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## Build a Pergola

**Skill Level:** Advanced

A pergola gives a deck character and provides a focal point for decoration and design. Pergolas are great for vines, other climbing plants and hanging baskets. If you don't have a green thumb, dress the pergola with lights, ribbon or streamers for special occasions. This pergola makes a great weekend project - a good helper would make the job go much more smoothly. Lowe's is happy to provide this information as a [service](#) to you.

A pergola adds elegance to your home.

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### Tools & Materials

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#### Tools

- [Mason's line](#) 
- [Chalk line](#)
- [Tape measure](#) 
- [Jig saw](#) 
- [Drill/driver](#)  with bits
- [Ladder](#) 
- [Hammer](#) 
- Water level
- [Circular saw](#) 
- [Miter saw](#)  (optional)
- [Hammer](#) 
- [Ratchet and socket](#) 
- [Dust mask](#)
- [Goggles](#)
- Hearing protection

#### Materials

- 15 pounds- 2 1/2" galvanized screws
- 8- 6"x1/2" carriage bolts
- 8- 7"x1/2" carriage bolts
- 4- 4"x4"x10' treated posts
- 4- 2"x8"x10' treated boards
- 5- 2"x6"x10' treated boards
- 6- 2"x6"x8' treated boards

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### Construction Note



Check with your local building authorities before beginning, to find out if any permits are required.

These instructions are for a basic pergola with square rafter ends. You may alter the design and cut shapes in the rafter ends for a more decorative effect.

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Treated lumber recommended fasteners

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### Example Dimensions

- The deck has 2x8 [joists](#) 16" [on center](#) (OC).
- The pergola will be 8' square with 4x4 posts, doubled 2x8 beams, 2x6 rafters 24" OC and 2x6 bracing blocks 24" OC.

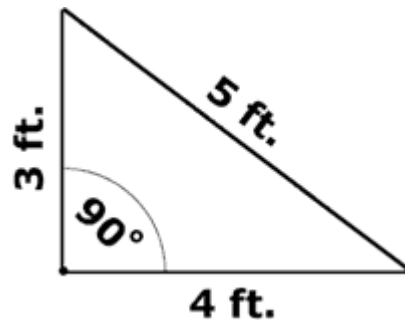


Whether joists are set 12", 16" or 24" OC there will always be joists at multiples of 48"OC.

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### Laying Out The Site

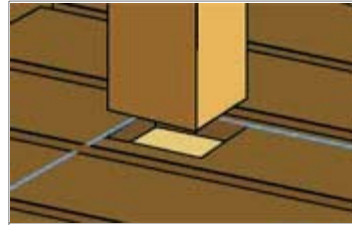
1. Determine the approximate area where you want the pergola. Locate a deck joist at one of the corners and mark the decking flush with the inside edge of the joist (mark 1). Measure 8' along the joist and make another mark (mark 2). Snap a chalk line between the two marks flush with the inside edge of the joist.
2. Partially drive a 6d nail into the decking at mark 1. Tie mason's cord to the nail and pull it perpendicular to the chalk line. Use the following method to square the cord with the chalk line.  
  
**3, 4, 5 Method:** Measure 3' along the chalk line and mark, measure 4' along the cord and mark it, then adjust the cord until the distance between the two marks is 5' (see image "A").  
  
Measure 94 1/2" along the mason's cord and make a mark (mark 3). Snap a chalk line between mark 3 and mark 1.
3. Repeat step 2 from mark 2 to locate mark 4.
4. Marks 3 and 4 should be flush with the inside edge of a deck joist. Snap a chalk line between marks 3 and 4, flush with the inside edge of the deck joist ([see top view of Image "B"](#)).
5. Stand a small piece of 4x4 on the decking at mark 1. Align the outside [edges](#) of the 4x4 with the chalk lines. Trace the other two sides of the 4x4 onto the decking. Use a jig saw or a reciprocating saw to cut out the hole for the 4x4. (see Image "C") Perform the same steps at marks 2, 3 and 4.



**Image A:** The 3, 4, 5 method is a highly accurate method of determining right angles.



**Image B:** Notice here that the deck joist is located on the outside edge of the mark.  
([Click here for top view](#))



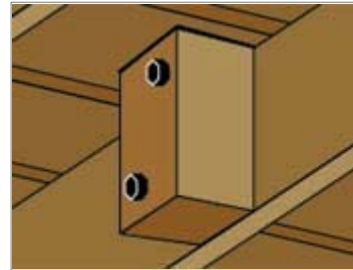
**Image C:** Tracing a piece of 4x4 on the decking will guarantee an accurate hole.

[\(Click here for top view\)](#)

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### Setting The Posts And Beams

1. Have a helper slide a 10' 4x4 post into the hole at mark 1. Align the bottom of the post flush with the bottom of the deck joist, while the helper holds it **plumb**. Drill two offset 1/2" holes through the post and the joist. (offsetting the holes helps maintain the strength of your framing members.) Secure the post to the joist with 6"x1/2" carriage bolts (see Image "D"). Set the posts at marks 2,3 and 4 the same way.
2. Measure up 8' 6" from the top of the decking on post 1 and mark it. Use a water level to transfer the mark on post 1 to the other posts. Cut each post off at the marks.
3. Square two 10' 2x8s and cut them to 10' exactly. Screw the 10' 2x8s together flush. The fasteners should be in rows of three, spaced approximately 24" apart and driven in from alternate sides to ensure the boards don't separate.
4. Measure the distance from the outside of post 1 to the outside of post 3 and subtract that number from 120" (The length of the doubled 2x8 beam).
5. Divide the difference from above by 2, to determine the overhang of the beam at each post.
6. Measure in from each end of the beam and mark for the overhang.



**Image D:** Securing posts to joists with offset carriage bolts will make for a very stable structure.

**Example:** Outside of post 1 to the outside of post 3 = 94 1/2"

$120" - 94 \frac{1}{2}" = 25 \frac{1}{2}"$

$25 \frac{1}{2}" \text{ divided by } 2 = 12 \frac{3}{4}"$

The beam overhang on each side of the posts is 12 3/4".

Set the beam with the top of the beam flush with the tops of posts 1 and 3. Also align the overhang marks flush with the outsides of the posts. At each post, Drill two 1/2" offset holes through the beam and post. Secure the beam to the posts with 7"x1/2" carriage bolts (see Image "E"). Set a second beam on posts 2 and 4.



**Image E:** For a sturdy beam, secure posts to beams with offset carriage bolts. Notice the 12 3/4" overhang.

[\(Click here for top view\)](#)

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### Setting The Rafters

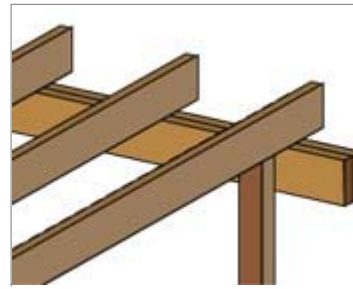
1. Set the rafters 24" OC. Find and mark the center of each beam. Measure from the center of the beam and mark it every 24". You should have five marks on each beam, one in the center and two on each side. The marks represent the centers of the rafters ([see top view of Image "F"](#)).
2. Measure the distance between the beams from outside face to outside face and add 12". The extra 12" allows the rafters a 6" overhang at each beam. Cut five 2x6s to length.

**Example:** The distance from outside face to outside face of the beams is 102"

$$102" + 12" = 114"$$

The rafters should be cut to 114".

3. Center the rafters on the marks and screw them to the beams. The rafters should overhang each beam by 6".

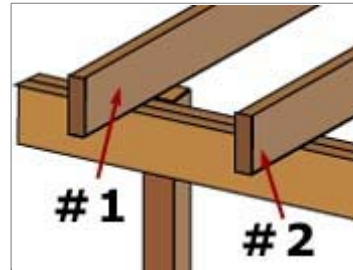


**Image F:** Perfect rafter placement is essential. Your pergola will look thrown together if you rush through this step.  
([Click here for top view](#))

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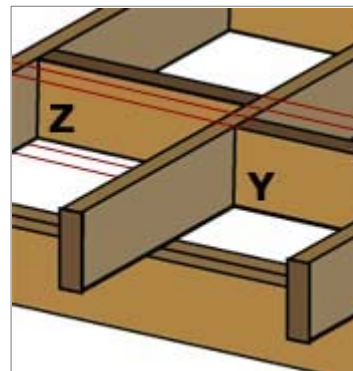
### Installing Brace Blocks

1. Measure between the rafters and cut brace blocks from 2x6 boards (For rafters 24" OC the braces should measure approximately 22 1/2"). Number the rafters from left to right (see Image "G").
2. Measure 10" back from the inside face of the beam along rafters 1 and 2 and mark them. Continue measuring and marking the left side rafters 24" OC. You should have four sets of marks. Secure the bracing blocks between the rafters.



**Image G:** Numbering your rafters will make steps 1 through 4 of "Installing Brace Blocks" much easier.  
([Click here for top view](#))

3. Go to the next set of rafters (Rafters 2 and 3) and measure from the inside face of the beam 13" and mark each rafter. Then make marks 24" OC and install brace blocks. Between rafters 3 and 4 mark and install brace blocks as you did between rafters 1 and 2. Between rafters 4 and 5 mark and install brace blocks as you did between rafters 2 and 3. Offsetting the brace blocks allows you screw through the rafter into the end of the brace block instead of toenailing. (see Image "H")



**Image H:** Notice how brace blocks Z and Y are offset. The offset eliminates the need to toenail.  
([Click here for top view](#))

4. [Stain and seal](#) the pergola to match the deck.

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The completed pergola.

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