

Timber projects

This section contains plans and instructions for three timber projects.

The projects are suggested for students to

- practise skills
- use tools from the course and
- make something useful and practical.

Students could work together on a project — or build one on their own.

The projects are:

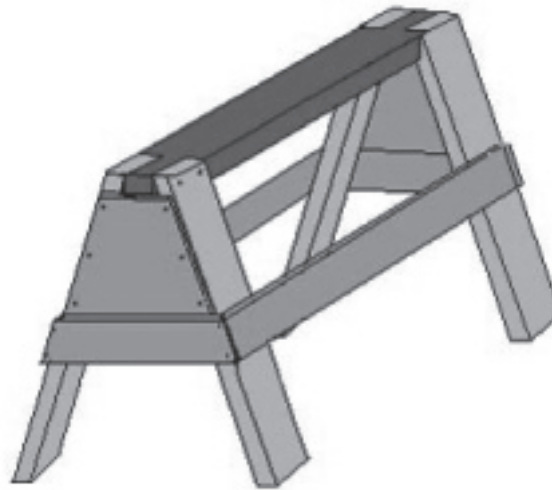
- A saw-horse
- An outdoor table
- A workbench

These are just suggestions. You can use any suitable local project instead.

Project

Make a saw horse

These plans are fairly quick and simple to build



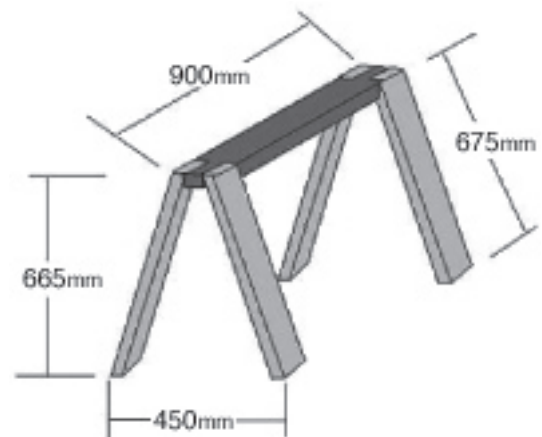
You can change the height and length to fit you

Make the top from 50 x 150mm timber. About 900 to 1000mm long.

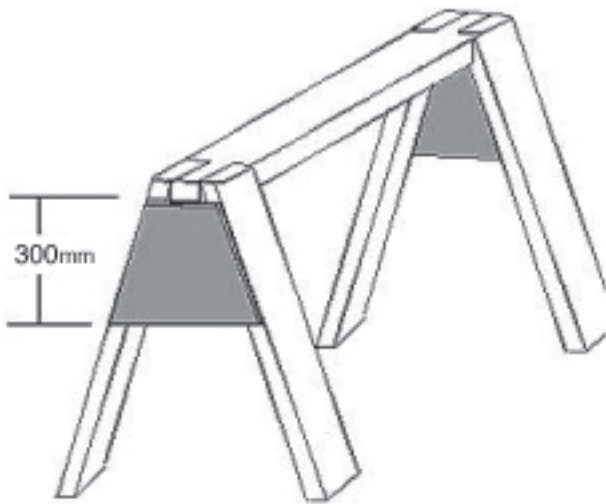
Saw and chisel notches at each end 95mm by 38mm for the four legs.

You could cut the notches at an angle (about 20degrees) to hold the legs at their angle. It will make the horse stronger – but many people don't bother.

Saw four legs of equal length about 675mm long from 50 x 100mm timber.



Nail the legs to the top, but don't nail them all the way in just yet.



Next saw some 12mm plywood into 300mm squares.

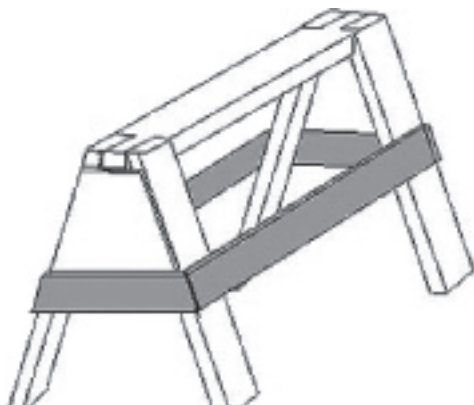
Set the legs about 450 apart at the bottom, hold the plywood up to the base and mark for sawing it along the legs. Make both angled cuts equal so the legs are at an equal angle.

Cut the plywood pieces and nail them on.

Next saw some 25 x 100mm timber to fit all the way around the legs — just under the plywood. Fit between each pair of legs and along the length of the saw horse on both sides.

Measure, saw and nail the pieces on as you go.

Check the legs are square with the top before measuring the two long braces between each pair of legs.



Finally finish nailing the legs in tight to the top.

You could use screws instead of nails to put the horse together, with a little wood glue.

Project

Make an outdoor table

Basics

This table is for use outside. It will seat about to six people — but you can choose how long you want to make it.

This table:

- Uses standard timber sizes
- Is simple to cut and make
- Has no diagonal cross braces — difficult to make
- Is good and solid — so it works well



The tabletop height is about 765mm,

The seat top height is about 425–455mm.

All saw cuts are at 90 degree or 45 degree angles.

There is a list of the all the timber and fixings you need on the back page.

Measure and cut

Legs

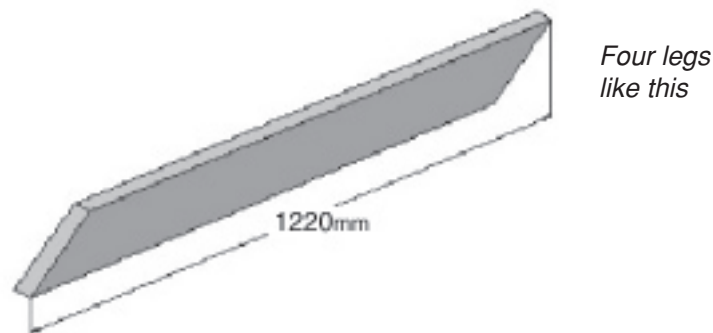
The legs use 50 X 150mm timber.

Cut four lengths, each one 1220m.

Cut each end at 45 degrees so the ends are parallel.

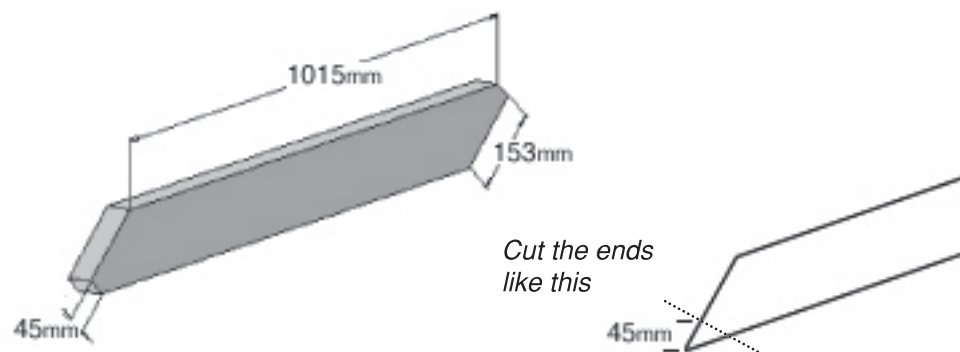
It is very important that they are all exactly the same length!

You should have four legs that look like this:



Cut off the end points of each leg. Measure 45mm along the 45 degree cut from the point end. Mark a line square across to the edge of the board. Saw along the line to cut off the point.

You should have four legs that look like this:



When you put it together, the two 45mm end faces will butt together under the table. The other 45mm faces will be the outer edge at the bottom of the legs.

When the legs are in place, the distance between the outer ends of the legs will be about 1745mm.

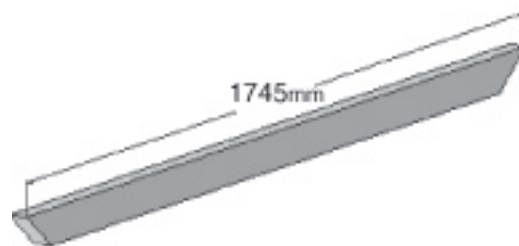
1745mm is also the length for the beams that support the seats — so the edge of the seat will be plumb with the outer end of the legs.



The legs at each end

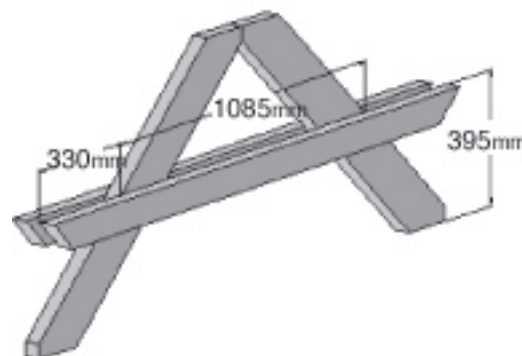
Seat beams

Measure and saw four 50 X 100mm beams to 1745mm length. Cut the ends at 45 degree angle, like this:



Four seat beams

Two seat beams are used at each end, with the legs between them, like this:



Legs and seat beams go together like this.

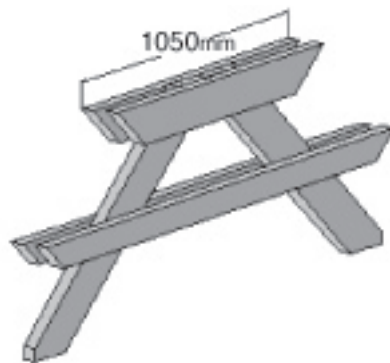
The seat beams are fixed to the legs at a height of 395mm. This will make the top of the finished seat at about 435 – 440mm.

Top and seats

The table top will be about 1050mm wide.

Measure four 50 X 150mm table top beams to 1050mm long.

Cut the ends at 45 degrees as you did for the seat beams. When the top beams are fixed, the legs will look like this:



Legs with seat beams and top beams

Table top and seat planks

The table top will be about 1050mm wide and the seats about 330mm.

You can make the top from 7 equal lengths of 50 X 150mm timber, or 10 lengths of 50 x 100mm — or whatever timber you have available. Space the planks evenly across the top to fit the length of your top beams.

The seat tops can be one 50 X150mm and two of 50 x 100mm — or a combination of whatever timber you have, to give about 330mm.

The length of the top and seats is up to you. About 2000–2150mm is good.

You can measure and cut the top and seat planks now, or you could fix them in place on the table and then cut across in a nice straight line later

Placing the legs

Fix the legs anywhere between 250–350mm from the ends of the seat and top, depending on the length of your table.

As a guide, divide the length of your table by four and use this to centre each leg from the table end.

For example, if you are making the table 2080mm long:

$$2080 \div 4 = 270\text{mm.}$$

Mark the centre line for each leg assembly at 270mm from each end of the table.

Building the table

You should now have all your timber sorted out and cut to size.

Now to put it together.

The legs

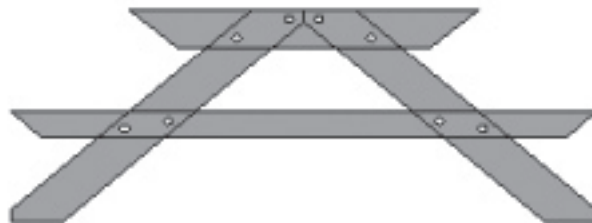
Lay a top beam and a seat beam on a flat floor or a big bench. Put two legs on top of the beams, and then put another top and seat beam on top of the legs.

The two legs must be exactly at 90degrees where they meet at the top. Check with a square.

Measure the height of the seat beams (395–400mm) from a line across the bottom of the legs.

Check the top and seat beams are centred and that they are level. It will take quite a lot of pushing and fiddling to get everything in the right place! When you have the frames right, hold them together with clamps if you have them.

When everything is set accurately, drill 8mm holes through both beams and the legs where they meet — as shown here:



Leg assembly showing bolt holes.

It is easier to keep everything in place if you drill and bolt one joint at a time.

Use 8mm X 150mm coach bolts with a flat washer under each nut to bolt everything together.

Do the same for the other set of legs. Make sure you keep the angles and the height of the seat beam **exactly** the same as for your first set of legs.

Top and seats

Measure and lightly mark the position for each set of legs on the top/seat planks.

Check everything is square and plumb and fix the top and seat planks to the top beams and seat beams. You could skew nail each plank at each join, but the table will be much stronger if most, or all, of the joints are fixed with screws. Use 65mm or 70mm No 8 screws, preferably non-rusting as this is an outside table. Pre-drill and countersink the holes for the screws. Use two screws for each join.

If you have already cut the planks, keep the same overhang at each end of the table. Otherwise, allow for enough overhang at each end, fix the planks and then mark and saw them level.

Changing the Design

You could change the basic design in the following ways.

Adjust the angle of the legs. Putting the legs on steeper slopes will narrow the overall width of the table. If you do this, you will reach a point where the table will become unbalanced if people sit only on one side. If you change the angle of the legs, you will also have to change the 45degree angles at both ends of each leg.

Change the length of the table and/or the position of the legs from the end of the table. There is plenty of room to adjust this. How many people do you want to seat ? Do you want room for a small person to sit 'outside' the legs?

The seats and table top will sag in the middle if you put on too much load or make the table much longer than the 2150mm suggested.

Use other timber sizes

The sizes suggested will give the strength and rigidity you need. Use other sizes if you have them available, but do not use timber that is any smaller, especially for the legs and beams.

Materials

All timber sizes shown are nominal standard sizes. Actual sizes will be smaller.

You need:

Timber

If you can, use good quality timber, especially for the top planking.

Legs

4 of: 50 x 150mm x 1220mm

Seat beams

4 of: 50 x 100mm x 1745mm

Top beams

4 of: 50 x 150mm x 1050mm

Seat planks

2 of: 50 x 100mm x (your length -2150mm max)

1 of: 50 x 150mm x (your length -2150mm max)

Top planks

7 of: 50 x 150mm x (your length -2150mm max)

OR

10 of: 50 x 100mm x (your length -2150mm max)

Fixings

Bolts

16 of 8mm x 150mm galvanised coach bolts and washers

Screws

104 of 65mm x No8 (rustproof)

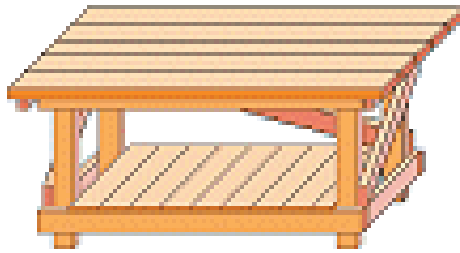
OR

(128 screws if 100mm is used for the table top)

(Or nail equivalent)

Project

How to build a workbench

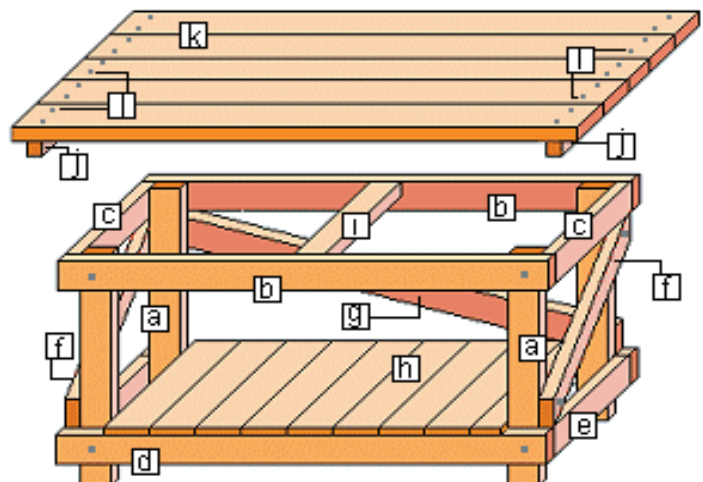


This workbench is basic but very strong. It is easy to make with simple tools.

It is based on the design by Les Kenny at Buideazy.com. If you have access to the internet, you can get full details at <http://www.buideazy.com/workbench>. Thanks to Les for the use of his plans.

Identifying the members:

- (a) Legs 100x50
- (b) Top front & back rails 100x50
- (c) Top side rails 100x50
- (d) Bottom front & back rails 100x50
- (e) Bottom side rails 100x50
- (f) Side diagonal bracing 100x50
- (g) Rear diagonal bracing 100x50
- (h) Shelf 150x25
- (i) Benchtop centre support 100x50
- (j) Benchtop end supports 50x50
- (k) Benchtop 150x50
- (l) Galvanised coach bolts



Materials list

item	description	size	length	number
a	legs	100x50	800	4
b & d	front & back rails for top & bottom	100x50	1600	4
c & e	side rails top and bottom	100x50	550	4
f	side diagonal bracing	100x50	900 (oversize)	2
g	rear diagonal bracing	100x50	1800 (oversize)	1
h	shelving	150x25	650	9
i	benchtop centre support	100x50	550	1
j	benchtop end supports	50x50	750	2
k	benchtop	150x50	1800	5
l	galvanised coach bolts and washers/nuts	10mm	100mm 150mm	44 4

The timber

All the timber sizes are standard nominal sizes. Actual sizes are slightly smaller. Make allowances for any difference in thickness and width.

H3 treated timber is best — especially for outside use.

Four different sizes of timbers are used.

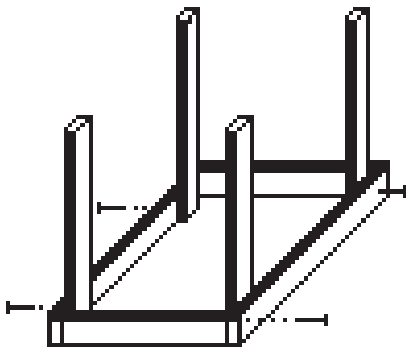
- 50x50 (actual about 46x46) for the top end supports.
- 100x50 (actual about 90x46) for the legs, bracing, rails and benchtop centre support.
- 150x50 (actual about 145x46) for the benchtop.
- 150x25 (actual about 145x20) for the shelving.

How to put it together

Step 1. The frame

On flat ground, nail the front and back top rails **(b)** to the side top rails **(c)** forming an rectangle 1600mm x 650mm.

Clamp a leg **(a)** to the inside edge of each corner (note that the table is upside down). Fix the legs to the rails. Drill a 10mm diameter hole through the centre of where the two pieces meet at each corner. Fit the bolts, washers and nuts, and tighten.



Turn the frame upright.

Clamp the bottom rails **(d)** and **(e)** to the legs **(a)** so that the top of the rails are 200mm up from the bottom of the legs.

Fasten the bottom rails in a similar way to how the top rails were fastened in 'Step 1'.

Nail the benchtop centre support **(i)** in place.

Step 2. The bracing

Make sure all the angles of the workbench frame are square.

Hold the bracing members **(f)** and **(g)** (which are too long at this point), diagonally in place against the legs and mark where they fit the legs. Cut them to size, drill and bolt in place.

Note about the bolts.

The bolts are very important for a sturdy workbench. They are also a big cost. To save money, nails (90mm) can be used in place of some of the bolts. The workbench will still be sturdy, but not **AS** sturdy.

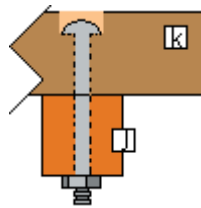
Step 3. The top

Lay all the benchtop pieces (**k**) on level ground, upside down and so that each piece of timber is hard up against one another and all the ends are flush.

Put the two end benchtop supports (**j**) on the benchtop pieces (remember, the benchtop is upside down) so that each support (**j**) is in 50mm from each end. Note that the two supports should also be 1600mm apart which is the length of the bench frame.

Fix the bench supports (**j**) to the benchtop pieces (**k**) with nails. This will hold the top in place until it can be drilled and bolted, so make sure the nails are at a length that will not go all the way through the benchtop.

Turn the benchtop over (upright) and place off the ground on timber blocks so that you can get to it with a drill. Mark for drilling, two holes at each joint. (See the drawing 'Identifying the members' at the top of the page.) Start each hole with a diameter slightly bigger than the bolt head and about 10mm deep. This is so the bolt head does not stick-out above the face of the benchtop. The rest of the hole will be 10mm diameter (or the thickness of the bolt shank).



Start each hole with a diameter slightly bigger than the bolt head.

When the benchtop is bolted firmly together, place it on top of the bench frame and fasten in place by bolting the benchtop end supports (**j**), to the top side rails (**c**), using two bolts (horizontally) each end.

Step 4. The shelving

Nail the shelving (**h**) to the top of the bottom front and back rails (**d**).

Use flat- or jolt-head nails 75mm long. The last shelving piece will need to be cut lengthwise to fit snugly in place.

Finished!

The Workbench Plans and Dimensions

Plan metric and imperial (ft ins)

