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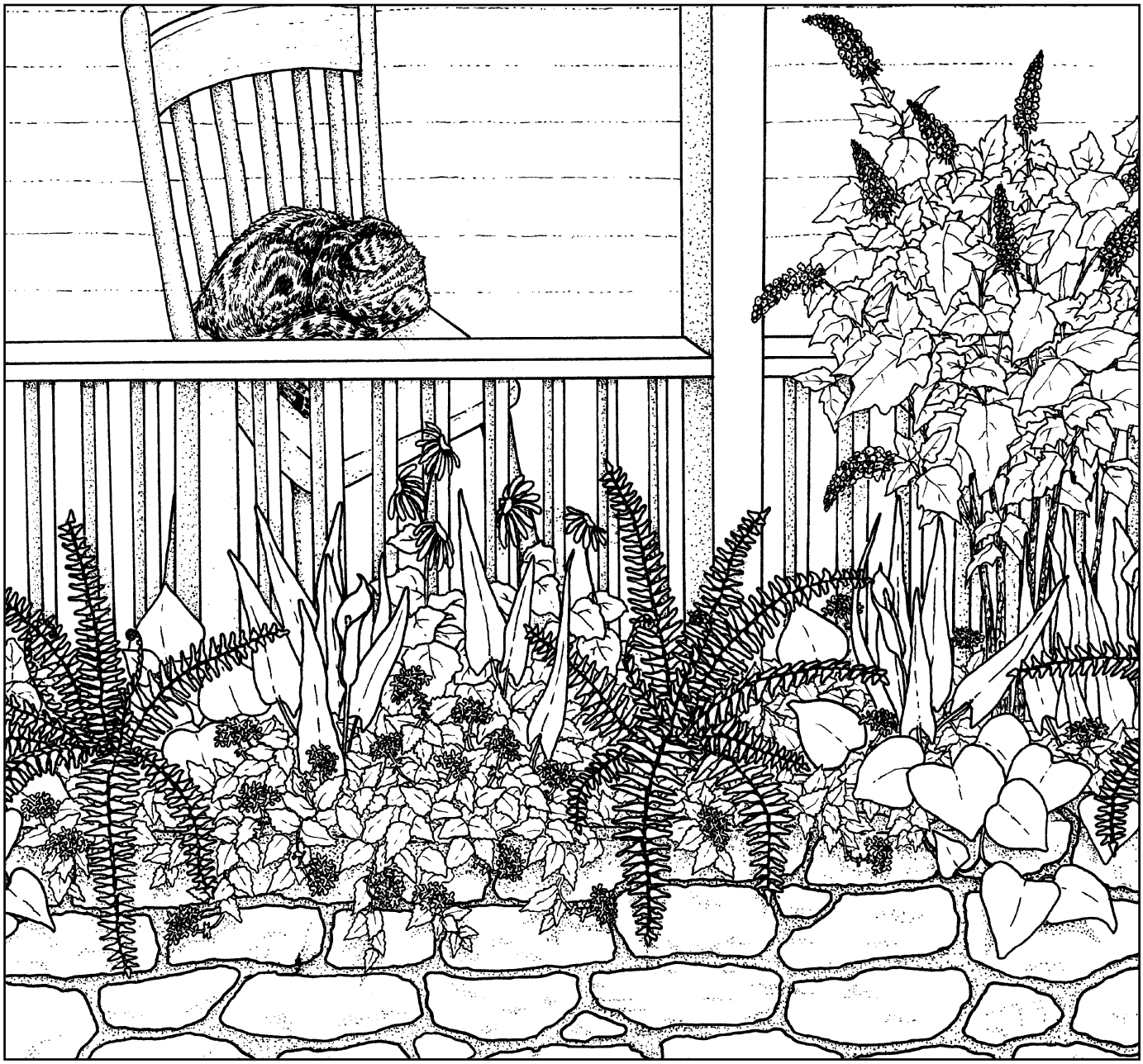
Building



A Raised Bed Garden

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Planning

A Raised Bed Garden

Raised beds are freestanding garden beds constructed several or more inches above the natural terrain. Texas gardeners are discovering that raised bed gardens can help solve many problems. In many areas of the state the soil is of poor quality. It may contain too much sand or clay, or be too alkaline for some plants to grow well. Soil that is poorly aerated because of compaction or poor drainage also may be a problem. Soil quality problems are often aggravated in urban and suburban settings, where topsoil and vegetation may be removed or the grade changed during construction.

Raised bed gardens improve the environment for plants by lifting their roots above poor soil. Soil in the beds can be amended to provide a better growing medium for plants, even those that would not naturally thrive there. Raised beds are less apt to be invaded by certain grasses and by tree roots. Soil in raised beds warms up earlier in the spring. Also, raised beds are easier to maintain

Site Selection

The first step in planning a raised bed is deciding where it will be located. Site selection and plant selection go hand in hand. Many vegetables, ornamentals and herbs require a lot of sunlight; a bed for these plants should be located where it will receive full sun. If that is not possible, select a site that receives morning rather than afternoon sun. If only shady sites are available, try growing cool season vegetables that tolerate shade, such as broccoli, cabbage and lettuce. Some ornamental plants do best in partial shade also. In windy regions, place beds where they are protected from prevailing winds by fences, buildings or other structures. Beds should not be located in frost pockets or where air circulation is poor. Fungal diseases often develop where there is little air flow.

Drainage

A raised bed should drain well so that plants do not become water logged. Soil that remains very wet will deprive plant roots of air. Also, plant diseases develop more easily under wet conditions. Good drainage is especially important in vegetable beds. Both the soil and the location determine how well a raised bed will drain. If the bed contains clay soil, it should be amended with sand, organic matter or a coarse grade of perlite to improve drainage.

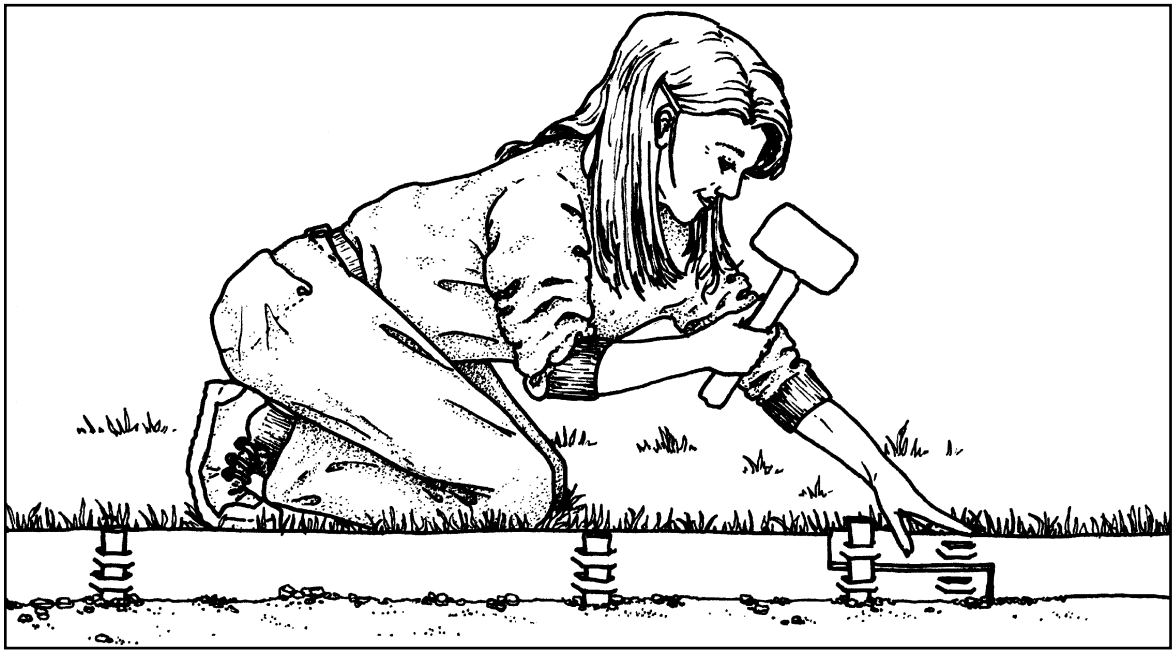
Do not locate a bed in a marshy area where it will sit in water. Construct landscape beds so that they slope about 2 percent (a ¼-inch drop per foot of horizontal distance) away from any structures, or away from the center of the bed. Sometimes it is necessary to install special drains, and this should be determined during the planning stage. Drain tiles or septic line tubing can be extended the length of the bed and through the walls at either end to create a drainage channel. Normally, one line every 4 to 6 feet is sufficient. Another method is to dig a trench in the desired direction of water flow (from the bed to a lower elevation), lay 3 to 4 inches of coarse stone in the trench, and then lay tiles made of clay, concrete or plastic in the center of the trench. Cover the trench with more coarse stone and then soil. The French drain, another alternative, is simply a narrow trench filled with coarse stone leading from a poorly drained area to a lower elevation.

Design

The design of a raised bed should blend with its surroundings. Beds may be formal or informal, depending on their shape and the kind of edging chosen. A rectangular bed edged with a low brick wall, and filled with yaupon or boxwood pruned into straight hedges or topiaries, has a formal look that might be appropriate in the front of a house. An irregularly shaped perennial border tucked behind a dry stone wall is less formal, but could be attractive almost anywhere in the landscape. A vegetable garden has an informal look that works best in private areas of the yard. The size of the bed should be kept in proportion to the space around it.

A raised bed does not have to be excessively deep to be effective. Eight to 12 inches is usually adequate. If drainage is a problem, or if the plants you are growing prefer drier soil, the bed could be taller and filled with a porous growing medium. Vegetable beds should be 12 to 18 inches deep. The material used to edge a raised bed should be stable, durable and attractive. It is the edging that gives the bed its "look" within the landscape. It also establishes the outline of the bed and holds the soil in place. Edging may be as simple as metal strips, railroad ties or timbers, or as intricate as a mortared brick or stone wall. A crested bed is one in which the soil is simply mounded from the edges of the bed to the center; it may or may not have an edging.

Metal edging comes in 8- to 10-foot lengths, is easy to install, and is convenient for edging curved beds. However, it can rust with time, and unless plantings overflow the bed or the edging is camouflaged with a more aesthestic material, it may not be as attractive as you would like. Ties and timbers can be laid singly or in layers and have a rustic appearance. Railroad ties treated with creosote do not pose any health problems because most of the creosote has leached away. Stone walls make interesting beds, and can be constructed with cracks and openings for creative plantings. However, stone can be expensive.



Metal edging is available in strip that bend easily to fit curved bed edges.

Whichever edging material you choose, it should be strong enough to withstand being bumped into or ridden over by a riding lawn mower. It should be complementary to the rest of the landscape, and properly installed.

Irrigation

The design phase is the best time to decide how you will irrigate your raised bed. Hand watering may be simplest in many cases, but it can become tedious; the gardener must also know when and how much to water or plants will suffer.

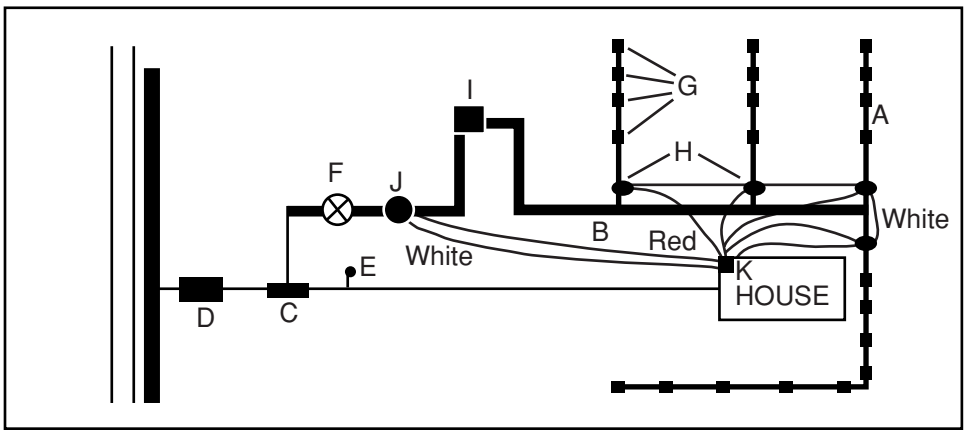
With an automated sprinkler system beds can be watered on a regular basis with little effort, but sprinkler heads wet the foliage, which contributes to disease and salt damage. If the system is automatically timed it may come on whether or not there has been recent rainfall, and thus waste water. So, an automated system may be the most convenient for the gardener, but it is not necessarily best for the plants.

Irrigation systems that work well for woody plants and vegetables include microsprinkler, drip, trickle and soaker hose systems. These systems conserve water, can be installed under mulch, can be regulated to tailor flow rates to individual plant needs, and are less likely to wet foliage. However, they do have some disadvantages. Emitters are prone to clogging unless the water used is very clean, and if emitters are installed under mulch it is difficult to spot problems. Emitters are sensitive to elevation changes along the irrigation line and require pressure compensating lines. Also, lines are easily damaged by rodents and other wildlife.

If you choose a sprinkler system, decide whether the sprinkler heads will pop up or be set on risers, and how many sprinkler heads you will need. Be sure to consider the spray overlap, angle of spray and height of the sprinkler heads. Always design the system so that at least one additional riser per section can be added later. You may need this flexibility as your plantings mature. If you choose drip or trickle irrigation, determine the length of the hose and the number of emitters you will need. (Drip tape with 12-inch emitter spacing is best for vegetables.) Beds should be divided into watering zones according to the needs of the plants, the size of the system, the water pressure, and the volume of water available. Zone watering can be a manual or timed system. There is no “best” irrigation system for raised beds. Sometimes a combination of systems works best.

Irrigation Design

A	Section irrigation line
B	Main irrigation line
C	Tap into house line (“T”)
D	POC (point of connection to municipal water supply)
E	House water line
F	Main cut-off
G	Risers (sprinklers)
H	Section valves
I	Backflow preventor
J	Main valve
K	Controller
Red	Live wire
White	Ground wire



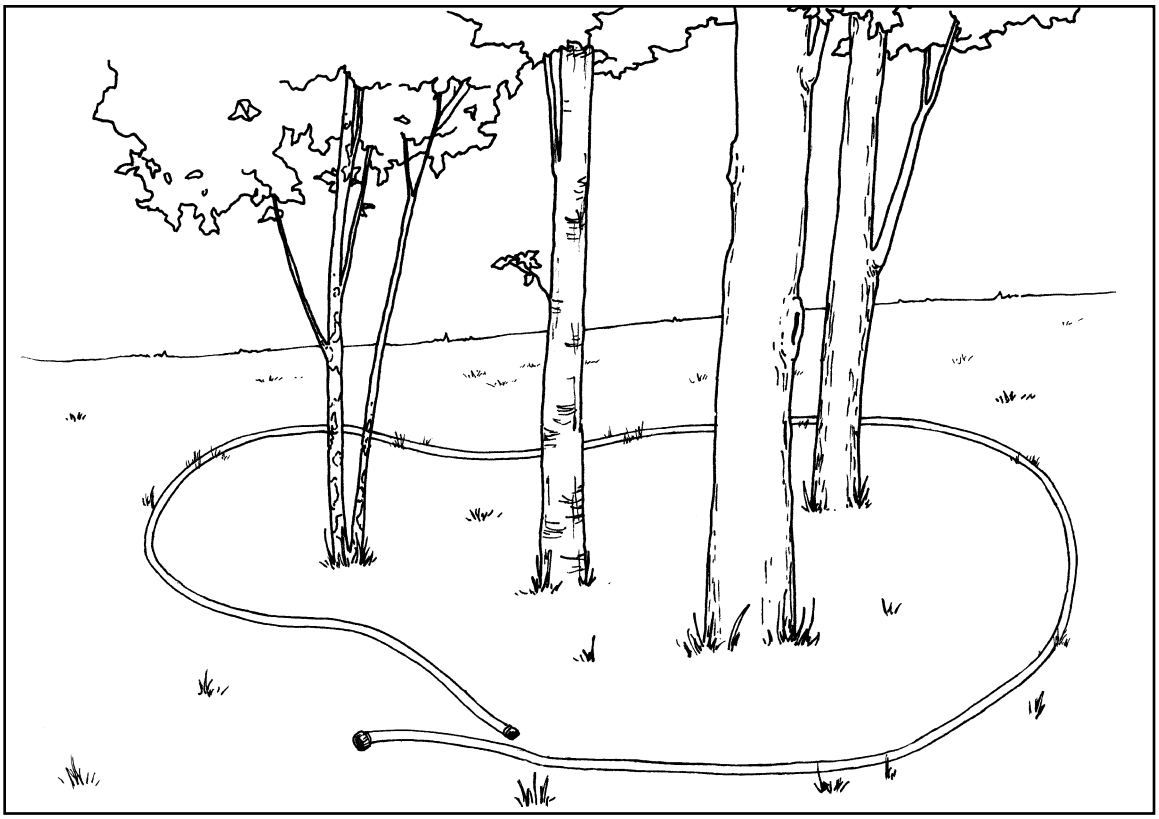
Constructing

A Raised Bed Garden

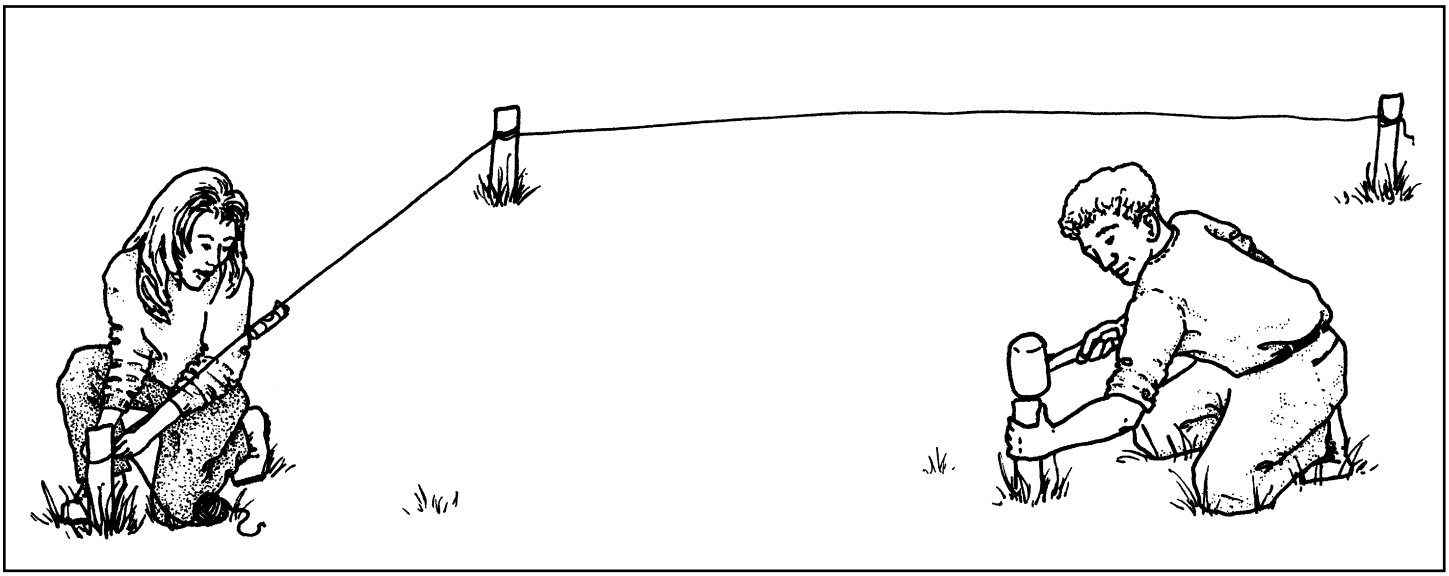
Lay out the Perimeter

If the bed has straight lines, use stakes and string to outline the perimeter. Garden hose or rope works well for outlining curved beds. Most vegetable beds are square or rectangular so that vegetables can be planted in rows. Many ornamental beds are curved. To make maintenance easier, particularly mowing, design the bed with long, flowing curves rather than many tight ones.

Use a garden hose to outline a curved bed so that you can preview its look in the landscape.



Use stakes with string lines and string levels to mark off the sides of straight beds and make sure walls on slopes are level.



Remove Existing Vegetation

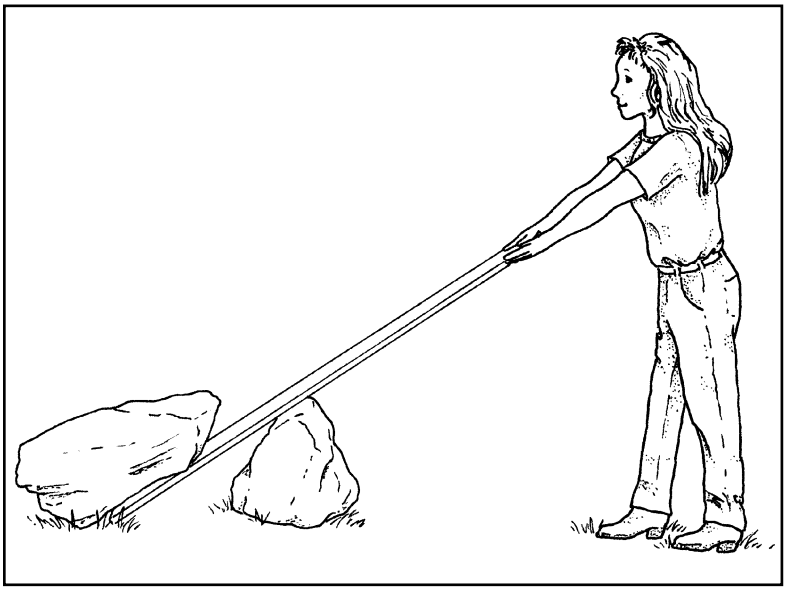
Remove any woody plants with loppers, hand saws or chainsaws, then dig out the roots. Apply a systemic herbicide to kill perennial weeds and prevent them from returning. Or, kill vegetation without herbicide by covering the bed area with clear plastic (anchor edges with rocks or soil) for 1 to 2 months. If both day and night temperatures are warm, the intense heat generated under the plastic will kill plants, though not as quickly as herbicide. Once the site is bare of vegetation, till the soil thoroughly.

Install Edging

Metal. Metal edging is usually packaged as 4- to 6-inch wide metal strips in varying lengths. They are connected and held together by stakes inserted through overlapping notches. Place the strips on edge along the perimeter of the bed and overlap the ends, lining up the notched strips. Hammer the stakes into the soil through the overlapping notched strips. Using a rubber mallet or a piece of wood between a hammer and the top of the edging, lightly hammer the edging into the soil between the stakes. It is best to partially sink the stakes until all are in, and then sink them to the desired depth. If the soil is hard and dry, soak it before installing the edging, or excavate the soil to accommodate the edging.

Brick/Cinder Blocks. To build a brick-edged raised bed, first pour a concrete footer at least 6 to 12 inches high and 16 to 18 inches wide. This will be the base of the wall. Dig the trench for the footer carefully so that you won't need to use forms. Once the concrete is poured, work a ⅜-inch reinforcing rod into the center for stability (especially important in clay soils). Smooth the top of the footer with a trowel. After the footer has cured for 3 or 4 days, wet it and apply about ¾ to 1 inch of mortar about 2 feet down the slab. Press the first brick into the mortar so that about ½ inch of mortar is left between the brick and slab. Apply mortar to the side of the next brick and place it ⅜ inch from the first one. Rap the brick gently with the trowel handle to set it and remove the excess mortar squeezed from between the bricks. Continue until the edging is complete. Cinder block edging may not require mortar because the blocks are larger.

To prevent back injury, lever large stones into place or lift them with hydraulic equipment.

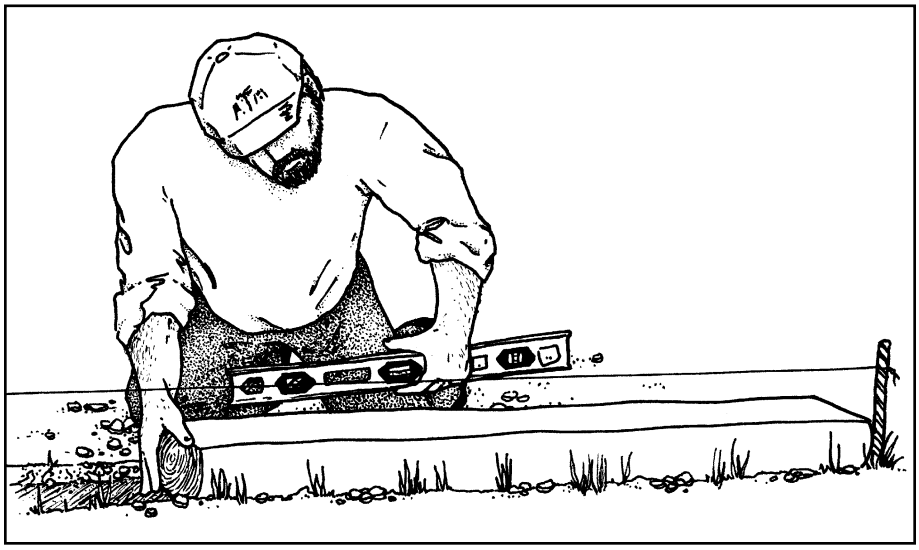


Stone. To raise the stones, roll them up a plank on pipes or use a hydraulic lift. To install a dry stone wall, first level the terrain of the perimeter. Lay the stones in each row so that they overlap the stones underneath. Make the wall wider at the base than at the top, and cant the stones inward for stability. If the wall is to be more than one stone thick, periodically insert tie stones—long stones laid across the width of the wall. This makes the wall stronger. If the wall is to be more than 2 feet high it should be mortared in place and built on a concrete footer. Test fit two or three stones at a time before applying the mortar. To ensure good contact between the mortar and the stone, lay the first layer of stone while the footer is still wet and rap the stone sharply with the trowel handle to set it. If the stones are heavy, insert wooden pegs between the stones to keep the mortar from being squeezed out before it dries. Remove the wooden

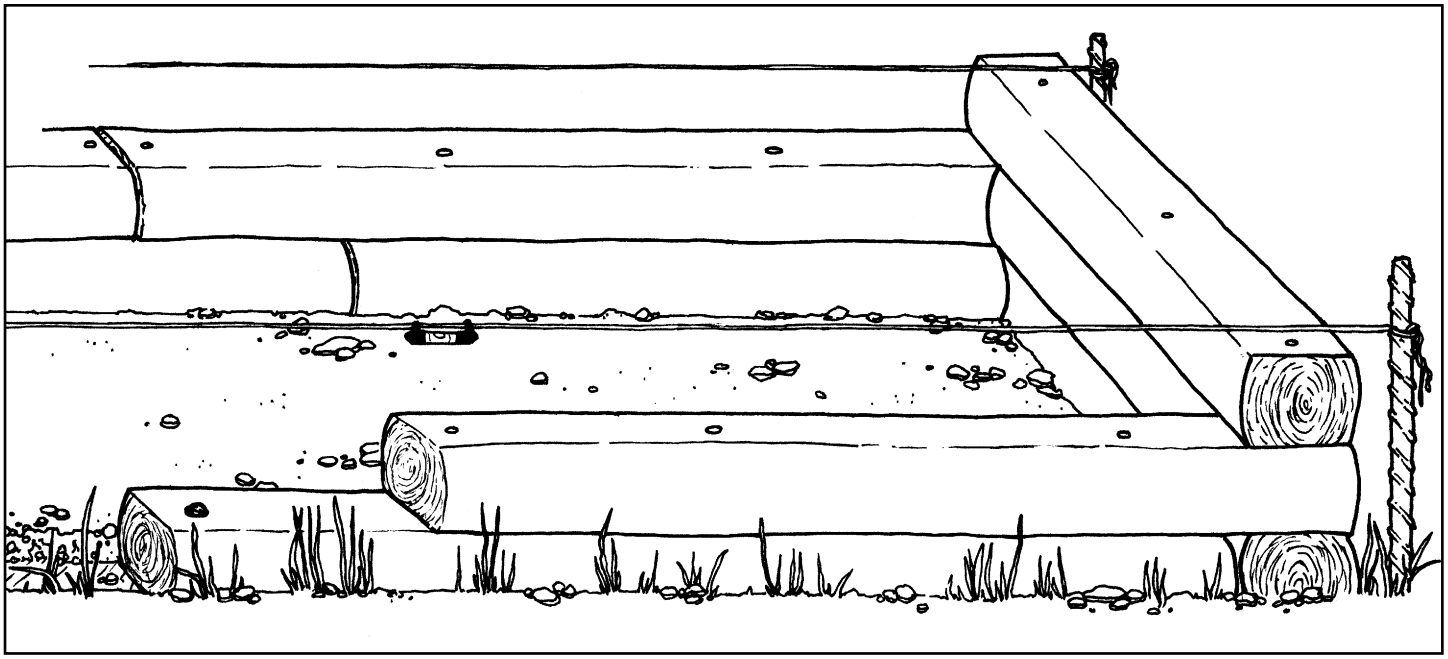
pegs after the mortar has partially set and fill the holes with mortar. It may be advisable to have expert help because an improperly constructed stone wall can be hazardous. Also check local ordinances to determine whether an architect's seal is required for the plans.

Timbers. Level the perimeter of the bed so that the first layer of timbers is level or set at the desired slope. Drive rebar or galvanized spikes through the ends of the timbers at 20-degree angles to the center of the timber, and then drive them into the soil approximately 12 to 18 inches. Lay the successive layers of timbers in an overlapping fashion and nail them to the previous layer with galvanized spikes. Check the level or desired slope frequently during construction.

Set the first layer of timbers slightly into the soil. Level each timber as it is put in place.



Secure the first row of timbers by driving a piece of rebar through a predrilled hole and into the ground at a 20-degree angle. Secure subsequent rows with three or four spikes or pieces of rebar per timber. Make sure spikes extend well into the timber below.



Install Irrigation System

If you will have drainage trenches or an automatic sprinkler system, install them before soil is added to the bed.

Add Soil

To help keep out aggressive lawn grasses, especially bermudagrass, install a weed barrier between the edging and the soil. Then you are ready to add soil or growing media.

Soil should hold water well so that plant roots do not dry out, but it should also have good drainage. Soil with too much sand does not hold water well; soil with too much clay does not drain well. Generally, a sandy clay loam soil is best for most plants. It should be mixed with organic matter such as peat moss, composted manure, sawdust or ground bark.

Soil is sold and delivered in cubic yards. It can be ordered as a topsoil/compost blend; common mixtures are three-fourths topsoil and one-fourth compost, two-thirds topsoil and one-third compost, and half topsoil and half compost. The higher the organic material content the sooner you will need to add more soil/compost to the bed, because the organic matter breaks down over time. Make sure organic material has been composted before it is added to the soil. Otherwise, it will deprive plants of nitrogen as it decomposes. The best media for vegetables consists of one-third topsoil, one-third peat moss and one-third sand or coarse perlite. Standard potting soil or commercial container mixes are also good for growing vegetables, but are usually too expensive for filling large beds. When filling the bed, grade the soil so that it slopes slightly away from the center of the bed to the edge, and away from adjacent structures.

It can be difficult to incorporate existing trees or shrubs into a raised bed. The easiest method is to encircle the plant with metal edging to keep soil and excess mulch away from the crown of the plant. Leave as wide a space as possible between the edging and the plant. Tree wells can be used in taller beds. It is important to remember, though, that adding large quantities of soil over the roots of established plants is not advisable and may kill the plants.

Planting & Mulching

A RAISED BED GARDEN

Planting

Be sure the plants you select are adapted to the climate and water in your area, and that their mature size will be appropriate for their location in the landscape. Perennials and permanent trees and shrubs should be located at the rear of the bed where they will be least disturbed. Plant annuals along the edge where they will be within easy reach when it is time to replace them.

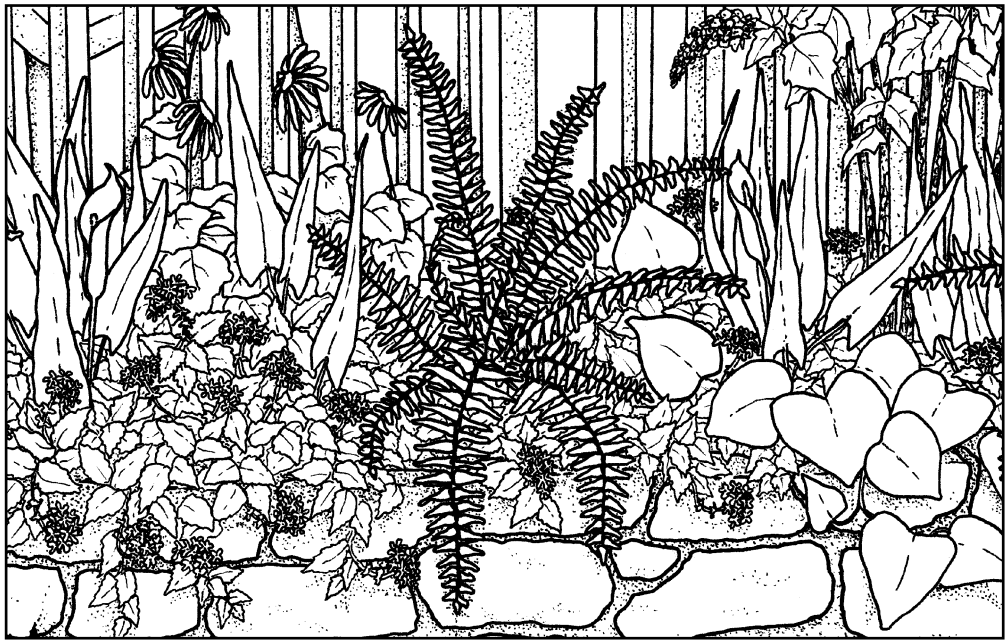
Mulching may be the single most important finishing touch to your raised bed garden. Mulch keeps plant roots cool in summer, reduces water evaporation from the soil, controls erosion by softening the impact of rain and slowing runoff so it can soak into the soil, and suppresses the growth of weeds. Mulches also add to the attractiveness of the landscape.

Mulching

After all the plants are in the bed, apply a 3- to 4-inch-deep layer of mulch, tapering it to the bases of the plants. To determine how much mulch you need, multiply the length of the bed by the width and by the depth of mulch you want. Divide this total by 12 and then again by 27 to obtain the amount of mulch in cubic yards.

Bark and pine needles are both popular mulches. Many vegetable gardeners use shredded newspaper or strips of black plastic anchored down the rows. Seeds or seedlings are planted in holes cut in the plastic. Newspaper and exposed plastic are not particularly attractive and should probably be reserved for private areas of the garden.

Be sure the plants you select are adapted to the climate and water in your area



Maintaining

A Raised Bed Garden

Maintenance

Maintaining a raised bed garden involves weeding, irrigating when needed, replacing decomposed mulch, and pruning and removing spent plants. Here are some guidelines for keeping your garden looking its best.

1. Irrigate the bed when needed, letting the top inch of soil dry out between waterings. If the plant species are complementary, their water requirements will be similar.
2. Keep 3 to 4 inches of mulch on the bed. The mulch should be appropriate to the region, perhaps pine straw or wood chips in East Texas and stone or gravel in West Texas.
3. Add compost or top-dress with organic mulches twice each year in the spring and fall. This replenishes the soil and acts as a slow release fertilizer. Simply rake back the mulch, add the compost, and replace the mulch or add new mulch over the old. Or, add an inorganic slow release fertilizer before and during active plant growth.
4. Prune each plant properly according to its use and the intended design.
5. Control insect pests and diseases. You can reduce the need for chemical treatments by practicing integrated pest management: start with good quality plants; handle plants carefully before and during planting; select plants that are adapted to your region.

A properly designed, constructed and maintained raised bed will be a lasting source of beauty in your landscape.

For Further Reading

ON RAISED BED GARDENING

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