Loft beds with bookshelf ladders

by **makendo** on August 11, 2011

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I'm probably off making something. Most likely a sandwich.

Intro: Loft beds with bookshelf ladders

My daughter has always had her own room, but envies her brothers' bunk bed. So I built her a loft bed that look likes a floating cloud, which made her happy and created a little more space in her room. It uses some of the design principles of the one-legged bunk bed I posted previously - namely using the walls as part of the frame. However, this one has a **heavy duty combination ladder/bookshelf** for support, rather than a single leg. It's built using simple joinery out of construction lumber (2x4 and 2x6) and plywood, it's incredibly solid, and it only cost about $150 to build.

And pretty much as soon as I'd built that one, my eldest son moved into a room of his own... and wanted a loft bed, too. His incorporates a **second bookshelf** , a **desk** , and a **secret compartment,** and is designed for someone with longer legs, more books, and who isn't fussed about sleeping on a cloud...

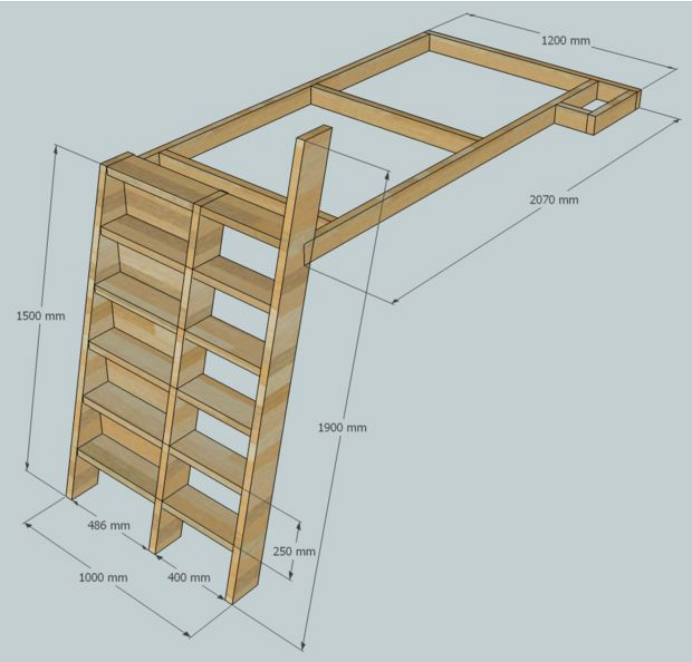
Image Notes
1. It is REALLY hard to photograph something big in a small room!

Step 1: Design: loft bed #1

One end of the cloud loft bed (from here on in, #1) is a combination ladder/bookshelf. It's angled at a 4:1 ratio, which equals 14º away from vertical. It has six steps and six shelves, and can hold nearly three linear meters (10') of books. The bed is about as high off the ground as it can be and still retain head room above, with 8' ceilings (important so the occupant can sit up in bed).

The side of one of the beds is a stylized cloud. It's pretty cute for an eight-year old, but I have no illusions that a teenager will necessarily think it's just as cool, so I anticipate removing it and replacing it at some stage with some other design. The ladder and bookcase are pretty future-proof, I hope - it's quite comfortable for an adult to climb, and we all need storage for books.

Click on the icon below to download the SketchUp 3D design file for this loft bed, and use it as a starting point to design your own.



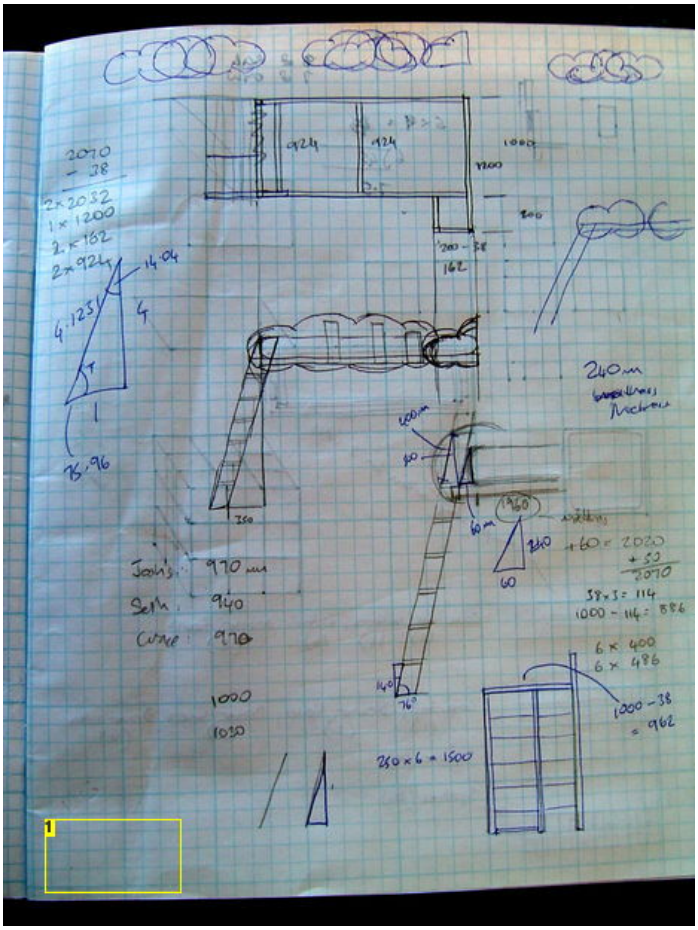


Image Notes
1. What I *actually* used when designing the first bed - but Sketchup was great for the design of the second bed!

File Downloads

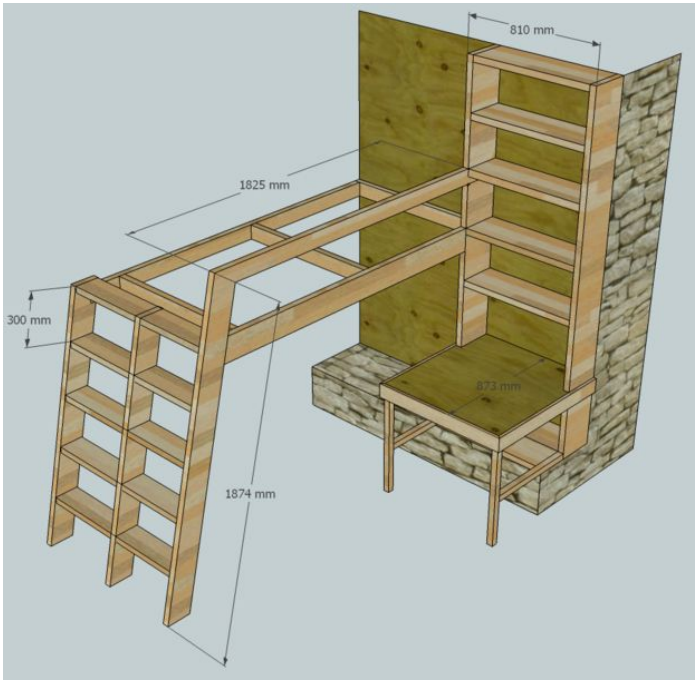
cloudloftbed.skp (138 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'cloudloftbed.skp']

Step 2: Design: loft bed #2

The other loft bed (#2) has a mitered railing instead of a cloud, and because it's going in a bigger room, has space for a desk and another bookshelf alongside the bed. It's also covering a redundant fireplace, which gives the opportunity for adding a **secret compartment** . NO ONE is too old or too cool for a secret compartment, unless they're dead inside.

Other design differences: it has 5 steps instead of 6, as my son is over 5' tall at age 10, and will probably be 6'5" before leaving home (uh-oh...). Wood strips instead of plywood backing for ladder bookshelf - just enough to stop the books falling off the back. No bottom shelf. Dowel running underneath bed, so the space can be used as a wardrobe. The bed frame is notched into only the wall side of the bookshelf ladder - it is lag screwed into the inside of the outside leg. This allows the 2x6 on the outside to look seamless (the other bed didn't need this, because the plywood cloud performs that role).

Click on the icon below to download the SketchUp 3D design file for this loft bed, and use it as a starting point to design your own.



File Downloads

loftbed2.skp (208 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'loftbed2.skp']

Step 3: Tools and materials

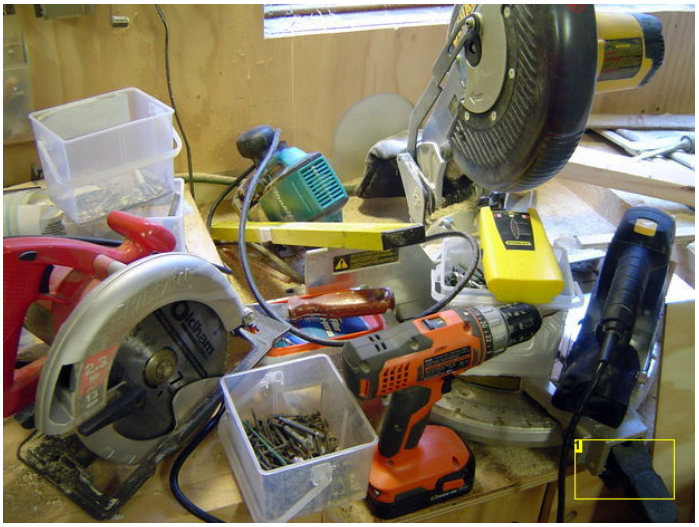
This project will be easier if you have access to a **miter saw** , but you could do the whole thing with a **circular saw** if you have a good guide. I also used an **orbital sander** , **jigsaw** , **router** , **tape measure** , **square** , **level** , **studfinder** and a **cordless drill.**

You need (for each bed):

3-4 pieces of 10' 2x6 construction lumber (carefully selected)
3-4 pieces of 10' 2x4 construction lumber (carefully selected)
3" deck screws
1/4" plywood, about half a sheet
5/8" plywood, construction grade, one sheet
5/8" plywood, sanded one side, one sheet
4 1/4"x6" lag screws with washers
Wood filler
Paint

For the additional bookcase for #2 - I used three 10' 2x10s. You need some more 2x4 for the legs and sides of the desk and a small piece of plywood (5/8" or thicker) for the desktop.

Price is a little hard to judge, because I had some materials already. I'd ballpark $150 for each bed - the extra plywood for the cloud bed was compensated for by the extra wood for the additional bookcase/desk for the other bed. If you need extra plywood to cover up a fireplace like I did, that will add another $50.



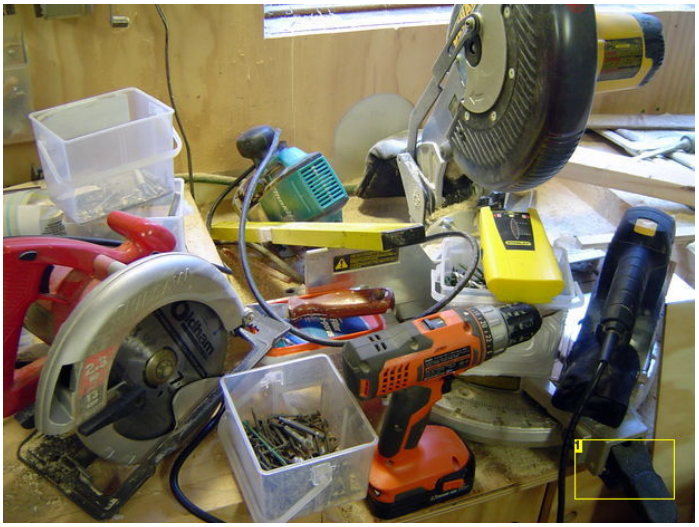


Image Notes
1. Most of the tools I used to make the loft beds

Image Notes
1. Construction grade lumber

Step 4: Cut boards

Saw the 2x6 to the following lengths. Note: construction lumber is far from perfect. You're better off to buy too much lumber and cut out the worst bits (knots, damaged areas) - the offcuts are good for firewood, and you'll have a nicer loft bed.

Cut these 11 pieces with square ends:
5 x 400 mm, 5 x 486 mm,1 x 962 mm

Cut these 3 pieces with parallel ends at 14 degrees:
1 x 1900 mm, 2 x 1462 mm

Saw the 2x4 to the following lengths, all with square ends:
2 x 2032 mm, 1 x 1200 mm, 2 x 964 mm, 1 x 362 mm, 1 x 162 mm

Cut six pieces of 1/4" plywood to 250 x 486 mm, and cut some of the good 5/8" plywood into six strips 20 x 486 mm. Fill all the holes and imperfections in the lumber with wood filler, and sand. You're ready to assemble the frames.

Note: check these dimensions will fit your mattress! The design could accommodate a bigger mattress (double, queen, king) no problem, but you might like to use 2x6s in place of the 2x4s in the frame. Bonus: you'd get a much wider bookcase! There are slight design changes for the loft bed #2, but from here on I'll just describe the cloud bed (#1), for simplicity's sake. The construction is also exactly the same for both. Check the plans for the details.

Image Notes
1. 486 mm long
2. 400 mm long

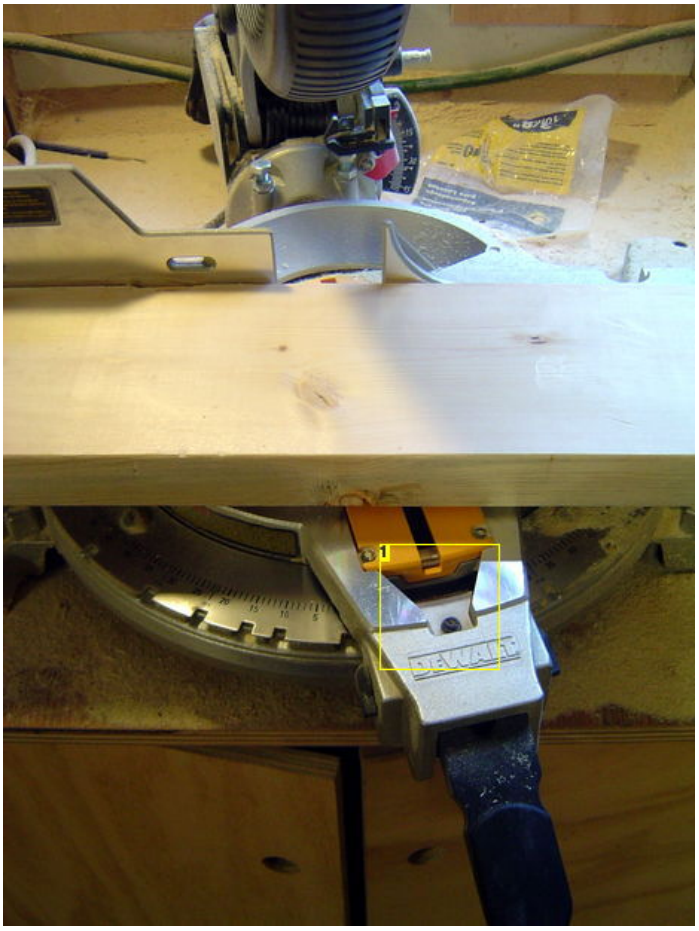


Image Notes
1. Set to 14 degrees

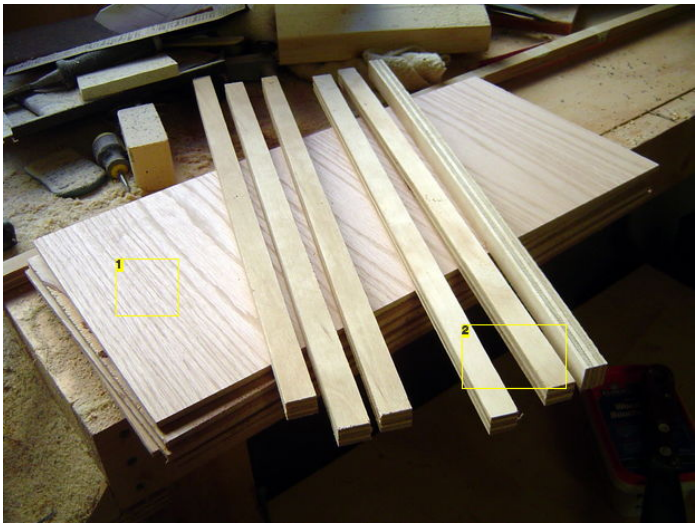


Image Notes
1. Six at 250 x 486 mm
2. Six at 20 x 486 mm

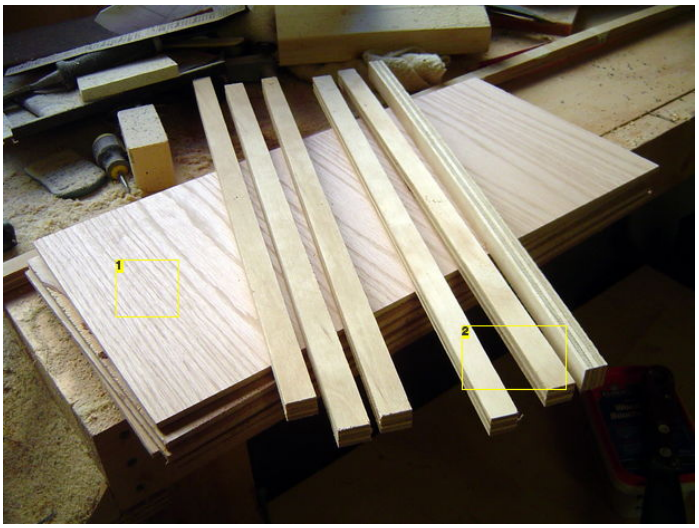


Image Notes
1. Uprights

Step 5: Assemble ladder/bookcase

Mark the angled 2x6 boards with the steps/shelves every 250 mm. That's a good height for a step for a kid, and high enough for most paperback books. Mark them parallel to the bottom angled piece, i.e. at 14º. Drill three holes for each step, and assemble as in the pictures with deck screws, using your handy cordless drill.

Make cut-outs (using jigsaw or saw + chisel) for the 2x4 frame in the back of the 2x6, 55 mm deep at its deepest point, at the underside of the top step.

Add the strips of 5/8" plywood to the underside of the 486 mm long pieces so you can support the backs of the shelves; 55 mm back from the rear of each shelf. Attach with wood glue and brad nailer. The backs of the shelves are made from 1/4" plywood, and can be fixed in place, nailing into the back of each 2x6 and into the plywood strip from the front.

Fill the screw holes, nail holes, and any other imperfections with wood filler, and sand smooth.

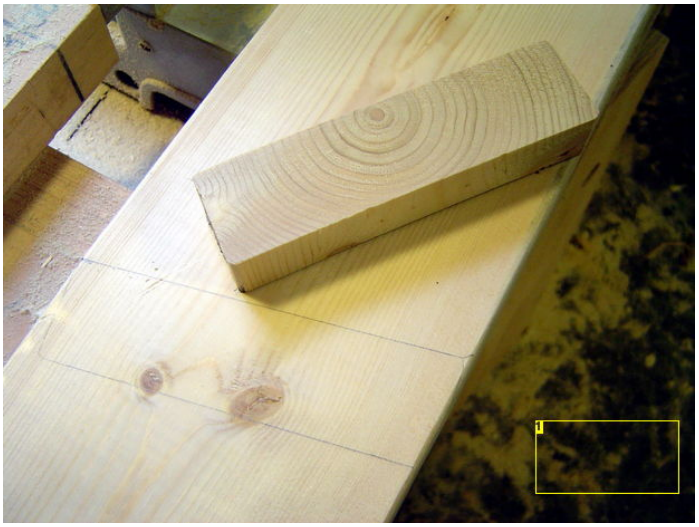


Image Notes
1. Mark the steps every 250 mm

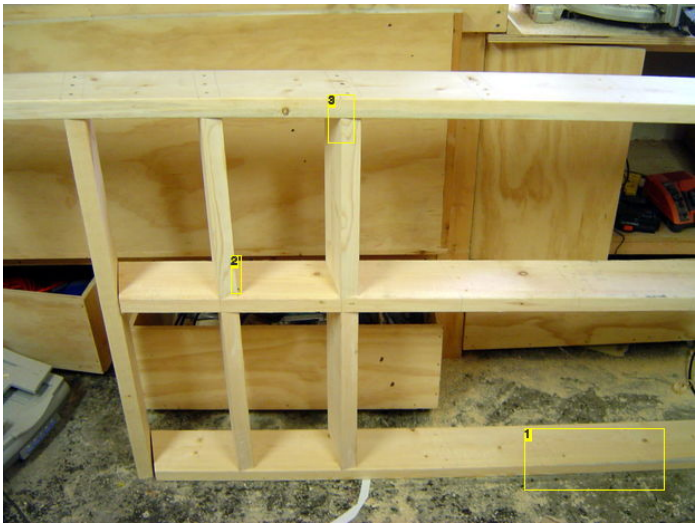


Image Notes
1. Mid-assembly
2. Screw down through here at an angle into the other shelf, on the underside of

each step. All other deck screws can go in perpendicularly
3. Line up the top of each shelf with the front edge of each riser

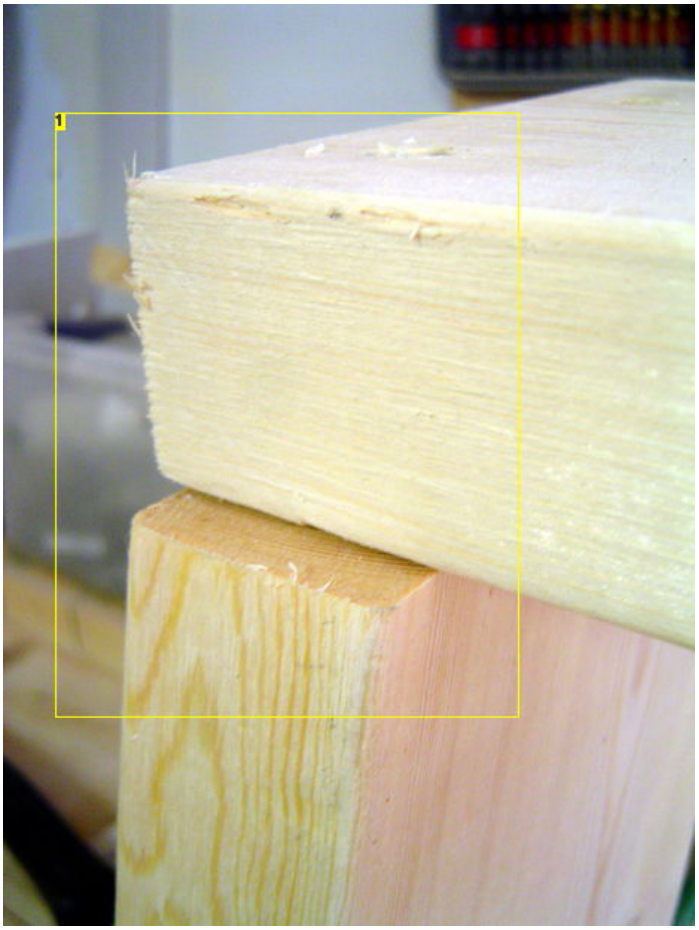


Image Notes
1. Oops! I forgot about this. You could either plan for it and cut your 2x6 accordingly, or... (see next picture)

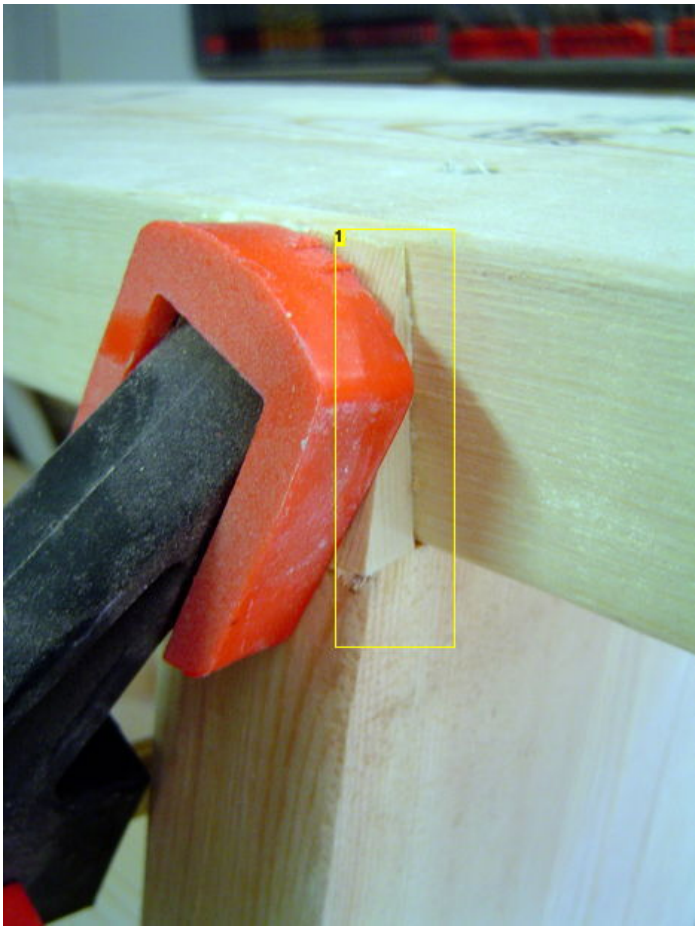


Image Notes
1. ...cut a small wedge and glue in place.

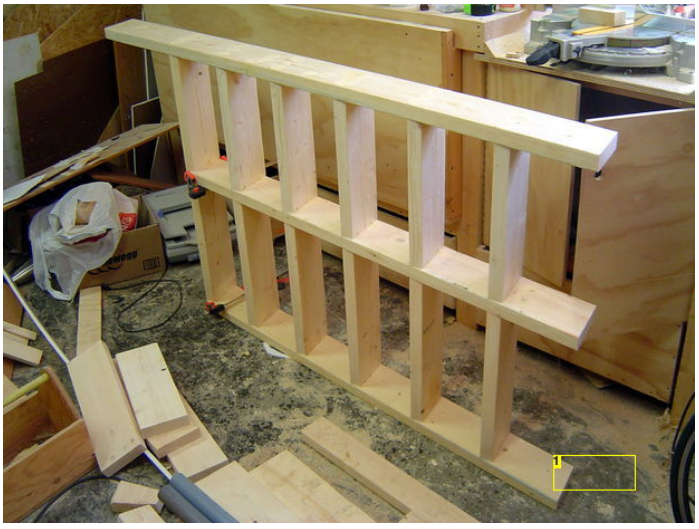


Image Notes
1. Assembled ladder shelves

Image Notes
1. Add strips of plywood to underside of each step

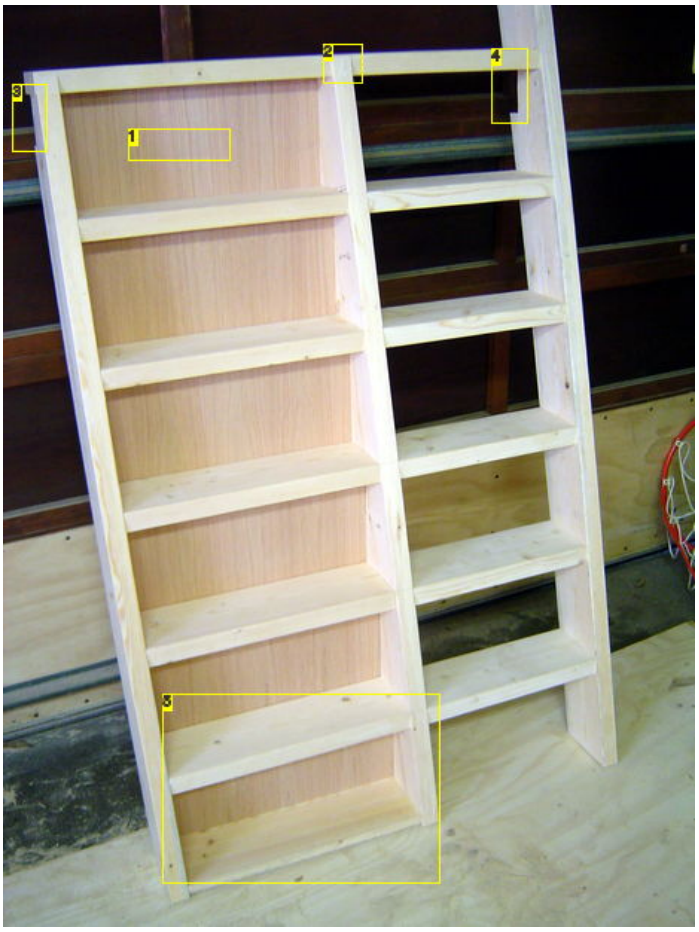


Image Notes
1. Plywood backs added to each shelf
2. One of the small wedges I cut and glued to improve the look
3. One rebate
4. Second rebate
5. Note - I wanted to be able to use the bottom shelf, so used a spare piece of 1" lumber. Not necessary if you don't need 6 shelves!

Step 6: Assemble bed frame

Assemble the 2x4 frame as shown, again with three deck screws per joint. The positions of the cross-pieces are not critical.

Image Notes
1. Assembled 2x4 frame.

Image Notes
1. Not a bad idea to mark out the size of the frame on the plywood before you put it up.

Step 7: Paint

Paint or polyurethane everything. We painted the ladder/shelves the same color as the walls of my daughter's room, so they'd blend in and add to the "floating cloud" effect. We just polyurethaned the other one.

Image Notes
1. Painted frames for cloud bed

Image Notes
1. Note: no bottom shelf. Add if you need the storage.
2. No full plywood back, just a strip of wood to stop books falling off the back of the shelf

Image Notes
1. Frame for loft bed #2

Step 8: Install

Get someone to help with this step - I did it myself with the help of a 6' length of 2x8 and a one-handed clamp, but it was unnecessarily awkward. You're going to attach the frame to the walls of the room using lag screws. Mark the studs - you want to attach it twice at the head and twice on the side. Get the frame the right height and level in both directions. Drill a hole through the frame deep into the wall with a long bit, then put in the lag screw (use a washer). Repeat for the other holes. Use angled deck screws to ensure the frame can't slide out of the brackets you cut for it in the bookcase/ladder.

Measure the plywood base for the mattress and cut to fit. Screw it to the frame.

Image Notes
1. Frame fits into ladder/bookcase here
2. and here

Image Notes
1. I used a deck screw to pin the frame in place temporarily...
2. ...before adding the lag screw.
3. These MUST go into studs

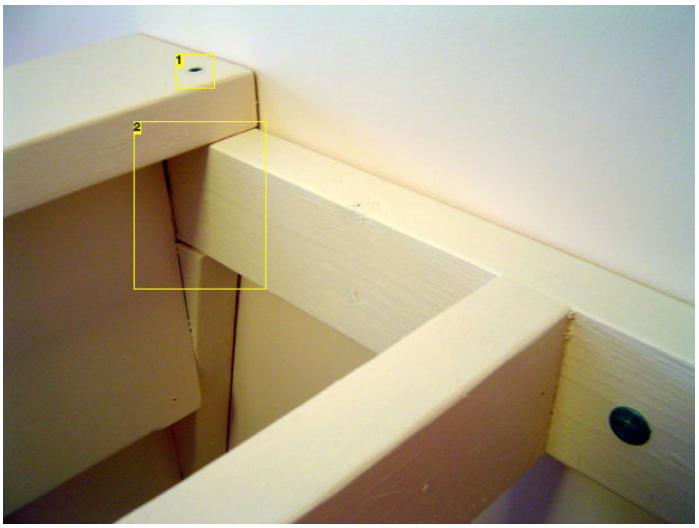


Image Notes
1. Screw bookcase/ladder into frame here
2. Frame sits in notch

Step 9: Clouds (or railing)

Loft beds generally have a railing to remind the occupant that rolling out is a bad idea. Here, we decided to use plywood cut into cloud shapes (who doesn't want to sleep on a cloud?). We mocked it up first in cardboard, then cut the shape with a jigsaw, sanded smooth, rounded the edges with a router, painted it, and screwed it to the frame.

The other bed has a piece of 2x4 that joined up to the other bookcase. Utilitarian, but easy and with a nice miter and rounded edges (I used a roundover bit in my router), it looks good.

Image Notes
1. Mocked up in cardboard

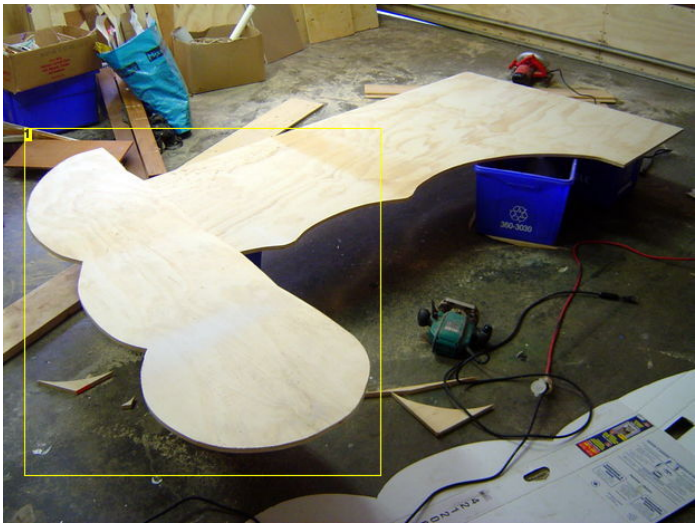


Image Notes
1. Cut out with jigsaw

Image Notes
1. Edges rounded-over with router and ready to paint

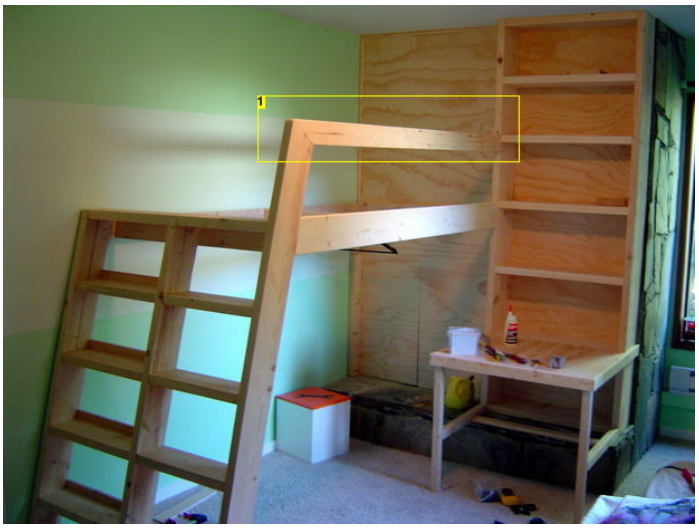


Image Notes
1. 2x4 railing for loft bed #2. Simple but effective

Step 10: Side bookcase and desk

The extra bookcase for loft bed #2 was made with 2x10s to accommodate bigger books. It's super easy to make - it went together so quickly that I forgot to take any in-progress photos. All simple butt joints joined with deck screws. The desk was made from a piece of plywood, and some 2x2 for legs/crossbraces and 1x3s for the sides to stiffen it - I used a very similar construction method here as for my door table . The 1x3s are mitered to make it look a bit slicker.

Image Notes
1. Desk

Image Notes
1. Bookcase, six shelves. The second one down was placed to line up with the top of the rail - the rest are spaced with gaps that I thought looked about right

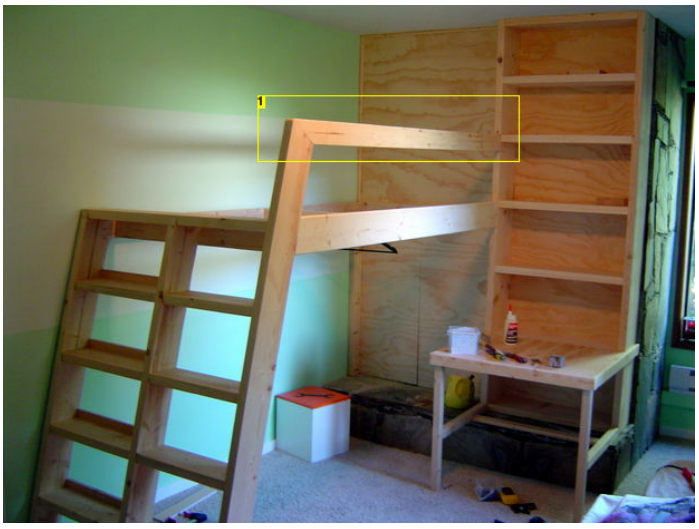
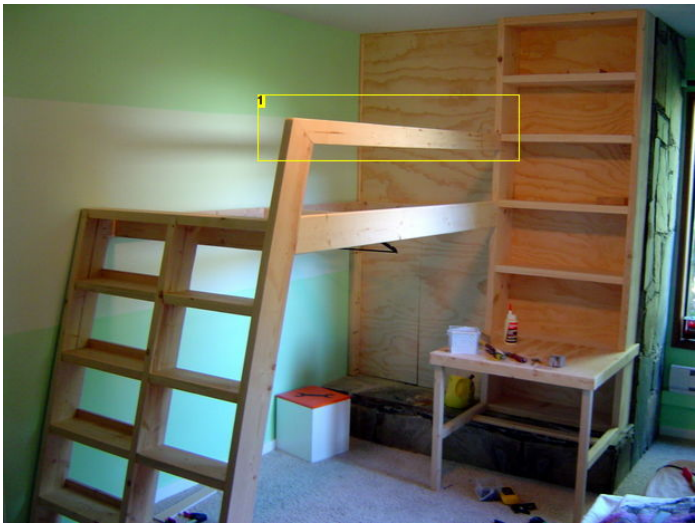


Image Notes
1. 2x4 railing for loft bed #2. Simple but effective



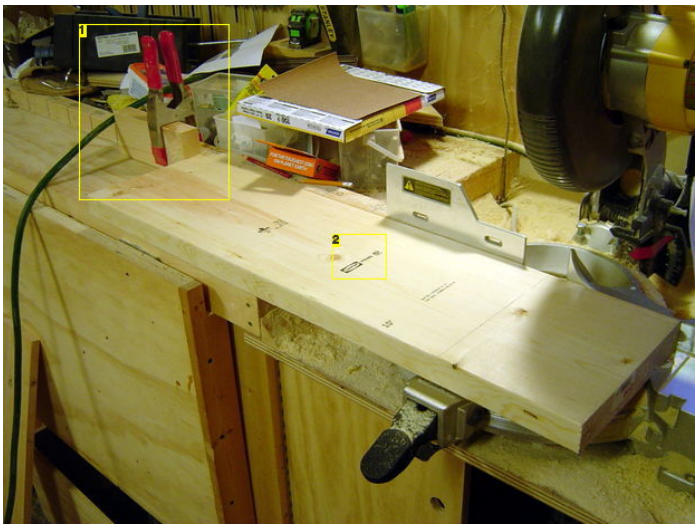


Image Notes
1. When you're cutting a bunch of boards and want them exactly the same length, like for the bookcase, always cut to a stop
2. Sand these stamps off

Step 11: Clothes rail

What can you use the space for under the bed? Well, it's good for general storage, but in the case of my son's room, he doesn't have a wardrobe. So I added a clothes rail so he can hang clothes under the bed. Really easy to do with this design - drill a hole for one end, and drive a screw into the other end of a dowel. I used an old curtain rail for the job. I'll add another one if he needs it.

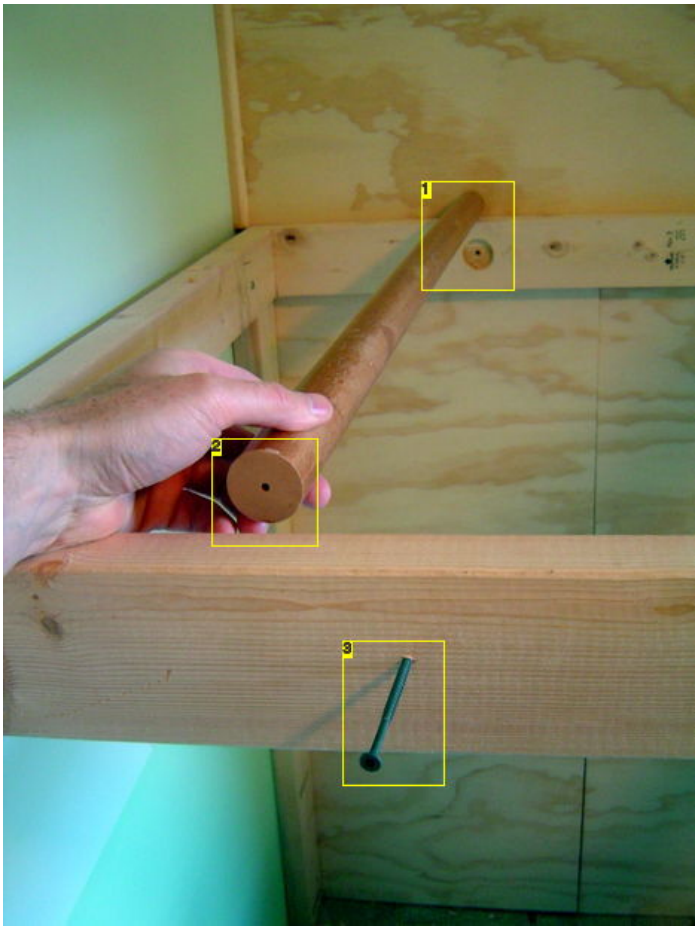


Image Notes
1. Hole drilled with spade bit
2. Predrill hole so you get it lined up right...
3. ....with this screw.

Image Notes
1. Clothes rail ready to go

Step 12: Secret compartment

Who doesn't want a secret space in their room? This one was easy to make, because we were covering up an open fireplace (which is perfectly functional, but which we never use - the room is way too small to justify it). All I had to do was make one of the plywood panels removable. You lift the panel up and over a strip of wood to remove it and reveal the space.

Image Notes
1. Be a shame to waste this space!

Image Notes
1. These two bits of plywood will be fixed

Image Notes
1. Secret panel - invisible at first glance

Image Notes
1. Access panel. All seams are covered with wood; note the extra gap above this panel to allow its removal

Step 13: Add bedding, books

...and happy occupants, and you're done.

Image Notes
1. As you can probably tell from the blurred/curved lines, this photo was stitched

together. You kind of get the idea of what it looks like, though
2. Plywood cloud "railings"
3. Bookshelf
4. Ladder, made from 2x6s
5. New space for stuff(ies)

Image Notes
1. And this photo was taken looking in through the window.

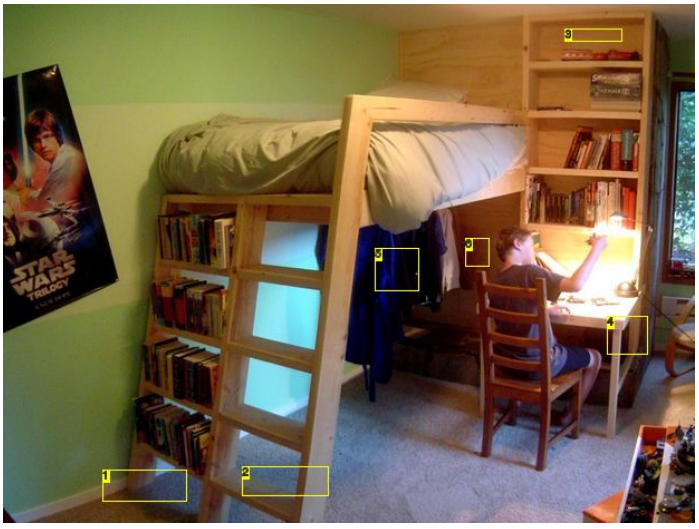


Image Notes
1. Bookcase
2. Ladder
3. Another bookshelf
4. Desk
5. Under bed clothes rail
6. Secret compartment!