

<b>Project</b>	Wood Decks
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When planning your wood deck, take time to consider what you really want the project to accomplish. Consider your lifestyle and family preferences for fun in the sun, relaxed lounging in cooling shade, the need for privacy, and the scope of activities you want your deck to accommodate.

You should also know the prevailing wind patterns, the direction and angle of the morning and afternoon sun, plus the view from the deck. Plantings and screen walls can provide more privacy, screen out undesirable views, and buffer winter winds. You can also position the deck to take advantage of existing shade trees or sunny exposures.

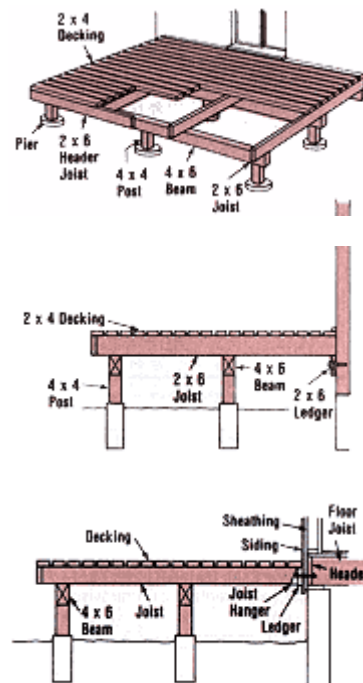
**A deck is one project that absolutely requires checking into local building code requirements.** Codes may specify setback distances from property lines, restrictions on deck height, and certain construction details, such as how to attach the deck to existing structures, or stair and railing details.

### Lumber for Decks

Lumber for outdoor projects should be highly resistant to moisture and insects. Pressure-treated lumber is a good economic choice.

Preservatives forced deep into the wood fibers give this lumber its distinctive green or yellow tint. The color will fade to a silver-gray when exposed to weather. Pressure-treated lumber can also be stained. Redwood and cedar are woods naturally resistant to insects and decay. While available in some sections of the country, they may be cost prohibitive for larger projects.

The four main components of the deck are the posts, beams, joists, and decking. Posts consist of 4 x 4 lumber. Beams typically measure 4 x 6 and are usually made by nailing two 2 x 6 pieces back to back. Joists are normally 2 x 6 lumber. Face decking boards are either 2 x 2, 2 x 4, or 2 x 6. Decking boards can be laid flat or positioned on edge.



Posts support the beams, which in turn support the joists. Deck facing is attached to the joists. Maximum spans for beam and joist pieces are given in the tables to follow. These are conservative estimates designed to help you plan your deck and estimate the materials. The exact strength of the lumber depends on the species used. The method of connection may also affect final loading strength. Always check beam and joist span and spacing specifications against local

building codes. Your lumber dealer may also help you select the best lumber choices from the species and sizes available in your area.

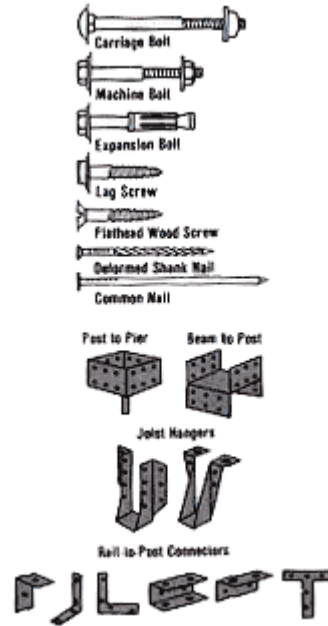
Beam Span	
Beam Size	Max. Span Allowed when Laid on Edge
4x4 or two 2x4s	4 ft (1m)
4x6 or two 2x6s	6 ft (1.5m)
4x8 or two 2x8s	8 ft (2m)
4x10 or two 2x10s	10 ft (2.5m)
4x12 or two 6x10s	12 ft (3m)
6x10 or two 2x10s	12 ft (3m)
6x12 or two 2x12s	14 ft (3.5m)

Joist Span		
Joist	Max. Span Allowed when Laid on Edge	
2x6 (min)	@ 12 in. o.c. 8 ft @ 16 in. o.c. 7 ft @ 24 in. o.c. 5 ft	(@ 30cm o.c. 2.4m) (@ 41cm o.c. 2.1m) (@ 61cm o.c. 1.5m)
2x8	@ 12 in. o.c. 10 ft @ 16 in. o.c. 9 ft @ 24 in. o.c. 7 ft	(@ 30cm o.c. 3m) (@ 41cm o.c. 2.7m) (@ 61cm o.c. 2.1m)
2x10	@ 12 in. o.c. 13 ft @ 16 in. o.c. 12 ft @ 24 in. o.c. 10 ft	(@ 30cm o.c. 4m) (@ 41cm o.c. 3.7m) (@ 61cm o.c. 3m)
2x12	@ 12 in. o.c. 16 ft @ 16 in. o.c. 15 ft @ 24 in. o.c. 14 ft	(@ 30cm o.c. 4.9m) (@ 41cm o.c. 4.6m) (@ 61cm o.c. 4.3m)

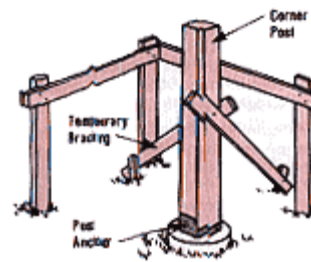
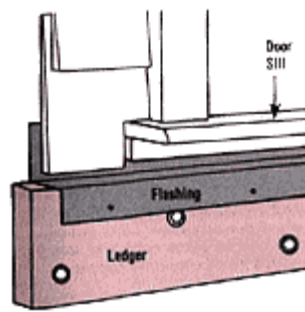
### Fasteners for Decks

Wood members can be joined together using nails, screws, bolts or lag screws. Metal nailing straps, joist hangers, post anchors and other special hardware pieces make joining members easier and more accurate. All fasteners and hardware must be galvanized or otherwise non-rusting to prevent staining of the wood.

Always nail through thinner members into thicker stock. Nails should penetrate the thicker back piece by twice the thickness of the thinner piece, but no more than 1 1/2" (38mm). Screws should penetrate the receiving member by at least the thickness of the thinner member, but never less than 1" (25mm). Carriage bolts require washers under their nuts, while machine bolts and lag screws need flat washers at both their head and nut ends to keep from crushing the wood when tightened. Lag screws should be installed with a washer. Pilot holes for bolts should be the same diameter as the bolt shank. Pilot holes for screws and lag screws should be the diameter of the solid portion of the screw between the threads.



## Step by Step



### Post Placement

1. Lay out string lines and construct batter boards to locate the position of

corner and intermediate posts.

2. Dig postholes and place concrete post footing using QUIK-TUBE™ Building Forms. Consult local building codes for the accepted method of setting posts in your area. The method most often specified uses a post anchor embedded in the concrete footer. Be sure this anchor is positioned properly. After the concrete has gained its final set (at least 24 hours) attach the post to the anchor. If you plan to embed the post in the wet concrete of the footer, be sure it is properly centered and set deep enough to provide proper support.

3. Do not cut the posts to finished height at this time. The exact height of the posts will depend on the method used to set and secure the joists to the beams.

### Ledgers

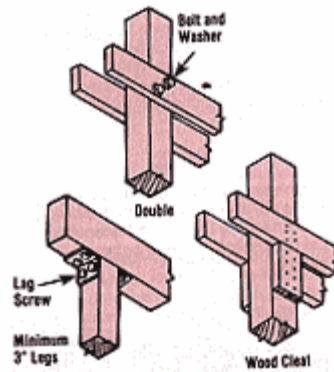
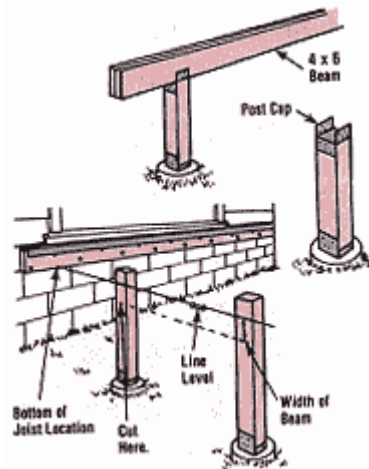
Decks that attach to an existing house require the use of a ledger. A ledger is a 2 x 6 or 2 x 8 piece of lumber that attaches to the house with bolts, which extend through the ledger, house siding, house sheathing, and box header of the house frame. It is also possible to attach the ledger to concrete or masonry surfaces using expansion type anchors and lag bolts.

When joist hangers are used, the tops of the joists are level with the top of the ledger. The proper position for the ledger is 1" down from any existing door sill, plus the thickness of the decking face. The ledger must also extend 2" beyond the last joist position to allow room for securing the metal joist hanger.

When hangers are not used, the joists rest on top of the ledger and are toenailed or otherwise fastened to it. In this case, the proper ledger position is 1" down from existing door sills, plus the thickness of the decking face, plus the height of the joist.

In either case, the ledger should also be flashed with metal to prevent water from seeping between the ledger and house. Check all measurements before fastening the ledger, and be sure to use the actual, not the nominal dimensions of the lumber when calculating the overall thickness of the joists and deck facing.

Be sure you understand the exact position and elevation of the



ledger, joists, beams and posts before attaching the ledger or cutting off the posts

to their required heights. The method you select for attaching joists to the ledger and beams will affect the height of the posts. It is helpful to

study the illustrations given here in understanding the relationship of deck components.

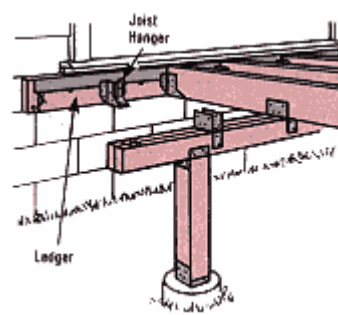
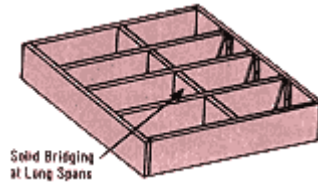
## Beams

The 4 x 6 beams that support the joists normally rest on top of the posts. However, you may also plan to run the posts up through the deck to serve as supports for a railing. If this is the case, sandwich the posts between the two 2 x 6 pieces of stock that make up the beam and secure using bolts and washers or nailed wooden cleats.

### To determine the cutoff or attachment height for the posts.

1. Attach a line level to the ledger at the point where the bottom of the joist will be located.
2. Run the line level out to the posts in that row, and carefully mark this elevation on the posts.
3. Measure down from this point a distance equal to the thickness of the beam (for a 6" (150mm) nominal beam, this is usually 5 1/2" (140mm)).
4. If the posts will not serve as rail support, cut them off at this level. Cut carefully to ensure the tops of the posts are level. Secure the beams to the post using post cap anchors or angle irons. If the posts will serve as railing supports, the position marked in step 3 is where the bottom edge of the beam pieces will be located as they are sandwiched around and bolted to the posts.

## Joists



1. Attach the joists to beams by resting the joists directly on top of the beams and attaching them with fasteners

called framing anchors or beam saddles.

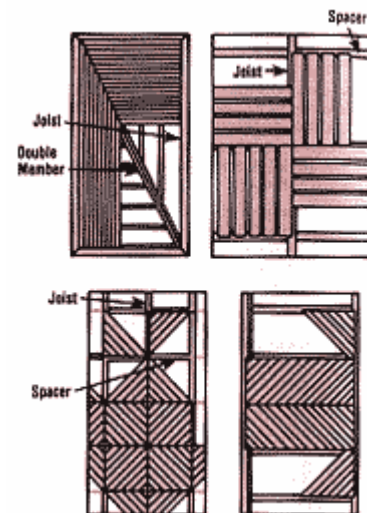
2. If two pieces of lumber must be used to create a long joist run, be sure the joint is located over a beam location.

3. Nail solid 2 x 6 bridging pieces (intermediate joists) between the main joists when spanning long distances. This bridging will keep the main joists from twisting and help distribute the load on the deck.

4. Attach a 2 x 6 header joist to the front of the deck to cover the ends of the joists. This header joist acts as a facing and nailer for intermediate railing supports.

## Decking

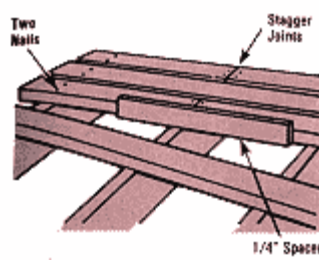
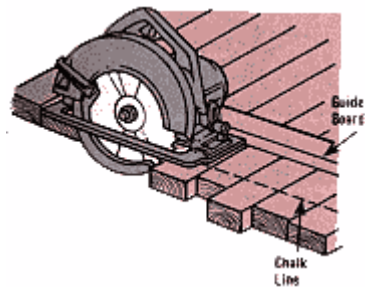
Decking is most often made of 2-by material, such as 2 x 2, 2 x 4, or 2 x 6 lumber. Exterior grade plywood or sheathing is also used as deck facing if outdoor carpeting is being installed. The simplest method of laying 2-by decking is to run boards all in one direction. More intricate patterns can be created if adequate joists supports are installed.



1. Check the end grain of each board before nailing. Position the board so its end rings curve up. In other words, the bark side of the lumber is facing up. This helps eliminate cupping.

2. Lay the first deck board perfectly square since it will serve as a guide for the remaining boards. Drive two nails into each decking board at each joist.

3. All deck board joints must occur above a joist. Stagger adjacent board joints to eliminate a continuous deck board joint. Maintain proper spacing between boards using a 1/4" spacer strip.



**4.** Periodical  
ly measure  
the  
distance  
remaining  
to be  
covered

with decking. Take measurements at both ends and the midpoint and keep the boards running parallel to one another. Make any corrections gradually over a span of several boards.

**5.** When there is roughly 6' (1.8m) of decking remaining to be laid, begin adjusting the spacing between boards so the deck will end with a full board.

### Trimming Decking

Allow the deck boards to slightly overlap the edges of the deck. Do not attempt to cut each to size as you nail it. After all the decking boards are fastened, snap a chalk line at the desired edge of the deck. You can then cut all boards to size using a power saw. Tacking a wooden guide strip for the saw to ride against is the best method of ensuring a straight, even cut along the chalk line.

### Freestanding Decks

If you do not plan to access the deck through a door to your home, a freestanding deck design may be your ideal choice. A freestanding deck eliminates the problems associated with attaching the deck to your home's frame or foundation. A freestanding deck can be built adjacent to your home, or in a shady corner of your property away from the house.

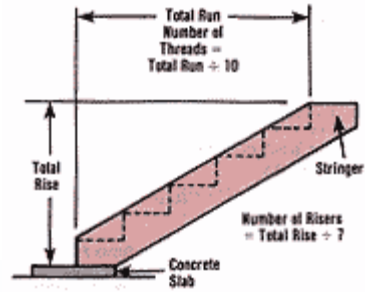
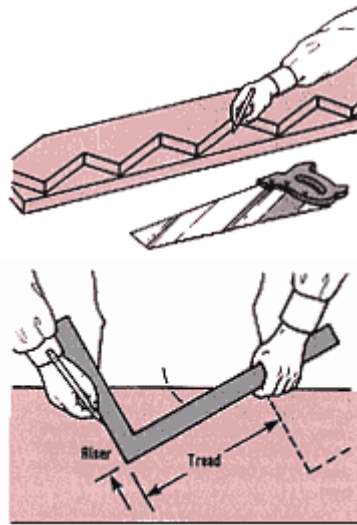
The freestanding deck uses the same post, beam, joist, and decking system used for an attached deck. Joists can be set on top of beams or hung between beams using joist hangers. Once again, it is important to establish the final height of your deck and cut posts to the proper elevation.

### Stairs

The stringers, or side supports for the stair treads, are the most important part of the stair design. They must be accurately marked and cut to ensure success. The most common stair design used for decks is the open riser/open stringer type.

**1.** Measure the height of the deck to the ground (total rise) and the distance from the deck to the base of the stairs (total run).





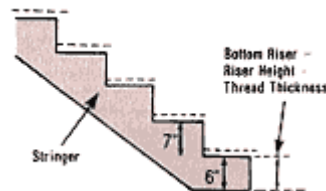
**2.** Most stairs have a rise of about 7" (18cm) and

a run of about 10" to 11" (25cm to 29cm). Divide these figures into the rise and run to see if the distances can be covered with an equal number of steps. Make slight adjustments to the rise and run as needed, but never vary the rise and

run between steps. Include the thickness of the thread material in your rise calculations. Two-by lumber is actually 1-5/8" (4cm) thick.

**3.** When the exact location of the stair base is determined, pour a small slab foundation so the base of the stairs will be level and perfectly supported. Use QUIKRETE® Concrete Mix or QUIKRETE® Fast-Setting Concrete Mix. Slab thickness should be 4" minimum. Install anchors at the proper locations so the stringers can be firmly fastened to the slab.

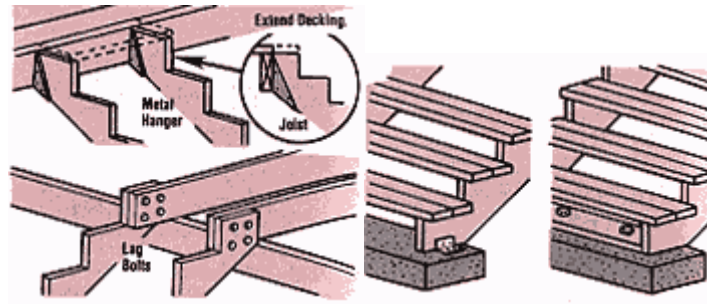
**4.** Stringers are made using 2 x 10 or 2 x 12 lumber. Mark off the rise height on one leg of a framing square and the depth of the thread on the other leg.



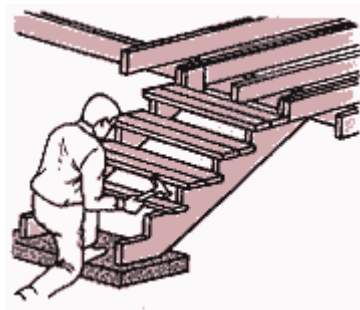
**5.** Cut the stringer out using a hand or power saw. Check that the stringer is properly sized and then use it as a template to create the other stringer.

**6.** To keep the rise equal on all steps, cut a strip of lumber off the bottom riser that is equal in thickness to the tread thickness.

**7.** Attach the top of the stringer to the deck joists using hangers of lag bolts. Secure the bottom of the steps to the concrete slab anchors.



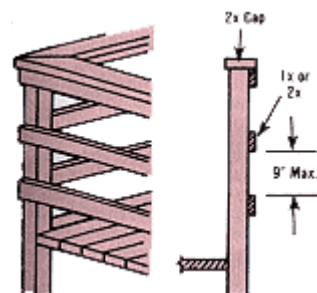
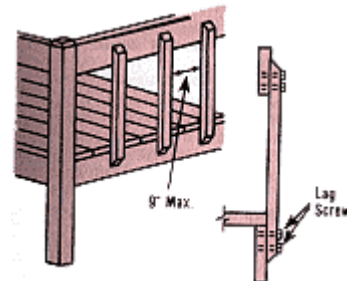
8. Nail the tread boards in place, bark side up. They can be trimmed flush to the stringers or allowed to overlap.



## Railings

Railings are needed to ensure personal safety on all but true ground level decks. Building codes often list deck railing specifications, so check with local authorities before finalizing your design. In general, the vertical and horizontal railing members must be spaced close enough to keep children from slipping through. Screening can also be used to close off openings between posts and rails.

Railing posts that are not actual deck support posts must be secured to the joists, ledger, or beams using lag screws or carriage bolts. Never use nails to attach railing posts and never fasten them to the deck surface boards.



## For Best Results

- Low decks will shade the lawn beneath, and the lawn will die out. Remove the sod now and use it on bare spots elsewhere on your lawn. To prevent weeds from growing under the

deck, cover the bare soil with heavy black plastic film topped with crushed stone. QUIKRETE® Marble Chips or Deco Pebbles, or bark chips.

- Use and maintain an effective sealer on all pressure-treated lumber projects.
- Dispose of all scraps of pressure-treated lumber in ordinary trash. Do not burn.
- Reduce splitting of boards when nailed by blunting the nail point or predrilling pilot holes that are 3/4 the nail shank diameter.
- In softer woods, use a larger washer under the carriage bolt heads.