBmp2, illustnsbuying.bmp} The Designer and the Materials List within it can help you calculate the quantity of trees, shrubs, or ground cover to buy. Several weeks before planting, print out a shopping list and take it to your nursery. You'll see plants there in any of several forms, including: **bare root**, **balled and burlapped**, or containerized. Your choice depends on the kind of plant, its size and the time of year.

Better nurseries can special-order any plants that aren't in stock. Try to pick up your plants or have them delivered just before planting time, so they will be in top condition.

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Design Tip

The Materials List estimates prices for plants, but you'll want to replace these with actual quotes from a nursery--plant prices vary widely. For hedges, vines, and ground covers, the Designer assumes a standard spacing that may not be appropriate for every plant. Check with your nursery about how far apart to place your plants, and thus exactly how many you'll need.

Tip from the Pros

Refer to your plants by their **scientific names**. **Common names** may cause confusion, since they aren't the same everywhere and may refer to more than one plant.

Money-Saving Tip

Buy plants in smaller sizes, such as 1-gallon rather than 5-gallon. They will catch up in size in a year or two. If you're working with a landscape architect or designer, see if you can accompany them to a wholesale nursery. You could save as much as 50 percent.

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Laying Out Planting Areas

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When you've finished your landscape in the Designer, print it out and take it to your yard. You'll need it to mark the areas where trees, shrubs and other plants will go.

First, choose reference points such as fence corners or a gate. Measure from these points to the proposed edges of beds, setting stakes every few feet along the boundary lines. Connect the stakes by laying a garden hose along them, or with string or a line of powdered **gypsum** sprinkled on the ground. You can also use **landscape paint**. If you want plants in straight rows, stake out each row with string and measure off the spacing.

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When you're done, look over your yard from all angles.

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Tools

tape measure
stakes
string, **gypsum**, or garden hose

Related topics

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Where To Put It

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"how_big_to_make_it")']bitmaps.bmp} How Big To Make It

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Clearing the Area

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Rough Grading

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"planting_trees_and_shrubs")']bitmaps.bmp} Planting Trees and Shrubs

Tip from the Pros

For ground covers and other mass plantings, stagger the rows of plants for more even coverage.

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Planting Trees and Shrubs

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Spring or fall is the best time to set new container plants into the ground. Starting from a fence corner or other reference point, measure off the planting distances indicated in your plan. Set each container in position, then adjust placement if it looks ungainly. Use tall stakes to represent plants you'll be adding later.

Your new plantings may look sparse, but resist the urge to move plants closer together. Have patience. They will eventually fill in.

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Tip From the Pros

For a natural-looking hedge, space shrubs so they will barely touch at maturity. For a hedge that will be clipped, plant them closer together.

More

Even drought-tolerant plants need water while they are becoming established and their roots are growing into the surrounding soil. Water them through the first season's dry spell.

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Step by Step: Planting Trees and Shrubs

1. Dig a hole for each plant. Make it twice as wide as the rootball. (If planting trees or shrubs, dig the hole extra wide to help the plant's roots grow.) To prevent settling later, leave a platform in the middle of the hole that is only as deep as the rootball. Then dig 2 to 3 inches deeper all around the platform to make space for the roots.
2. Tap sharply on the sides and bottom of the container to loosen the rootball. Turn smaller containers upside down and slide the plant out, supporting the top of the rootball with your hand. For a larger container, lay it on its side and slide the plant out. You may need a helper.
3. Gently loosen the roots with your fingers. Cut off roots that are too tightly coiled.
4. Set the plant on the mound and spread out its roots. (For **balled and burlapped** plants, untie the burlap and spread it out in the hole to decompose. Also spread out the roots.)
5. Backfill the hole with soil, firming around the roots with your hands. Soil around the **root crown** should be 1 inch above surrounding soil.

Related Topics
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Buying Plants

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Planting a Lawn

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When putting in a lawn, you've got several ways to go: seeds, **sod**, **plugs**, or **sprigs**. Seeding is the least expensive method but it takes work and time. A sod lawn, while expensive, looks great immediately and is ready to walk on in about 2 weeks. Sprigs or plugs are both less expensive than sod, but you use them mainly to plant **warm-season grasses**. They send out horizontal runners that fill the lawn in 9-12 weeks.

Before planting any type of lawn, prepare the soil. For instructions, click on "Step by Step" below.

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"planting_plugs")']bitmaps.bmp} Planting Plugs

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Step by Step: Planting a Lawn

1. Install edgings, if desired.
2. Install an in-ground **sprinkler system**, if desired.
3. Work **soil amendments** such as compost and fertilizer into the top 8 inches of soil, or make several passes with a rotary tiller. Take care not to disturb any pipes or utilities below.
4. With a rake, level the low and high spots and remove any rocks or debris. If you'll be laying sod, allow for its depth by raking the soil an inch lower than adjoining sidewalks, driveways, or edgings.
5. Use a half-filled **roller** to firm the soil, then water to further settle it. The finished grade should be 1/2 inch lower than adjacent edgings or pavement--1 inch lower if you're planting sod.

Tools and Materials

metal rake
shovel
rotary tiller
roller

Related Topics

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Clearing the Area

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Local Conditions

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Testing the Soil

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Rough Grading

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Planting a Lawn - **Laying Sod**

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Sod is a carpet of grass you unroll to create an instant lawn. You can lay sod in any month when the ground isn't frozen. To purchase it, look under "Sod" in your Yellow Pages.

Use the Designer to calculate the area of the lawn. Order enough sod to cover it, plus about 10% extra to allow for fitting. Sod deteriorates quickly if it sits around, so arrange to pick it up or have it delivered on the day you intend to lay it. Also plan to have help--sod rolls are heavy.

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Tools and Materials
roller
turf edger
fertilizer

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Step by Step: Laying Sod

1. Prepare the soil. If it is sticky wet, let it dry out.
2. Lay the first strip along a straight edge, such as a sidewalk. If your lawn shape is irregular, mark a line down the middle and lay sod along it.
3. Unroll the next strip tightly against the first, staggering the ends of each strip as if you were laying bricks. Place the edges tightly together, but don't overlap them.
4. Use a **turf edger** or a heavy knife to cut sod to fit around curved edges or trees.
5. After laying all the sod, roll it with a half-filled **roller** to firmly connect its roots with the soil.
6. Water until moisture has penetrated the top 6 to 8 inches of soil. (Dig a narrow hole to test.) Water heavily for one to two weeks, then keep the soil lightly damp for a few weeks more.
7. Keep heavy traffic off of the lawn for the first five to six weeks, while the roots become established.

Tip from the Pros

On slopes, start at the bottom and lay sod across the grade. You may need to stake it in place.

Related Topics

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Clearing the Area

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Local Conditions

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Planting a Lawn - **Seeds**

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Though it takes more time than laying sod, starting your lawn from seed is economical. It also offers you a wider selection of grasses. Buy top-quality seed from a reliable source to be sure it will germinate evenly and is weed and disease free. Places that sell grass seed sometimes lend rollers and other planting equipment free.

The amount of seed you need varies with the type of grass--check the label to be sure you're buying enough.

Sow seeds by hand or use a **spreader**, *upper left*. Lightly rake the seeds to bury them, *lower right*. For more instructions, click on Step by Step, *below*.

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Tip from the Pros

Sow **cool-season grasses** in fall, at least six weeks before your first expected heavy frost. You can also sow them in spring, but an early heat wave may harm the seedlings.

Tools and Materials

metal rake
shovel
hose-end nozzle with a mist setting
grass seed
mulch of **sphagnum peat moss** or aged sawdust
spreader (optional)
roller
peat moss spreader, also called a squirrel cage (optional)

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Step by Step: Seeding a Lawn

1. If the soil is sticky wet, let it dry out.
2. Divide the seed into two equal lots.
3. Sow the first seed lot evenly across the lawn, either by hand or with a **spreader**.
4. Sow the second seed lot at right angles to the first.
5. Lightly rake the entire area to bury the seeds 1/8 to 1/4 inch deep.
6. With a shovel or **peat moss spreader,** evenly spread a 1/4-inch layer of damp sphagnum peat moss or aged sawdust over the area. This mulch helps keep the soil moist around the seeds.
7. Go over the area with a half-filled **roller** to settle the soil and mulch.
8. Keep the seedbed moist until the grass germinates -- about 1-3 weeks. Mist the lawn briefly several times a day, using a battery-powered timer if you're not home.

Related Topics

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Clearing the Area

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Testing the Soil

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Planting a Lawn - **Sprigs**

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Often used to plant **warm-season grasses**, these pieces of grass stems and roots (also called **stolons**) spread naturally by horizontal runners. They will fill in your lawn in 9 to 12 weeks.

In spring, order sprigs by mail or from a sod farm. (Local **garden centers** can recommend sources.) In your order, specify the area you need to cover--the Designer can calculate this for you.

When the sprigs arrive, keep them moist and shaded until you plant. For instructions, click on "Step by Step" below.

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Step by Step: Planting Sprigs

1. Prepare the soil and roll the area with a half-filled **roller.**
2. Plant sprigs. The fastest way is to scatter shredded stems over the area like seeds, then cover them lightly with soil. (Specify that you are using this method when ordering.)
3. Roll over sprigs with a half-filled roller.
4. Water at once. Then water daily until the sprigs start growing in about two to three weeks.

Tools
roller

Related Topics
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Clearing the Area
{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"choosing_a_lawn_grass")']bitmaps.bmp} Choosing a Lawn Grass
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Rough Grading

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Planting a Lawn - **Plugs**

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These small pieces of sod are often used to plant **warm-season grasses**, some of which cannot grow from seed. They spread by horizontal runners, filling in the lawn in several months to years, depending on the grass species. Spring is the best time to plant them.

Buy plugs from a mail-order firm or a sod farm. (A **garden center** can recommend sources.) In your order, specify the area you need to cover--the Designer can calculate this for you.

When the material arrives, keep it moist and shaded. Plant it as soon as possible. For instructions, click on the "Step by Step" below.

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Tools
roller
steel plugger, or **plug auger**

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Step by Step: Planting Plugs

1. Prepare the soil and roll the area with a half-filled **roller**.
2. Make planting holes with a shovel, **steel plugger**, or **plug auger**. Space the holes in a checkerboard pattern. Make them 6 inches apart for centipedegrass and zoysiagrass, 12 inches for St. Augustine grass and hybrid Bermudagrass.
3. If the seller of the plugs recommends it, place a small amount of **plug-starter fertilizer** in each hole.
4. Plant the plugs firmly. Make them level with the surrounding soil.
5. Roll the area with a half-filled roller.
6. Water immediately. Then water daily until the plugs begin to grow and spread, about 2-3 weeks.

Related Topics

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Clearing the Area

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Rental Tools

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Tool rental stores can seem intimidating, especially when you don't know the names of the tools, or how to use them. Yet rental stores provide access to tools you'll need for many projects around your yard. Read this primer to learn the important ins and outs.

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Ins and Outs of Renting Tools

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Rental centers carry an array of specialty tools you can rent by the hour, half day, full day or week. Here you'll find expensive, industrial-strength tools that make projects easier and safer. Yet many do-it-yourselfers find rental centers much more intimidating than, say, the car rental counter at the airport. Here's a brief explanation of how they work:

Rental yards require a cash or credit card deposit plus the rental fee for the tool. The clock starts ticking when you leave the rental center, so it pays to have a game plan for your work back home. Reserve the tool for the time you want it and order any accessories that you'll need.

If you have problems using a rental tool, don't assume it's your fault. The tool could be broken. Try to get instructions from the rental yard over the phone before you take it back.

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More

The tools at rental yards take a beating from constant use -- and misuse. If the tool you're offered looks too worn or broken, ask if they have another. Look for sharp cutting tips on saws and drills.

Scout a rental center to see the selection of tools first. Don't be shy about asking questions -- the clerks have heard them all.

Safety

Remember to include related safety gear like respirators, ear protectors and safety goggles.

Read the operating instructions before you work with any piece of equipment. Follow all safety precautions.

Beware of the potential for electric shock when using electric power tools. Make sure the power supply is adequate and that all equipment is grounded.

Focus on the task at hand. Do not allow yourself to be distracted. Get a sure footing and good grip on the tool or machine.

Make all adjustments before turning the power on.

Always wear safety goggles with cutting machines.

Never feed material faster than the machine can accept it.

Most blades take time to stop rotating after the power is shut off. Be sure to wait until all movement is stopped before moving the machine.

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Chain Saw

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A precision cutting tool? Hardly. When you need to cut through heavy brush and clear trees, however, chain saws have no equal. The motor, either gas or electric, drives a chain studded with cutting teeth around a fixed bar.

Use a gasoline-powered chain saw for cutting trees or large branches, and for any job far from electricity. Typically, it comes in 14-inch, 20-inch and 28-inch bar lengths. Electric-powered chain saws are generally smaller

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and less powerful, but are perfect for cutting timbers and posts.

Look for broken or dull teeth. You shouldn't have to sharpen the chain if you only use it a few hours. Make sure you fully understand how to operate the tool safely. The yard will tell you what kind of gas and oil to have on hand for a gas model. You'll need ear and eye protection.

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Pole Pruner and Saw

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Why climb to prune when you can reach high branches with a pole pruner? The extension handle reaches from 12 to 18 feet on common models. Clip branches up to about 1 1/2 inches in diameter with the pruner. Grab the branch with the pruning hook and pull on the rope to cut. For larger branches, use the small, detachable saw.

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Tips from the Pros

Detach the saw and prune as much as you can without it. It's easier to maneuver the pruner this way.

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Chipper/Shredder

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Here's a great way to recycle your yard debris. A shredder will make mulch out of leaves and small branches. Larger gasoline-powered chippers turn branches into coarse chips, suitable for casual paths or weed control. You feed the branches into the bin. There they get chewed up by the blades at the bottom and are then spewed out through the blower. Beware. Don't underestimate the power of the blades pulling the branches through. Wear goggles and ear protection at all times.

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Stump Grinder

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A gas-powered stump grinder makes short work of unsightly tree stumps. The engine powers a cutting wheel located at the end of a mechanical arm. You lower the wheel over a stump (cut to a few inches above grade) and the wheel chops and spits out bark chips. It's a brute of a machine because it's heavy, noisy and makes a mess.

Ask the staff at the rental center to show you how to operate the beast. You'll need a trailer hitch to tow it home. If you don't have a hitch, you may be able to rent that, too.

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Safety

Don't leave the rental store without safety glasses, a hard hat and ear protection.

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Come-Along

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This is a ratchet and pulley mechanism that can make some of the most grueling grunt work a piece of cake. Fix the come-along to something you know won't budge, like a tree trunk or heavy-duty bumper hitch. Then connect the thing you've got to move to the other end with ropes or chains and start cranking. Be sure that your connections are secure and sufficient to withstand the forces you're going to generate.

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Trencher

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This tool can do the work of a carload of adolescents and doesn't need loud music to work by. It's great for laying drainage pipe or utility services. The machine works like an oversized chain saw. The chain digs into the ground while the auger turns and shunts the loosened dirt off to the side. One pass will dig a 4-inch-wide by 2-foot-deep trench.

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Soil Compacting Tools

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Loose, uncompacted or back-filled soil must be compacted to form a stable base for structures. If you build over uncompacted soil, your masonry work will likely crack and a whole structure may tilt.

These tools all use vibration, and their own great weight to perform essentially the same task. The following topics will help you choose the right machine for your work.

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Soil Compacting - **Vibratory Rammer**

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Use this to compact fill soil in trenches and before masonry work. Powered by a gasoline engine, it literally jumps along, so you only have to guide it as it goes. Its small rectangular shoe makes it ideal for tight places like trenches. It's too heavy for one person to lift alone, so be sure to have a wheelbarrow handy to move it to the work.

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Soil Compacting - **Vibratory Plate Compactor**

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A gas-powered soil compaction tool with a steel plate that you guide as you would a lawn mower. Use it to tamp down soil or gravel. To vibrate dry sand or mortar between bricks, be sure to rent one with a plywood or rubber liner below the steel plate. Otherwise, the plate will chip the brick edges.

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Soil Compacting - **Vibratory Roller**

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This gas-powered compactor for large areas has tandem vibrating rollers. Some models are ride-on with a steering wheel; others, you push and steer with brute force.

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Post Hole Auger

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Post hole diggers make neat, cylindrical holes in the soil for fence posts and footings. Hand-operated diggers have parallel wooden handles and a pair of curved blades.

If you need to dig a lot of holes or deep footings below frost line, rent a gas-driven post hole auger, top. The engine is mounted between handles above a large spiral bit. A single person can operate a small auger. It takes two people to run the larger unit.

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Tips from the Pros

Rent two auger sizes so that you can start the hole with the smaller size, and enlarge it to the diameter you need with the larger size.

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Rotary Tiller

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To till soil for your new plantings, it makes sense to rent, rather than own, a rotary tiller. That means you won't have to store or maintain it the rest of the year. A tiller is also the perfect tool to rent with a neighbor because the time spent tilling the soil is often less than the time it takes to pick up and return the machine.

Light-duty 3- to 5-horsepower models, like the one shown here, pack enough muscle to turn over your vegetable garden in spring.The larger 10-hp version is good for major landscape projects like putting in a new lawn.

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Tips From the Pros

Choose a tiller that lets you walk to one side so your footsteps won't compact the soil.

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Peat Moss Spreader

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A wire mesh roller that evenly dispenses a thin layer of peat moss.

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Lawn Tools

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For all but the smallest of lawns, these tools are worth renting to smooth, seed and tamp the soil.

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"landscape_rake")']bitmaps.bmp} Landscape Rake

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"broadcast_spreader_topic")']bitmaps.bmp} Broadcast Spreader

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"soil_roller")']bitmaps.bmp} Soil Roller

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Lawn Tools - **Sod Cutter**

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A gas-powered tool that removes lawn in 12- to 18-inch strips. Cutting depth is adjustable for different grasses.

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Lawn Tools - **Landscape Rake**

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When you're ready to grade loose soil to the finished surface for a lawn or large flower bed, a 3-foot landscape rake makes the job easy. Use the flat back side to move soil and the 3-inch teeth to sift rocks, twigs and clods. A landscape rake helps you work faster and create flatter beds than the smaller garden rake, *top*.

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Lawn Tools - **Broadcast Spreader**

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A rolling or hand-held device that flings seeds over a wide area.

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Lawn Tools - **Soil Roller**

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Fill the drum half full with water to increase its weight, then use the roller to compress newly planted grass seeds or sprigs, or freshly installed rolls of sod. Rollers are also great for preparing the soil base for a lawn.

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Bolt Cutter

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To cut 6- by 6-inch reinforcing mesh for concrete slabs, bolt cutters are the best choice. Hand snips just won't cut it. You can saw through each joint with a hacksaw, but that gets old fast. Three-foot long bolt cutters can also cut 1/2-inch rebar.

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Masonry Tools

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Bricks, block mortar and concrete demand specialized tools, that often have little other utility. There's no need to struggle with substitutes or invest in equipment for a single job. Most of what you'll need is available at your local rental yard.

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"concrete_finishing_tools")']bitmaps.bmp} Finishing Tools

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"guillotine_brick_cutter")']bitmaps.bmp} Guillotine Brick Cutter

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"brick_tongs")']bitmaps.bmp} Brick Tongs

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"rebar_bender_cutter")']bitmaps.bmp} Rebar Bender/Cutter

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Masonry Tools - **Tile Saw**

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If you've got a lot of tile to cut, and want to do it neatly, a motorized tile saw like this is the way to go. Place your tile on the table, then slide the table towards the water-cooled, diamond-abrasive blade. If you only need to cut a few tiles, you can often take your marked tiles to the store where you bought them and use their saw for nothing or a small fee.

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Masonry Tools - **Masonry Saw**

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To cut concrete pavers or bricks, consider renting one of these tub-mounted circular saws. Water from the tub is pumped continuously over the diamond blade to cool it and carry away the grit.

To cut just a few bricks, use a brick set and hand sledge or buy an abrasive masonry blade (about $4.00) for a circular saw.

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Masonry Tools - **Finishing Tools**

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You'll need an assortment of these tools to create a clean, finished look in your concrete work. While the concrete is freshly poured, use the wood float to smooth high spots and fill in little craters. After the sheen has disappeared, use a concrete trowel to make the surface smooth and slick. The jointer is used to create crack control joints in the surface of the concrete. The inside and outside corner tools help you finish corners after the concrete is well set.

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Masonry Tools - **Guillotine Brick Cutter**

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{ewc MVB

This tool quickly cuts bricks and cast concrete pavers. It's not as precise as a tile saw, but it gets the job done. First, you mark the brick where you want the cut. Then place the brick on the platform, below the chisel-like blade, and push the lever down pressing the blades to the brick. This cutter is designed for square cuts and will not easily accommodate bevel cuts. It can shave as little as 1/4 inch off a brick

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Masonry Tools - **Brick Tongs**

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Think of these as an oversized pair of tweezers. Use them to pick up and carry a stack of bricks with one hand. Now your other hand is free to hold onto a ladder, carry other tools or another pair of tongs with bricks. Tongs can help you save trips and extra handling as you move bricks about your yard. Keep your bricks neatly stacked to save time. For smaller jobs, use a wheelbarrow, hand truck or buckets.

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Masonry Tools - **Rebar Bender/Cutter**

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The 5-foot handle on this cutter makes quick work of cutting through **rebar**. It also has a built-in bender. With the handle up, lay the rebar between three heavy-duty pins on the bender's head, then push down the handle to bend the rebar. You can bend to any angle up to 90 degrees.

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For outdoor construction, the stuff your dreams are made of must withstand freezing temperatures, rain and snow and the rays of the sun. This chapter will help guide you to high-quality materials that are suited to your budget and taste and can stand the test of time.

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Choosing good lumber is a bit like buying meat. Just as beef is sold as steak or hamburger, lumber pieces are graded by quality and cut into different sizes. And just as you need to know what kind of meat to get for a recipe, when you go to the lumberyard you'll need to know what kind and amount of lumber will match your plans, taste and budget. Here's what to consider:

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Lumber - **Designing with Natural Wood**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Born from the forest, it's no wonder that wood bridges landscape and hardscape--especially in informal yards and cottage gardens. For structures like fences, wood is the most popular choice due to its low cost, light weight and workability with common tools.

Unlike inorganic materials, though, wood suffers from exposure to sun, rain, and insects. Watch for decay, warping or splitting during its 15- 20- year life-span, and replace boards as needed. Paint wood for a more finished look. Use a clear, ultraviolet-resistant sealer to prolong wood's color, or stain it to highlight the grain and even color between boards.

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Lumber - **Lumber Grades**

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Lumber is classified by its species, strength and appearance. Unfortunately, some species have different grading systems, and the nomenclature of each system may vary by region. In lumber used in landscaping--usually **pressure-treated** pine, spruce and fir--the main difference between grades is appearance. In other words, you'll pay a lot more for clear lumber, or lumber with no knots. Don't pay for a higher grade than you need.

Redwood and cedar usually sell at a premium because of their color and their natural resistance to insect damage and decay. Heartwood, the reddest and most decay-resistant, comes from the center of the tree. Sapwood, from the outer portion of the tree, is lighter in color and has little natural decay resistance.

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Lumber - **Decay-Resistant Lumber**

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The fungi that destroy wood need only air, water, moderate temperatures and not too much sunlight. Whenever wood contains more than 19 percent moisture--enough to make it damp to the touch--the fungi's ever-present spores begin to grow. As the wood dries out, the fungi go dormant. They don't die, though, and the wood starts to decay again when conditions are right.

Wood that touches the ground--like fence posts, raised beds or retaining walls--has to resist decay. Redwood and cedar **heartwood** have natural decay resistance. **Pressure-treated lumber** is less expensive and more available, and in most areas of the country it's the most cost-effective choice. Pressure-treated 2 by 6's can be used as edging, 4 by 4's as fence posts. Landscape timbers, shown at right, are a cut of pressure-treated lumber often used to build retaining walls.

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Safety Tip

Be sure to follow these U.S. Environmental Protection Agency (EPA) precautions if you use pressure-treated lumber.

Where to Use Pressure-Treated Lumber

1. Wood pressure-treated with waterborne arsenical preservatives may be used inside residences as long as all sawdust and construction debris is cleaned up and disposed of after construction.

2. Do not use treated wood for cutting boards, countertops or animal feed containers.

3. Only treated wood that is visibly clean and free of surface residue should be used for patios, decks or walkways.

4. Treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact, such as docks and bridges.

How to Work with Pressure-Treated Lumber

1. Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers in accordance with state and federal regulations.

2. Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

3. When power-sawing and machining, wear goggles to protect eyes from flying particles.

4. After working with the wood and before eating, drinking or using tobacco products, wash exposed areas thoroughly.

5. If preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Tip from the Pros

To prevent fungal growth, keep your siding and trim well painted. Keep trees and shrubs pruned to maintain good ventilation around the house. To repair decayed wood, replace decayed boards with well-primed stock.

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Lumber - How to Order Lumber

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Lumberyards may seem intimidating if you don't know the lingo and customs for ordering wood. Take time to learn them so it will be easier to get what you need.

Lumber is generally priced by the linear foot, although larger quantities may be priced by the board foot. One board foot is 1 square foot of lumber, 1 inch thick.

All milled lumber has a nominal and an actual set of dimensions. For example, a 2 by 4 actually measures 1 1/2 by 3 1/2 inches. The difference used to be the shrinkage and the milling after the log was rough-sawn. Today lumber is milled more precisely, and the smaller dimensions are the standard.

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Nominal and actual lumber dimensions table

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Nominal Size	Actual Size	Nominal Size	Actual Size
1 x 2	3/4 x 1 1/2	4 x 4	3 1/2 x 3 1/2
1 x 4	3/4 x 3 1/2	4 x 6	3 1/2 x 5 1/2
1 x 6	3/4 x 5 1/2	4 x 8	3 1/2 x 7 1/4
1 x 8	3/4x 7 1/4	4 x 10	3 1/2 x 9 1/4
1 x 10	3/4 x 9 1/4	4 x 12	3 1/2 x 11 1/4
1 x 12	3/4 x 11 1/4	6 x 6	5 1/2 x 5 1/2
2 x 2	1 1/2 x 1 1/2	6 x 8	5 1/2 x 7 1/4
2 x 4	1 1/2 x 3 1/2	6 x 10	5 1/2 x 9 1/4
2 x 6	1 1/2 x 5 1/2	6 x 12	5 1/2 x 11 1/4
2 x 8	1 1/2 x 7 1/4		
2 x 10	1 1/2 x 9 1/4		
2 x 12	1 1/2 x 11 1/4		

Tip from the Pros

Always give the quantity first, then specify by thickness, width, length and grade. For example, "three pieces, 1 by 6, 8 feet long, select heart redwood."

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Concrete

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Concrete is a mixture of gravel, sand, **portland cement** and water. It can be mixed in large quantities at a plant and delivered in a mixing truck, or you can mix it yourself on site. The option you choose depends on how much you need, the accessibility of your site, how much help you have and your budget.

Add 10 percent to your calculations to allow for spills and seepage. It is much better to have extra than to come up short.

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Concrete - **Designing with Concrete**

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Outdoor structures rely on concrete for far more than footings. Shape this practical, inexpensive material into curves, use it for high-traffic walkways, or rely on its strength for projects like walls. Avoid large expanses of cold, monotonous concrete. Soften edges with plantings, or trim it with brick or wood. Concrete needn't be a flat, white expanse. You can tint the mix and texture the surface. Plan smoother surfaces for patios, so furniture won't wobble, or coarser textures, such as aggregate or a broomed surface, for casual walkways or stairs, to prevent slipping in the rain. To break up monotony, alternate concrete with other natural materials--gravel or grass.

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Concrete - **Delivered Wet Mix**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} If your project requires a cubic yard or more of concrete, it's best to order a delivery of ready-mixed concrete from a concrete plant. The planning for the delivery should not be undertaken lightly. Once a mixing truck arrives, you have only so much time before the mix becomes too hard to work with. Make sure that all form-building and preparations are complete before the day of the pour and that enough helpers are there ahead of time--ready-mix suppliers charge for waiting time above a minimum.

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More

Consider your yard and any potential problems of access to it: slope, culverts, low wires. Discuss these with the dispatcher when you order. Some trucks come equipped to pump concrete several hundred feet. Be prepared with wheelbarrows and chutes to move concrete quickly.

Order ready-mixed concrete by the cubic yard or fraction thereof. A delivery surcharge on short orders makes ordering 1 or 2 yards quite expensive, since mixing trucks carry up to 9 yards (thus the expression "the whole nine yards"). When you order concrete from a plant, they'll offer the standard **five-sack mix**. You can request that color be added to the mix when you order.

Related Topics
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Concrete - **Site-Mixed Bulk Material**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Site mixing is a good option if your yard is inaccessible, your budget is tight or you just want to avoid the excitement and risks of a large pour. You can mix the concrete in an electric- or gas-driven concrete mixer or in a wheelbarrow. Use the standard **five-sack mix**.

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Concrete - **Ready-Mix in Bags**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} If you need less than a cubic yard, choose dry concrete ready-mix in bags. It's about twice as expensive as bulk **aggregate** and **portland cement**, but it's great for small quantities. All you need to do is add water and mix it. A 90-pound bag of ready-mix makes approximately 2/3 cubic foot of concrete. A 60-pound bag, which is far easier to carry, makes about 1/2 cubic foot. Some suppliers also carry a weaker, less expensive mix for setting fence posts.

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Concrete - **Estimator**

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Buying the right amount of concrete for a project is critical. If you bring home too little, you'll have to rush out while the work is already beginning to **cure**. If you buy too much, it will be hard to dispose of the leftover amount. Concrete is notoriously difficult to store. Portland cement, the binder in concrete, absorbs moisture from the air, which weakens the mix.

This Concrete Estimator provides results in common bag sizes, as well as in cubic yards, cubic feet, and pounds of dry mix.

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Concrete - **Reinforcement**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Concrete, on its own, is prone to cracking. To overcome this, steel reinforcement bar, or rebar, is built into most concrete structures. Steel mesh is frequently substituted for rebar in concrete slabs.

Rebar is made in at least 10 different sizes, but for most projects around the yard, #3 (3/8 inch in diameter) or #4 (1/2 inch in diameter) are appropriate. Rebar is usually sold in 20-foot lengths, but some building suppliers have 10-footers or will cut the bars for easier transport.

Steel mesh welded in a 6-by-6-inch grid is sold in rolls, 5-foot and wider. Some suppliers will sell less than a roll for small projects.

Whether you use rebar or mesh, it's important to use dobies, as shown here, to raise the reinforcement above the gravel base. If you don't, the reinforcement won't be as strong and will rust.

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Concrete Block

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Like other masonry materials, concrete block is manufactured locally, and varies in price and kind from place to place. Three types of block are generally available: standard, interlocking and decorative. All come in assorted colors and shapes for different uses. Blocks are usually priced individually, with price breaks for large quantities.

To determine how many blocks you need, sketch out the project, showing the number of **courses**, how many blocks per course and how the corners will be finished.

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"interlocking_block")']bitmaps.bmp} Interlocking Block

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"decorative_block")']bitmaps.bmp} Decorative Blocks

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Concrete Block - **Standard Block**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Standard block is 8 by 8 by 16 inches, but it's also made in other heights and colors. It comes as stretcher block -- used when only the sides are exposed. Shown here with a standard block are a cap and a half-block, used for corners.

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Concrete Block - **Interlocking Block**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Interlocking block makes construction easier by eliminating the need for mortar. It's designed to be dry-stacked into **battered** retaining walls and still resist lateral loads.

Interlocking block is bigger and considerably more expensive than standard block. It may also be more difficult to find. Check with a masonry materials supplier if your regular building materials retailer doesn't have it..

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Concrete Block - **Decorative Block**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Decorative block includes (from top to bottom) split-face, which resembles cut stone; slump, which resembles handmade adobe; and screen or breeze block, which is open on the sides. Use corner blocks, with a decorative end and face, at the end of a wall.

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Brick

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} There are two main categories of clay brick: face and common. Use face brick where you want a slicker surface and uniform color. Common brick is a favorite for garden paving. Its rough, porous texture reduces glare, provides traction and absorbs and evaporates moisture, which makes for a cool surface underfoot.

Depending on how available they are, used bricks may cost more than new bricks or manufactured used bricks. The weathered, mortar-streaked surfaces of used bricks have an attractive, informal appearance.

Generally, darker, well-burned brick is harder than salmon-colored brick and resists wear better. Some people, however, favor softer brick because it weathers faster.

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Designing with Versatile Brick

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Although brick dimensions vary, most common bricks measure about 2 1/4 by 4 by 8 inches. For economy, use brick pavers (also called face brick or split brick), which run as thin as 1 1/8 inches. However, if you use them for pathways you must set them on a mortar bed for stability.

Tip from the Pros

Have your bricks delivered on a pallet to prevent them from breaking. Order enough bricks to finish the job--it may be difficult to match the color later.

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Brick - Designing with Versatile Brick

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Brick fits many landscape styles due to its small size and range of colors. The running bond and basketweave **patterns** look good in informal landscapes. Dressier patterns, like herringbone, especially with a brick border, complement formal landscapes.

Use brick in almost any landscape structure. It's hardwearing and strong--especially when used as a facing over reinforced concrete. Be sure to specify ASTM C902 rated frost-resistant brick to withstand cracking. Maintenance is minimal. And if a brick cracks, a replacement won't stand out.

The good looks and versatility of brick, however, come with a price. Both the labor and material cost more than concrete or wood for most projects. Unless you choose brick-on-sand, neatly setting bricks in mortar is time-consuming, especially for the novice.

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Stone

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Use stone to give structure and texture to your garden. Stone ranges from cut cobbles to boulders; use it as building material or as accent. Because of its great weight, stone is a highly regional product, and you won't find all kinds in any area. Like wood, it varies in color, workability, availability and cost.

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{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"field_stone")']bitmaps.bmp} Uncut Stone

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"cut_stone")']bitmaps.bmp} Cut Stone

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"flagstone")']bitmaps.bmp} Flagstone

{ewc MVBMP2, ViewerBmp2, [macro=`JI(qchPath,"stone_tiles")']bitmaps.bmp} Tile

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Stone - **Uncut Stone**

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Uncut stone can be river cobbles, boulders or fieldstone. Hand-pick the stones you buy or at least inspect the stock before you order. Look for harmonious color and texture and a variety of sizes. For building garden walls or retaining walls, choose stones so that the largest have no more than six times the surface area of the smallest.

To calculate how much stone you need to build a wall, multiply the wall's height by its width and length. If the stone is sold by volume, increase the volume you calculated for the wall by at least 10 percent to compensate for voids when the rocks are loaded. If the stone is sold by weight, have the dealer convert from volume to weight for that particular size and density.

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Rule of Thumb

Figure approximately 120 pounds of stone per cubic foot. Denser stone, such as granite, weighs as much as 150 pounds per cubic foot.

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Stone - **Cut Stone**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Cut or quarried stone comes in many sizes and shapes. Its uses include edging, stair risers and walls. Ashlar is a kind of quarried stone used for structures such as walls. Small chunks of cut granite are sometimes called cobblestones, but don't confuse them with the round, uncut cobbles collected from riverbeds.

Cut stone is generally priced by the square foot of the face. Buying the right amount of cut stone for a specific project is a bit of a jigsaw puzzle. Decide how many of each size stone you'll need.

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Stone - **Flagstone**

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Flagstone is flat pieces of sandstone or slate, ¼ to 3 inches thick. Thinner cuts cost less per square foot of paving, but they must be laid in a bed of mortar over a stable surface, such as a concrete slab.

Flagstone 1 ¼ inches thick covers about 150 square feet per ton. When you lay flagstone on a bed of sand, buy stone 1 ¼ to 2 inches thick and expect 1 ton to cover 125 square feet. When you lay flagstone over soil, buy flagstone at least 2 inches thick and expect 1 ton to cover 80 square feet.

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Stone - Tile

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At the high end of the market, you'll find cut stone tiles in regular shapes and sizes like the sandstone, bluestone and slate shown here. Stone tiles are typically installed with mortar over a slab or attached with thinset adhesive to walls.

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Gravel

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Different kinds of gravel have specific uses. Use **aggregate** for mixing concrete. Use road base, an engineered mix of sharp-edged gravel that compacts better than smooth, uniformly sized rock, for patio bases. Many kinds of gravel, including pea gravel, are available for use as decorative **mulch**, path rock and **exposed aggregate**.

Gravel size is determined by the size of the mesh through which it was screened. Gravel is sold in bulk by the ton, the cubic yard or portions thereof. A cubic yard weighs about 3,000 pounds. A ton is about 0.7 cubic yard or 18 cubic feet. If you are buying more than a few hundred pounds, use a pickup truck or have your order delivered.

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Designing with Casual Gravel

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Gravel - Designing with Casual Gravel

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Local gravel is inexpensive, easy to lay, and instantly finishes any bare ground. Choose from white, gray, black, pink or beige but, if you select white, beware of glare on sunny days. Use it for pathways, where rounded gravel crunches underfoot and encourages a slower walking pace. Don't use stones larger than 3/4 inch, though, because they're unpleasant to walk on. In an Asian landscape, rake it into eddy-like patterns to simulate water. Or alternate different colored gravel to create pattern in a formal yard.

Gravel requires maintenance. Rake or sweep it to remove leaves and neaten stray stones. Edging and weed control fabric minimize upkeep.

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Sand

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Sand for building and landscaping is sold in bulk by the ton or cubic yard, or portions thereof. One cubic yard weighs about 2,500 pounds and, conversely, a ton is about 0.8 cubic yard in volume. Wet, compacted sand weighs about 20 percent more. If you buy more than a few hundred pounds, you will need a pickup truck or you should have the order delivered. If you need only very small quantities, look for 80-pound bags, which will contain about 2/3 cubic foot.

For concrete and mortar, sand should be clean, sharp-edged and free of impurities such as clay, dust, salt and organic matter.

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Mortar

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Mortar is like a structural glue used to hold brick, stone or concrete block together.

If you are laying anything less than 500 bricks, it makes sense to buy ready-mix mortar, which comes in 75- or 80-pound bags. Otherwise, buy the dry ingredients in bulk. To make mortar, you will need by volume three parts of **portland cement**, one part hydrated lime, and nine parts sand. By this formula, one bag of portland cement yields 3 to 4 cubic feet of mortar. Always thoroughly mix the dry ingredients before you add water.

How much mortar you'll need for brick work depends on the size of your bricks and the joints between them. For example, for one thousand common bricks laid with 1/4-inch joints you'll need approximately 9.5 cubic feet of mortar, while for 3/8-inch joints you'll need 12.5 cubic feet, and for 1/2-inch joints you'll need 15 cubic feet.

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Drainage Pipe

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Retaining walls and foundations usually need to be protected from excessive water buildup in the soil. Use perforated drainpipe to collect soil water, and use solid pipe for runs where you only want to move collected water.

Four-inch rigid drainpipe made of PVC plastic, solid or perforated, is sold in 10-foot lengths. Flexible drainpipe is usually sold in 50-foot rolls, though some suppliers may offer 10-foot pieces. With either kind of pipe, you'll need couplings, elbows and Y and T fittings to assemble your system, as well as adapters for uses like drainage outlets and connecting different sizes of pipe.

Rigid pipe can be snaked out with a sewer auger if it becomes clogged. Flexible pipe eliminates the need for some fittings and is easier to install. Take care not to crush flex while backfilling.

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[TK This doesn't seem to be used --Ethan]Filter Cloth Filter fabric is a polyester felt used to prevent soil from clogging drainage pipe and the surrounding gravel. Filter fabric is sold by the linear foot in 15-foot widths from landscape and masonry suppliers.

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Mulch

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Decorative mulches keep soil moist, slow erosion, insulate soil against rapid temperature changes, and keep weeds down while giving unplanted garden areas an attractive, uniform surface.

Bark and shredded wood, the most common mulch materials, are generally sold in bags of 2 to 3 cubic feet, or in bulk. A cubic yard weighs approximately 400 pounds and covers about 100 square feet of soil with a 3-inch layer.

Gravel is the most common inorganic mulch. River rock, volcanic lava, and marble chips are widely available. Decorative gravel is generally sold in bags of about 50 pounds; bulk quantities will likely cost less.

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Topsoil

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{ewr MVBMP2, ViewerBmp2, bitmaps.bmp} Good topsoil is medium-textured, containing sand, silt and clay in well-balanced proportions. Large clods should break down easily into smaller particles. Screened topsoil is a little more expensive than unscreened, but it's free of roots and debris. Use unscreened topsoil for jobs like filling in a field.

Topsoil is sold in bulk by the cubic yard. Depending on its moisture content, it will weigh 2,200 to 2,400 pounds per yard.

Ask the dealer about the soil's composition, its **pH** and nutrient levels and where it came from. The dealer should let you take a sample for testing. You can change the pH and nutrient levels with fertilizers and soil amendments. Do not, however, buy soil cleared from roadsides; it's likely to be contaminated with salts and heavy metals.

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Tip from the Pros

If your yard is accessible to the delivery truck, ask the driver to spread the load by dumping while driving through your yard.

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Soil Amendments

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Soil amendments are organic materials and minerals added to soil to change its characteristics. They change your soil's **pH** level or improve its ability to hold moisture and air.

These amendments change soil pH: limestone, which makes soil more alkaline, and sulfur and peat moss, which make soil more acidic. These amendments change soil texture: manure, compost, coconut coir, peat moss and wood chips, available in bags and in bulk.

Coconut coir (shown here with limestone) is increasingly used as an organic, environmentally sound substitute for peat moss, which is harvested by strip mining. It retains water better, lasts longer, resists disease and is free of seeds and weeds

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Delivery Checklist

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If you don't own a truck, arrange for delivery. Just about every garden center will deliver. There's usually a fee, but it may be waived for larger purchases. When you compare prices, be sure to add in the delivery charge. Ask what lead time there is on the service and whether the supplier will make deliveries on weekends. Here's what you'll need to think about before the delivery arrives:

1. Have someone receive the order and make sure it is all there.
2. Plan the dump location ahead of time. Delivery to the wrong spot can mean a lot of extra labor to move materials. You wouldn't want a huge load of bricks dropped in front of your garage when your car is parked inside.
3. Be sure that the driver understands where the dump location is and that the truck can get to it. Is the site steep, muddy, rocky? Are there low wires overhead? Some drivers won't cross sidewalks because of concern for liability, so check when you order.
4. Some trucks have dump beds. Some have booms that can lift an entire stack of lumber or pallet of blocks to the ground, so the materials don't have to be unloaded and restacked piece by piece. Again, check when you order.
5. Be prepared to cover and secure the materials when they arrive.

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wythe
A single vertical course of stone, brick or concrete block.

wood float

{ewr MVBMP2, ViewerBmp2, fotos.bmp}Used for the initial finishing of concrete to smooth down high spots and to fill hollows left after **screeding**.

concrete finishing broom

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A push broom with fine, soft bristles. You push it across hardening concrete to add texture for better traction.

heartwood

{ewr MVBMP2, ViewerBmp2, bitmaps.bmp}The darker, denser wood from the center of a tree. Heartwood from redwood and cedar have a natural resistance to decay. The redwood board shown here is made up of both heartwood and sapwood.

top rail sleeve

Sleeve connector that joins two pieces of pipe atop a chain link fence.

battered walls

Retaining walls that lean back against a slope.

pressure-treated lumber
Wood infused with a chemical that is toxic to wood-destroying insects and fungi. Usually pine, spruce, hemlock or fir.

rubber mallet

A mallet with a rubber or plastic head, used to tap stones or masonry into place without chipping them.

cells
The hollow spaces in concrete blocks.

garden rake

Other Names: Bow Rake, Steel Rake

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A foot-wide steel rake with rigid, 3-inch teeth used to groom a smooth layer of soil for planting atop garden beds. Use the teeth of a garden rake to comb through the top layer of soil. This breaks up lumps of soil and culls twigs and rocks. Use the back side of the rake for final smoothing.

masonry waterproofer

A liquid or fabric sealant that prevents water behind a masonry wall from leaching lime out of the mortar and staining the wall white. Buy it at a masonry yard.

concrete grout

A mixture of 3/8-inch pea gravel, sand, cement and water that you pour into the **cells** of concrete-block walls to reinforce them. Buy it in bags or ready-mixed from a concrete supplier.

throwing a line of mortar

Slice a wedge of mortar and scoop it up with your mason's trowel. Raise your arm toward your body, holding the mortar like a piece of pie on a spatula. Then rotate your hand to tip the trowel sideways to deposit the mortar. Draw the trowel back toward you to spread the mortar bed over two to three bricks at one time.

creosote
A tar-based material used to preserve railroad ties.

frost line
The level to which the ground freezes in winter. Varies with the climate.

broom finish

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A fine-bristled push broom is drawn on surface of damp concrete to leave a subtly ridged surface.

rock salt

Rock salt is lightly and evenly broadcast, then troweled into surface. The salt dissolves after the surface is lightly washed and leaves pocks or voids in surface.

pavers
Flat masonry units resembling thick tiles, used for paving.

split-faced blocks

Concrete blocks with a rough-textured outside face created when blocks are cast double and split down the middle. They're available in several colors and textures.

butt hinge

{ewr MVBMP2, ViewerBmp2, illustnshngbutt.bmp}Used on either the inner or outer face of a gate, it has two rectangular leaves with screw holes. A removable metal pin joins the leaves.

T-hinge

{ewr MVBMP2, ViewerBmp2, illustnshngt.bmp}Shaped more or less like a T, this hinge mounts flush on a post with its leg extending to the gate.

strap hinge

{ewr MVBMP2, ViewerBmp2, illustnshngstrp.bmp}A long, slender hinge whose halves extend horizontally from a "knuckle" pin at the center.

gate hinge

{ewr MVBMP2, ViewerBmp2, illustnshnghook.bmp}A hinge consisting of an L-shaped threaded lag screw that attaches to the post and lets the opposite part slip over its short leg. Best for setting into masonry walls.

thumb latch

{ewr MVBMP2, ViewerBmp2, illustnslatthmb.bmp}A decorative latch you open by pressing a short lever with your thumb.

ring latch

{ewr MVBMP2, ViewerBmp2, illustnslatring.bmp}A latch you open by pivoting a ring off the end of a horizontal bar.

vibratory rammer

{ewr MVBMP2, ViewerBmp2, fotos.bmp} Use this to compact fill soil in trenches and before masonry work. Powered by a gasoline engine, it literally jumps along, so you only have to guide it as it goes. Its small rectangular shoe makes it ideal for tight places like trenches. It's too heavy for one person to lift alone, so be sure to have a wheelbarrow handy to move it.

vibratory plate compactor

{ewr MVBMP2, ViewerBmp2, fotos.bmp} A gas-powered soil compaction tool with a steel plate that you guide as you would a lawn mower. Use it to tamp down soil or gravel. To vibrate dry sand or mortar between bricks, be sure to rent one with a plywood or rubber liner below the steel plate. Otherwise, the plate will chip the brick edges.

strike latch

{ewr MVBMP2, ViewerBmp2, illustnslatstrk.bmp}A latch with a fixed horizontal bar that docks in a metal catch. You lift a rocking arm to release it.

slide bolt

{ewr MVBMP2, ViewerBmp2, illustnslatslid.bmp}A bolt that slips into a rectangular or cylindrical strap mounted to a post.

lever latch

{ewr MVBMP2, ViewerBmp2, illustnslatlevr.bmp}A C-shaped bar that runs through a slot in a gate. Rotating one end of the C lifts the other end out of its catch.

loop cap

This slips on top of each line post to let the horizontal top rail pass through.

tension bar

A flat metal bar you weave through each end of the chain-link fabric and connect to the terminal post with wire ties. The bar spreads the tension across the full width of the chain-link fabric when pressure is applied with a come-along winch.

terminal posts

The end posts of a chain-link fence. They're thicker than the line posts between them to help support the tension of the chain-link fabric.

line posts
Thinner posts in the middle of a chain-link fence.

hardboard
Thin fiberboard, such as Masonite.

dobies
Small concrete blocks with embedded tie wire, used to support rebar or metal mesh in concrete work.

fire clay
A kind of clay that withstands high temperatures.

dry well
A gravel-filled vertical pipe or hole where excess water collects and percolates slowly into the ground.

tight-line drain
A solid drain pipe leading to an exit point, usually the street.

Bermuda grass

A fast-spreading lawn grass that can be an invasive weed when it grows among other plantings.

off-grade decks

Decks that stand 30 inches or more off the ground.

sewage sludge
Odorless dried residue of treated city sewage.

post hole auger

{ewr MVBMP2, ViewerBmp2, fotos.bmp} Post hole diggers make neat, cylindrical holes in the soil for fence posts and footings. Hand-operated diggers have parallel wooden handles and a pair of curved blades.

If you need to dig a lot of holes or deep footings below frost line, rent a gas-driven post hole auger, top. The engine is mounted between handles above a large spiral bit. A single person can operate a small auger. It takes two people to run the larger unit.

mushroom compost
Used-up growing medium from a mushroom farm.

organic matter

Decomposed plant or animal matter that supplies nutrients to plants. Good sources include homemade compost, **nitrogen-fortified sawdust**, aged steer manure, **sphagnum peat moss**, and **leaf mold**.

organic

Containing decomposed plant or animal matter. Organic soil is rich in plant nutrients, holds moisture well, and lets in air and water easily.

landscape paint

A nonpermanent spray paint in brilliant colors, sold at hardware and building supply stores.

PVC
Polyvinyl chloride, a kind of plastic.

certified arborist
A trained specialist, often employed by a tree service, who can advise you on the health and hazards of your trees.

survey
An exact mapping of property based on measurements and instrument sightings. There are two kinds of surveys: one that records boundaries and the other that records land contours.

base map

Your primary design in your drawing board where you can make notes to yourself regarding eyesores, wind patterns, etc.

joints
Places where bricks are joined with mortar.

framing square

Also called a carpenter's square or steel square. A large square used for carpentry layout. Some include rafter cutting tables. To cut stairs, a pair of small clamp-on stair gauges can be added.

mason's trowel

{ewr MVBMP2, ViewerBmp2, illustns.bmp}Use one of these trowels to mortar joints between bricks and concrete blocks. You can also use one to finish the joints between units as the mortar cures.

//TK Mason trowel JUMPS TO RELEVANT TOPIC IN TOOLS CHAPTER. HOWEVER, THE ONLY TROWEL MENTIONED THERE IS THE "STEEL TROWEL" IN "CONCRETE FINISHING TOOLS." SAME THING AS THIS, OR SHOULD WE ADD A TOPIC THERE?//

brick chisel

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A wide-bladed chisel that you strike with a hand sledge to cut bricks.

hand sledge

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A small version of a sledgehammer. Headweights vary from 2 to 4 pounds. Used to cut brick, drive concrete-form stakes and demolish masonry.

jointer

{ewr MVBMP2, ViewerBmp2, illustns.bmp}Term used for two kinds of masonry finishing tools. The one shown at right, also called a groover, cuts **control joints** in wet concrete slabs. Another, a slender metal tool with rounded sides, is used to smooth mortared joints between brick and block..

batter gauge

A right triangle made of wood that you make to use with a level to maintain the correct inward slope of a wall. For mortarless walls, the **batter** should be 2 inches for every foot of rise.

batter
The inward slope of the wall from the bottom to the top.

bond stones
Larger rocks used periodically to help hold the wall together.

slumpstone
A masonry unit with rounded edges and corners that give it the weathered appearance of adobe block.

stretcher bonded
A typical brick pattern in which the long sides of the bricks show and **joints** are staggered.

benderboard
Long, thin, flexible wood strips--usually redwood--that are used to form curved edgings.

rebar bender

{ewr MVBMP2, ViewerBmp2, fotos.bmp}The 5-foot handle on this cutter makes quick work of cutting through **rebar**. It also has a built-in bender. With the handle up, lay the rebar between three heavy-duty pins on the bender's head, then push down the handle to bend the rebar. You can bend to any angle up to 90 degrees.

peeler core

The cylindrical remainder of a log that has been turned on a giant lathe to "peel" plywood veneer. Often sold at landscape-supply centers.

edging tool
A steel hand tool that rounds edges of concrete with 1/2-inch radius.

seeded aggregate

A concrete finish in which small pebbles are spread over wet concrete, worked into the top and revealed by washing and sweeping.

corner block
A concrete block with one flush, smooth end.

cap unit

A solid piece measuring 8 by 16 by 4 inches.

stretcher block
A masonry unit laid with its longest dimension parallel to the run of a course.

builder's felt
Commonly called tarpaper, it's most frequently used between courses of wood singles.

ring-shanked nail
A nail with raised edges along its shank--like threads in screw--that make it hard to pull out.

lag screw

A cross between a screw and a bolt, a lag screw is used to hold thicker lumber together. It has a hexagonal head and a thick shank--1/4-, 3/8- and 1/2-inch diameters are common.

concrete cap
A top layer of concrete that adds a finished, decorative look to a pilaster. It also covers the center core of mortar.

form release

A chemical you paint on wood forms to prevent concrete from sticking to them.

stretcher
The long side of a brick.

header
The end of a brick.

setback line
A specified distance from a property line that establishes where structures can be built.

line level
A bubble level that hooks over **mason's line**.
{ewr MVBMP2, ViewerBmp2, fotos.bmp}

stringer
A long piece of wood, usually made from a 2 by 12, that is notched to create the stairway's risers and treads.

ledger

A board nailed, bolted, or screwed to the side of a house, wall, or deck. Stair **stringers** or decking rest on it or attach to it with metal **joist hangers.**

bolt cutter

{ewr MVBMP2, ViewerBmp2, fotos.bmp}To cut 6 by 6-inch reinforcing mesh for concrete slabs, bolt cutters are the best choice. Hand snips just won't cut it. You can saw through each joint with a hacksaw, but that gets old fast. Three-foot-long bolt cutters can also cut 1/2-inch rebar.

joist hangers
Galvanized metal stirrups used to connect joists to other structural members.

landscape timber

Pressure-treated lumber used as a substitute for railroad ties. It's available in several dimensions, typically 6 by 6 and 6 by 8 inches.

tread
The flat part of a step.

riser
The vertical part of a step.

rise
The vertical distance from the bottom to the top of a slope or step.

run
The horizontal distance covered by a slope.

screed
A board drawn across wet concrete or a sand base to level.

mortar bed
Layer of mortar on which masonry sits.

control joint
A groove scored by a **jointer** in wet concrete to control cracking caused by contraction and expansion.

fieldstones

Stones picked from fields. They come in random sizes and may have moss or lichen on exposed surfaces.

flagstones
Hard stones that have been split into thin pieces for paving.

form
The wood framework that molds and supports wet concrete.

expansion joint

A divider made of wood, felt or other material. It allows movement where a concrete slab abuts a house or another concrete slab.

mortar
A mixture of cement, fire clay, sand and water used to lay masonry.

batter board

A long right triangle of wood with its hypotenuse cut at the desired pitch for the stone wall. Used to check the pitch while building.

isosceles triangle
A triangle with two equal sides.

rebar
Short for "reinforcing bar." This steel bar is embedded in concrete and masonry to strengthen it. Sold in 20-foot lengths and in various diameters.

footing

A foundation under a wall, pilaster or stairway that's wider than the structure it supports. It distributes the load over a broader area.

pilaster
A column of concrete or masonry used to reinforce intervening panels and prevent them from tipping.

coping
Top course used as a cap.

gravity-stack concrete modules

Sold at home centers and landscaping-supply centers, these cast-concrete modules don't require special skills or a poured concrete footing. They have many shapes, textures, colors and locking mechanisms, but all stack with an offset so they lean into the soil they retain.

You can build a wall up to 3 feet high without tying back into the hill. Taller walls use a "geo grid"-- a metal or heavy polyethylene matting that pinches between courses and extends back into the hill, where soil is piled onto the grid.

fence-post concrete

A courser mix used primarily for anchoring fence posts. Sold by the bag at home centers.

brick veneer
A layer of thin brick facing that you attach to the main wall.

brick ties

Metal straps added between courses of masonry. They extend outward from one wall into an adjoining wall of brick or veneer to tie two together.

mason's line

Braided or twisted nylon string used to maintain straight courses of masonry. Because the cord is slightly elastic, you can stretch it tight without sagging. Also used for marking off boundaries.

on center
As measured from the center of the post (rather than the distance between sides).

deadman
Lengths of wood that extend behind a retaining wall into the retained slope.

building code

A set of regulations adopted by a local governments that regulate building practices. Codes vary by region and from one city to the next. Each community may adopt its own exceptions to a standard code.

swale
A valleylike passageway for **runoff**.

dry creek bed

A rock-lined artificial creek bed for channeling excess rainwater.

catch basin

A drain for a low or wet spot, with pipe exiting the side and a pit at the bottom to collect sediment.

pressure-treated wood
Lumber that has been chemically treated, usually with inorganic arsenic, to make it rot-resistant.

trencher
{ewr MVBMP2, ViewerBmp2, fotos.bmp}A gas-driven power tool that digs soil trenches.

soil-filter fabric
Rot-resistant synthetic cloth that lets water through but not soil.

drain rock
Clean rock, in graded sizes, that remains uncompacted so that water can pass through.

French drain

A drain filled with gravel that leads surface water away from your house, out of a catch basin or from poorly drained parts of your yard. Its destination is usually the street or a dry well.

perforated pipe
3- or 4-inch diameter plastic pipe used to drain excess water away from structures. May be either rigid or flexible.

landscape fabric

A blanket of coarsely woven jute or more permanent synthetic fabric that helps hold soil on hillsides. Buy the fabric in rolls at landscape supply stores. Pin it in place with the metal pins that come with the fabric. If you like, cut slits in the fabric and plant through them.

soil-holding plants

Plants with fast-growing or tenacious root systems that help control erosion. The Plant Selector in the Designer can suggest these. For more ideas, consult your local **Cooperative Extension** office.

perennial plant
A plant that lives more than two years.

chipper
{ewr MVBMP2, ViewerBmp2, fotos.bmp}A gas-powered machine that chops branches and tree limbs into wood chips.

sod cutter
A tool that cuts a lawn into 12- to 18-inch strips.

pneumatic
Air-driven.

scoop shovel

A lightweight shovel that has a short handle and a wide blade with turned-up edges. Used to move loose material, not for digging.

soil core sampler
A T-shaped tool with a tubular end that extracts a thin column of soil for testing.

tub saw

An abrasive circular saw used to cut brick and concrete block. The tub contains water used to cool the diamond blade and control dust.

common brick

A rough-textured brick favored for most garden paving. It is more porous than the slicker, face brick, and less uniform in size and color.

chalk line

A reel of thin cord enclosed in a housing with powdered chalk. You pull the cord over the line you want to mark, then snap it against the surface to deposit chalk there.

mattock

{ewr MVBMP2, ViewerBmp2, fotos.bmp}A wide-bladed pick used for digging. Available as a combination pick-mattock for digging or axe-mattock for digging and cutting roots.

turf edger

A long-handled tool with a semicircular blade. You step on the tread to trim sod rolls or the edge of an established lawn.

systemic herbicide

A chemical that, when sprayed on plants, kills the entire plant, roots and all. **Glyphosate** is an example.

glyphosate
The active ingredient in Roundup and similar herbicides. Sprayed on plants, it kills them quickly and becomes inactive in about a week.

utility lines

Underground utilities include water and gas pipes, electrical conduits, telephone and TV cables, and septic systems, including **leach lines** and **cleanouts**. If you don't know where these are, call your utility companies or a local plumber.

leach line
A gravel-filled trench that acts as a filter for a septic system.

herbicide
A chemical that kills plants.

dripline
An imaginary line extending from the tree's outermost branches to the ground.

heel in
Cover the roots with moist compost, **organic** matter, or soil.

rootball
A mass of soil held together by roots.

cleanout
An opening that provides access to a main septic tank.

lath
A thin covering made of wood strips that creates partial shade.

cantilevered
With the ends of beams extending unsupported.

cantilevered decks

Hillside decks whose top surface extends beyond the structural support.

splash block

A concrete or plastic block you place under a downspout to shield the soil against rushing water.

annual plant
A plant that sprouts and dies in a single season.

latticework
Panels made of crisscross strips of wood. Sold at home improvement stores.

native-plant society
An organization that promotes the preservation of plants from your area. Native plants tend to resist local climate extremes, as well as pests and diseases.

landscape architects

Licensed in most states, landscape architects can design entire landscapes, consult on design, or render your drawings. Many belong to the American Society of Landscape Architects (ASLA).

landscape designers

Qualifications vary greatly among landscape designers. Some have been trained as landscape architects but haven't taken or passed the licensing tests. Others are mainly horticulturists.

landscape contractors

Landscape contractors are licensed (in most states) to install landscapes. Many work with landscape architects, although some will design landscapes that they install. Most belong to state contractors' associations.

land surveyors

Licensed land surveyors are qualified to survey property lines.

lien waivers

Documents that release you from contractors' claims against your property if you don't pay them. Also get waivers from subcontractors you don't hire directly, since they can hold you responsible if your landscape contractor fails to pay them.

mulch

A soil covering, such as gravel or shredded bark, that slows evaporation and erosion. It insulates soil against rapid temperature changes. It also keeps down weeds.

bed
A plot for flowers or vegetables that you can approach from all sides.

border
A planting area along a walkway, wall, fence, or lawn.

ergonomics
Designing with human factors in mind.

septic system

A home sewage-disposal system consisting of a **septic tank** and a **leach field**.

septic tank

A buried holding tank for household wastewater. A disposal company periodically unearths its hatch to pump it out, so you must keep it accessible.

leach field

A system of buried pipes that allows wastewater from the septic tank to trickle (leach) into the ground, where soil organisms purify it.

drainageways
The areas where **runoff** converges from different slopes.

runoff

Rainwater or snow melt that runs over the ground instead of soaking in. It runs off because the ground is too steep, too hard, or too saturated with water.

hardpan
A layer of hard soil, usually 1-3 feet below the surface, that blocks the downward movement of water.

survey marker
A landmark left by surveyors to locate the end of a property line.

frost depth

The average depth that the soil freezes in winter. It affects how deeply you must set **footings** and foundations, and bury water lines.

water table

A permanent reservoir of water below ground. In some areas, the water table is less than two feet from the surface, a condition that many plants cannot tolerate. A high water table can also cause construction problems.

structural engineer
An engineer who designs structures to carry loads and withstand forces such as wind or earthquakes.

soils engineer
An engineer who evaluates the suitability of soil for building, terracing, drainage, and other uses.

prevailing winds

Winds that generally blow from the same direction. The direction may change with the season--for example, southwest in summer and northwest in winter.

plat map
A legal document that shows the boundaries and **easements** of your property, as determined by **survey**.

survey
An exact mapping of property based on measurements and instrument sightings.

easement
A portion of your property another party may use for utilities, maintenance of nearby roads, or access to nearby property.

licensed surveyor

A contractor who maps property lines and features with instruments to produce a legally binding **survey**.

10-10-10 fertilizer

A fertilizer containing 10% each of nitrogen, phosphorous, and potassium--the three basic plant nutrients. Look for "10-10-10" on the package.

limestone

A sedimentary rock containing mainly calcium carbonate ($CaCO_3$).
Powder, pellets, or granules are added to raise the pH of acid soil

plugs
Small pieces of sod.

sprigs
Pieces of grass stem and root, also called **stolons**.

sulfur
A chemical element, used in powdered or granular form to lower the pH of alkaline soil.

an equivalent

Alternative materials for changing pH include dolomitic limestone, hydrated lime, and ground seashells to raise pH, or ferrous sulfate, lime-sulfur solution, and ammonium sulfate fertilizers to lower pH. Product labels usually give a calcium carbonate or sulfur equivalency number, which you can enter at the right to determine how much to use.

amendment
A material you mix with garden soil to improve it.

nitrogen-fortified sawdust

Sawdust to which high-nitrogen fertilizer has been added. The fertilizer replaces nitrogen used by soil microbes while decomposing the sawdust. Buy it or make your own by adding 2-3 pounds of high-nitrogen fertilizer (per 100 square feet) to each 1-inch thickness of fresh sawdust.

sphagnum peat moss

Milled, decomposed plant debris from swamps and bogs. Keeps the soil acid and helps it hold water but does not supply plant nutrients. Moisten before using it or it will steal water away from plants.

leaf mold

Shredded and decomposed leaves that lighten soil texture and add plant nutrients. Hard to find commercially, but you can make your own by mowing over fallen leaves and **composting** them.

composting
Letting garden and kitchen waste decay into an odorless brown soil amendment. Buy composting containers or build your own from wood or chicken wire.

gypsum
Powdered or pelleted calcium sulfate used to mark boundaries. Also used to neutralize salt in high-sodium soil or loosen heavy clay soil.

pH

A measure of acidity or alkalinity, on a scale of 0 (highly acid) to 14 (highly alkaline). Soil pH affects how well plants absorb nutrients. At the wrong pH, nutrients may be there but plants can't use them. Most plants do best within a pH range of 5.5 and 7.5; for many a pH of 6.5 is ideal.

bare-root

Many **deciduous** shade and fruit trees, roses, and flowering shrubs are sold with the soil washed away from their roots to reduce shipping costs. Bare-root plants are available only during the dormant season--late winter and early spring--and must be planted before their leaves begin to grow again. They cost about half as much as container plants, yet they take root and grow just as quickly. The organic packing material around the roots should feel slightly damp and the roots should look fresh -- not dry or withered.

deciduous
A plant that loses its leaves in winter.

balled and burlapped

These shrubs and trees are sold with a ball of soil around their roots, held in place with a wrapping of burlap or other strong material. Usually available during the cooler months, balled-and-burlapped ("B-and-B") plants include many conifers, rhododendrons, and azaleas, as well as some deciduous plants. Unlike container plants, these are never rootbound.

container sizes

Many landscape plants are sold in containers, typically 1-, 5- or 15-gallon cans. Large trees can come boxed in wood containers measuring 2-6 feet on a side. Choose plants that look healthy and vigorous, not spindly or misshapen. Avoid **rootbound** plants.

rootbound

With crowded roots that grow above the soil in a container, through its drainage holes, or circling inside.

scientific name

A plant's official Latin or Greek name, recognized by gardeners and scientists around the world. For example, *Ipomoea tricolor* `Heavenly Blue' is the `Heavenly Blue' **cultivar** of morning glory.

cultivar
A plant variety developed by breeders rather than found in the wild.

common name
A descriptive name, often colorful, that gardeners use informally; for example, "Morning Glory."

garden centers
Stores that sell both plants and gardening supplies.

Cooperative Extension

The U.S. Department of Agriculture sponsors Cooperative Extension offices in every state to offer practical information for homeowners and farmers. Some offices will test soil for you. Many offer free or inexpensive publications. Find the nearest Cooperative Extension in the Tollfree Numbers Survival Guide under "Agencies."

specimen
A plant whose striking size, shape, or color makes it eye-catching.

fastigiate
With vertical instead of spreading branches.

shear
Trim to a smooth shape with **hedge shears**.

hedge shears
Large, scissorlike garden clippers.

alkaline
The opposite of acid; having a **pH** greater than 7.

cold hardy
Able to withstand the lowest winter temperatures likely to occur.

USDA
United States Department of Agriculture

microclimates
Local climate variations caused by elevation, sun and wind exposure, and nearby buildings and plants.

xeriscaping
Landscaping with water conservation in mind.

moisture sensor
A device that senses when soil moisture is low and turns on your watering system

full sun

At least 4-5 hours of direct sun a day, occurring between midday and late afternoon.

part sun

At least 2-3 hours of direct sun a day, mostly in the morning.

shade

Less than 1 hour of direct morning sun a day, or at least 2-3 hours of filtered sun a day.

deep shade
No direct or filtered sun.

high
Needs watering at least twice weekly.

medium

Needs weekly watering.

low
Needs watering every 2-4 weeks.

drought tolerant

Needs watering monthly (or less often) until established, then little extra watering. In arid regions, no extra watering at all.

clay
Sticky, heavy soil made of small particles. Clay holds water but excludes air, which is needed by plant roots.

sand
Gritty, fast-draining soil made up of large particles.

loam
Soil of medium texture; easiest to work.

rhizomes

Horizontal stems that grow underground to spread to new areas.

stolons
Horizontal stems that spread above ground.

sod
Carpetlike sections of ready-grown lawn with soil attached.

mixture
Seed or sod composed of more than one kind of grass, such as Kentucky bluegrass, fine fescue, and perennial ryegrass.

blend

Seed or sod composed of several **cultivars** of a single species; for example, wear-tolerant, disease-resistant, and shade-tolerant cultivars of Kentucky bluegrass.

cultivars
Plant varieties developed by breeders rather than found in the wild.

sprinkler system

An underground network of plastic pipes that deliver water through sprinkler heads around the yard. Timers or **moisture sensors** turn the water on and off.

roller

A metal or plastic drum you fill with water and roll over the lawn to tamp down soil or newly planted grass.

cool-season grasses
Grasses, such as Kentucky bluegrass, which grow best in spring and fall but stay green in summer if watered. They grow best in northern climates.

warm-season grasses
Grasses, such as Bermuda grass, which thrive in hot summers and go dormant and brown in winter. They grow best in southern climates.

broadcast spreader
A rolling or hand-held device that flings seeds over a wide area.

peat moss spreader

{ewr MVBMP2, ViewerBmp2, fotos.bmp}

A special roller that dispenses peat moss in an even, thin layer.

steel plugger

A metal tool with a T-shaped shank and a short, hollow blade. You push it into the soil to extract cores of soil that you replace with grass plugs.

plug auger
A bit that attaches to an electric drill to bore properly sized holes for plugs.

plug-starter fertilizer
Specially formulated fertilizer that helps plugs start growing quickly.
Sold by plug suppliers.

fertilizer
A substance that supplies nutrients to soil in percentages of nitrogen, phosphates, and potassium.

covenants
Restrictions on how you can use or modify your property, intended to preserve the character of the community.

root crown
Where the roots join the base of the stem.

spreader
A device that drops or flings seeds evenly over a large area. Also used to apply fertilizer.

curing

A chemical reaction in cement-based materials. The longer these materials stay damp, the stronger they get. Curing is not the same as drying, which implies evaporation.

concrete trowel
A tool used after the sheen has disappeared from the surface of the concrete to make a smooth, slick surface.

Chapter 8

portland cement

A mixture of baked and pulverized silica, lime, iron, alumina and gypsum that reacts chemically with water. Its British inventor named it "portland" because the color of the concrete made from it matched that of limestone quarried on the Isle of Portland in the English Channel.

course
A continuous level of masonry in a wall.

five-sack mix

Concrete mixes vary in strength depending on how many sacks of cement are added per cubic yard of finished mix. The five-sack mix is good for patios, walks and other structures that don't require special engineering. Five 94-pound bags of **portland cement**, 1 1/2 tons of **aggregate** and 25 to 30 gallons of water make 1 cubic yard of concrete. (Portland cement is also available in 47-pound bags from some retailers. If aggregate isn't available, you'll need about 17 cubic feet of sand and 19 cubic feet of gravel.) Varying the mix without engineering specifications will likely yield weaker concrete.

aggregate
Sand and gravel blended for concrete. Also, gravel used in **exposed-aggregate** finishes.

exposed aggregate
{ewr MVBMP2, ViewerBmp2, bitmaps.bmp}A decorative concrete finish in which gravel is seeded over the surface of wet concrete.

throw

The watering radius of a sprinkler head. On most heads, throw is adjustable. All sprinkler heads have specifications for maximum throw and the range of adjustability.

circuit.
A group of sprinkler heads connected to a single control valve. Only one circuit of a sprinkler system operates at a time.

pipe

PVC (Polyvinyl chloride) pipe is the most common choice for do-it-yourself sprinkler systems in non-freezing areas. Use ¾-in. pipe for a flow of up to 4 gal/min, ½-in. for up to 8 gal/min, and 1-in. for up to 12 gal/min. Connect lengths with PVC cement and fittings.

Polyethylene pipe is a highly flexible alternative to PVC, and is favored in cold weather regions. Connect lengths with clamps and fittings. Never use polyethylene pipe as a pressure-bearing feeder line from a service line to a **valve manifold**.

valves

Control valves turn the flow of water to individual sprinkler circuits off and on. They are designed for manual and/or electronic operation.

Antisiphon valves are control valves that prevent potentially contaminated sprinkler system water from siphoning back into the municipal water supply. Antisiphon valves must be set higher than the highest head in the system to be effective.

Backflow prevention valves also protect against contamination of the water supply, but a single unit installed downstream of the main sprinkler system shut-off valve protects the entire system, and eliminates the need for antisiphon valves. Backflow prevention valves are often required by local plumbing codes.

accessories

Timers are the brain of any sprinkler control system. Programmable electronic timers control the frequency and duration of each circuit's operation.

If you want to take automation a step further and save water, there are rain gauges and moisture sensors to detect rainfall or the presence of sufficient moisture in the ground.

Easy-to-install low-voltage wires connect the control system to the sprinkler valves.

valve manifold.
A group of control valves.

heads

There are three basic types of sprinkler heads: *Single-stream heads* generate the longest throw and are best for large lawns. *Spray or multiple-stream heads* are for small lawns and shrubs. *Bubblers* let water run directly into the ground. Use them for flower beds.

All three types are available in pop-up models (so you can mow above them). To water shrub tops, mount sprayers and single-stream heads on risers, a vertical pipe that raises the head. The throw and arc of most heads is adjustable.

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Sonia Caracuta is so cool!

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annual plant
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bare-root
base map
batter
batter board
batter gauge
battered walls
bed
benderboard
Bermuda grass
blend
bolt cutter
bond stones
border
brickchisel
brick ties
brick veneer
broadcast spreader
broom finish
builder's felt
building code
butt hinge
cantilevered
cantilevered decks
cap unit
catch basin
cells
certified arborist
chalk line
chipper
clay
cleanout
cold hardy
common brick
common name
composting
concrete cap
concrete finishing broom
concrete grout
concrete trowel

container sizes
control joint
cool-season grasses
Cooperative Extension
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corner block
covenants
creosote
cultivar
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dry creek bed
dry well
easement
edging tool
ergonomics
expansion joint
fastigiate
fence-post concrete
fertilizer
fieldstones
fire clay
flagstones
footing
form
form release
framing square
French drain
frost depth
frost line
full sun
garden centers
garden rake
gate hinge
glyphosate
gravity-stack concrete modules
gypsum
hand sledge

hardboard
hardpan
header
heartwood
hedge shears
heel in
herbicide
isosceles triangle
jointer
joints
joist hangers
lag screw
land surveyors
landscape architects
landscape contractors
landscape designers
landscape fabric
landscape paint
landscape timber
lath
latticework
leach field
leach line
leaf mold
ledger
lever latch
licensed surveyor
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limestone
line level
line posts
loam
loop cap
mason's line
mason's trowel
masonry waterproofer
mattock
microclimates
mixture
moisture sensor
mortar
mortar bed
mulch
mushroom compost
native-plant society
nitrogen-fortified sawdust

off-grade decks
on center
organic
organic matter
part sun
pavers
peat moss spreader
peeler core
perennial plant
perforated pipe
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pilaster
plat map
plug auger
plug-starter fertilizer
plugs
pneumatic
post hole auger
pressure-treated lumber
prevailing winds
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rebar
rebar bender
rhizomes
ring latch
ring-shanked nail
rise
riser
rock salt
roller
root crown
rootball
rootbound
rubber mallet
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runoff
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scoop shovel
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septic system
septic tank
setback line
sewage sludge
shade

shear
slide bolt
slumpstone
sod
sod cutter
soil core sampler
soil-filter fabric
soil-holding plants
soils engineer
specimen
sphagnum peat moss
splash block
split-faced blocks
spreader
sprigs
sprinkler system
steel plugger
stolons
strap hinge
stretcher
stretcher block
stretcher bonded
strike latch
stringer
structural engineer
sulfur
survey
survey marker
swale
systemic herbicide
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tension bar
terminal posts
throwing a line of mortar
thumb latch
tight-line drain
top rail sleeve
tread
trencher
tub saw
turf edger
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A Small City Yard
Photographer: 1994, Saxon Holt
Landscape design: Konrad Gauder, Land Sculpture of Berkeley, CA
Landscape architecture and construction: Denise Snaer-Gauder

A Formal Landscape
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(800) 554-2218

Underground Sprinkler Systems
Toro Irrigation Systems

Choosing Drip Irrigation
Courtesy of NIBCO Irrigation Systems

Sprinklers - A Parts Primer
Photographer: Steve Snow
The Toro Company, 5825 Jasmine Street
P.O. Box 489
Riverside, CA 92502-0489

Building Projects

Retaining Walls
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Patios
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Raised Beds
Landscape Architects: Jeff Stone Associates

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Local Conditions
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Local Conditions - Light Levels
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Local Conditions - Soil Types
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Planting a Lawn
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Rental Tools

Soil Compacting - Vibratory Rammer
Wacker Corporation
Menomonee Falls, WI
(414) 255-0500

Lawn Tools - Sod Cutter
Ransomes-Cushman-Ryan
(800) 228-4444

Masonry Tools - Masonry Saw
Stanley - Goldblatt
New Britain, CT

Masonry Tools - Concrete Finishing Tools
Stanley - Goldblatt
New Britain, CT

Materials

Lumber: Designing with Wood
Courtesy of Backen Arrigoni & Ross, Inc.

Lumber: Lumber Grades

Courtesy of the Southern Pine Council

Concrete: Designing with Concrete
Top left, Photographer: Mark Burns
Others: courtesy of Portland Cement Association, Skokie, IL

Concrete: Delivered Wet Mix
Courtesy of Portland Cement Association, Skokie, IL

Concrete Block
Courtesy of Handy-Stone Corporation, North St. Paul, MN, (612) 770-8818

Brick: Designing with Versatile Brick
Courtesy of the Brick Institute of America

Stone
Photographer: Ernie G. Wasson

Gravel: Designing with Gravel
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Other

Brick Chisel
Stanley - Goldblatt
New Britain, CT

Concrete Broom
Stanley - Goldblatt
New Britain, CT

Edger
Stanley - Goldblatt
New Britain, CT

Line Level
Stanley - Goldblatt
New Britain, CT

Mattock
Ames Lawn and Garden Tools
(800) 624-2654

Hand Sledge
Stanley - Goldblatt
New Britain, CT

Wood Float
Stanley - Goldblatt
New Britain, CT