



Woodworking

FOR EVERYONE



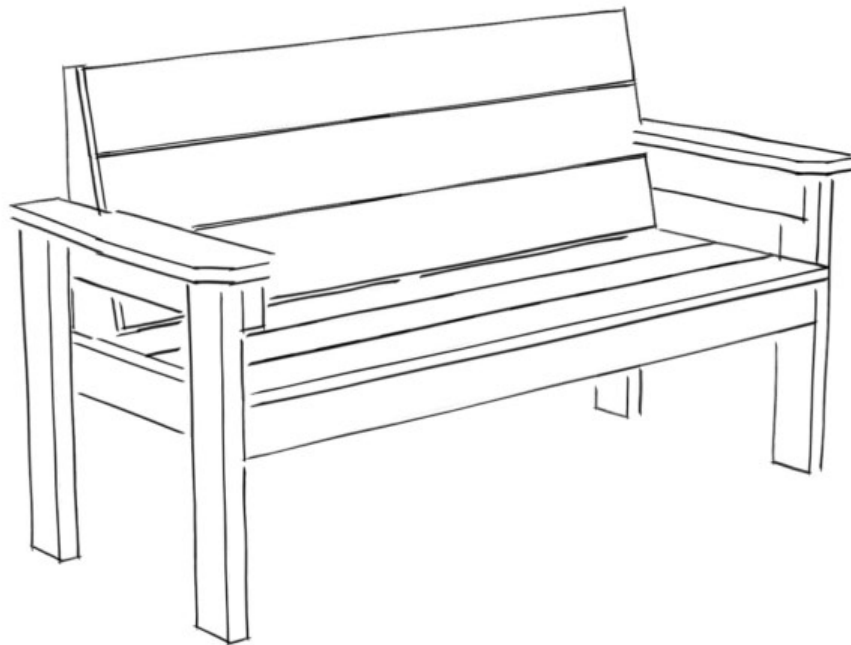
PETER ALKEMA

13 step-by-step projects for your home and family

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*To my incredible wife Amanda, our children James, Juliet, Andrew, Amelia and Genevieve;
I love you with all my heart, forever and ever.*



Extra content

Thank you for purchasing this ebook. We've produced some exciting extra content to help you on your DIY journey. Each project includes a 3D model so that you can view the final product from any angle, and/or an animation video and high-speed construction videos of the project being built. Additional content is indicated at the opening of each chapter with the symbols below, and are listed at the back of the book.



3D model



Animation



Video

AUTHOR INTERVIEWS



Listen to author Peter Alkema's interview on Classic FM.

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INTRODUCTION

Everyone loves to be creative, and making things with wood is enjoyable and easy. With very little experience you can build practical and stylish items for your home. As a father, woodworking is part of the fun I have with our children as we make family memories together. Each of the projects in this book has a story, not only the design and construction but also the reason we built it and the fun we had making it. When I started these projects three years ago, we had twins under the age of two. When I finished, we had five children under the age of five and the bunk beds have been very useful indeed (see pages 91–99). There is a project for everyone in this book so get creative today, discover the joy of woodworking and see the benefits in your home and family.

About the book

There are 13 projects made entirely from wood in this book; the designs and techniques to make the furniture, the enjoyment of

building and using them and the practical advice to improve any skill level is all here. You will learn how to bring wood to life in ways that touch the lives of those you love the most. Families are stronger and happier when there are hobbies and projects that everyone can get involved with. Children develop and grow when they spend quality time with their parents, especially when they are creating and learning together. Woodworking offers families these benefits and more. You will also gain a new piece of furniture that is practical, homemade and full of memories.

There is a project for everyone: the young child standing on the booster step reaching for something or the schoolboy doing home-work at his desk. The toy box is easy enough to be a first project for anyone, while the garden bench will add a much-loved favourite to the experienced woodworker's portfolio of projects. The window seat is fitting for the most stylish home and there is even a sturdy work-bench for the garage or workshop. There are also projects for any life stage of a family – the nursery shelf for first-time parents or the bunk



James and Juliet helping Dad by sanding down the nursery shelf, which you can also make (see pages 51–59). Note how the shelves have been assembled with a woodworking joint called a through dado, which you can also learn (see page 22).



My family is the inspiration for most of my woodworking, not only when I design projects but also when I build them and everyone gets involved. Our children love helping me and I enjoy seeing them use what I have made.

beds for later when you need extra space in the children's bedroom. The Wendy house is the most ambitious project, but perfect for any medium to large garden where children's laughter fills the air.

My dad taught me how to work with wood and this timeless craft also helps to strengthen the bond between parent and child. The go-kart he made me was the purest expression of his love, which is why this book includes a short tribute to him.

The Tools and Techniques chapter (see pages 13–25) presents all the practical advice you need to make the projects in this book. Hand tools such as screwdrivers, clamps and try squares are included, while the power tools section includes the electric planer and belt sander, as well as photographs showing you how to use these and other tools properly. Find out why a carpenter's pencil is shaped like it is and learn terms such as chamfer, half-lap joint and countersink. The joinery and finishing techniques introduce you to basic woodworking methods that you can put into practice when you make the projects.

The introduction of each chapter describes the background of the project in our home, as well as the design and construction principles involved. The exploded diagram of each project is an isometric view with almost every part separated from the final assembly so that you can see how it all fits together. The parts are labelled and referred to in the instructions and itemised in the parts list so you know what you need to make the project. Wood screws, brackets, nuts and bolts are not listed each time – keep a box of different sizes handy and look at the photos to determine their positions and the number you require. Other diagrams in each chapter give you the measurements and help

you to visualise different aspects of each design. The instructions and step-by-step photographs are clear and practical to help you build each project and develop your woodworking skills.

Learning from mistakes is part of life so I have also explained what I did wrong and would do differently the next time if I made the project again. This will also help you to improve on my approach so that you can find even better ways of making the projects. Each chapter also has an information section with the overall dimensions of each finished item, as well as the number of parts, special equipment, techniques, duration and difficulty of the project. The Family Fun Factor even tells you how much fun you and your family will have making and using the project. Many of the steps in the instructions also include tips and tricks, with useful explanations of why certain things are done in the building process.

Most of these projects were designed and built for our family home and the enjoyment of our children, all of whom feature in these pages. They brought me my tools, helped with painting and sanding and mostly just watched me, just as I watched my dad while he worked around our family home. Strengthen and enrich your family life as you create with wood to make practical and stylish furniture for every occasion. Hobbies make happy homes, and these woodworking projects will involve everyone and create fun family time together. Why purchase expensive furniture when you can make it for a lot less and learn some valuable skills at the same time? Try your first project today and get ready to impress your family and friends.

The Wendy House

By far the biggest and most complex project in the book, the Wendy house was made for our first set of twins as their second birthday present (see pages 139–155). Wendy houses are very popular with young children and commercial versions are a standard design consisting of pre-built parts, usually assembled by a skilled team in one day. Ours took six months to build from raw materials and also combined additional features of traditional wooden homes such as skylights, a raised base and a pitched roof. I built the Wendy house in four major phases:

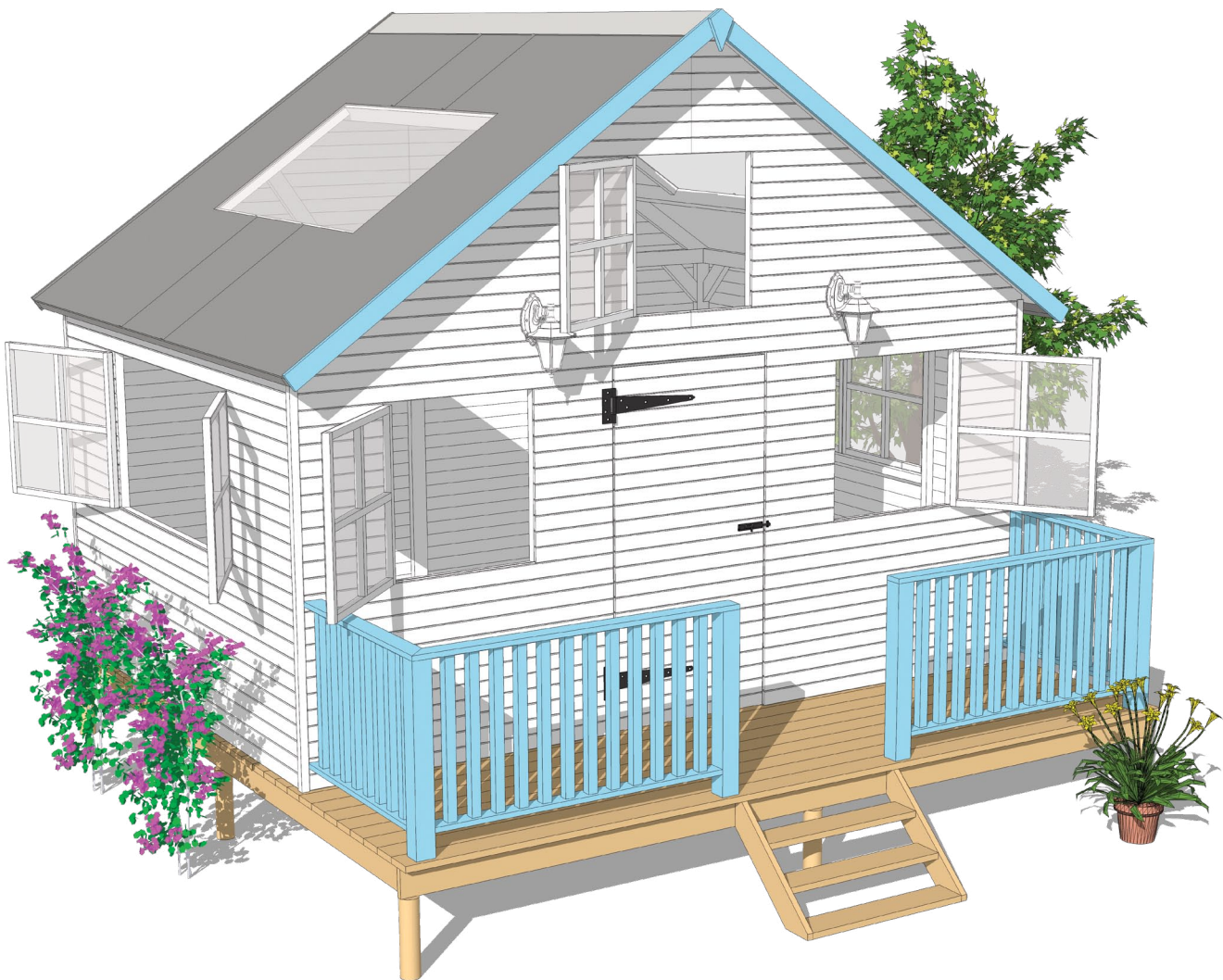
1. **The base** was very labour intensive as I used heavy wooden poles for the supporting stakes and large timbers for the floor to ensure a sturdy and safe foundation. Mid-way through this phase I decided to extend the front of the base so that we could have a bigger balcony; this only became clear once I got a sense of the physical space I was creating. (Once the base was actually finished, sanded down and treated I was tempted to stop at this point and just add some deck chairs and a hammock!)
2. Fortunately I carried on and the next phase was the **main structure** or skeleton of the house. This is where the design differs from commercial Wendy houses, which consist of wall panels

fully made up in the factory and which are simply fixed together at the four corners during on-site construction. (I also changed my mind during this process and made the pitch on the roof much steeper, which provided more headroom inside as well as space for the extra window above the door.)

3. My design is similar to the American-style timber-frame houses, which are fully erected before **the walls** are built around this structure (the third phase). I used tongue-and-groove timber for the walls, which is more common in making floors and ceilings but just as suitable, and the roof was made of large boards of plywood with two skylights cut out. (Although it took some late nights, I managed to reach this stage in time for the children's second birthday. The Wendy house was fully waterproofed and painted just in time for the party.)
4. The final phase was **windows, doors, fixtures and fittings**. Having cut out the five window frames in the previous step, I then built and installed the windows, which featured stays, hinges and curtain rails on the inside. I also installed lighting, as well as the door – a typical barn design – and the skylights, which were sheets of thick Perspex.

James and Juliet loved wearing their builder outfits. You can see the roof boards to the right of the photo, about to be hauled up the ladder and installed.





The Wendy house design was drawn on a computer program to the exact measurements of the real version. A 3D-drawing is useful before you start building a large project so you can visualise exactly what it will look like.

The whole family had plenty of fun at every stage of the project and everyone was able to contribute in some way as we transformed a corner of the garden into the favourite outdoor play area. The fully completed Wendy house was ready for their third birthday party, even fitted with curtains that were made by Nana.

When we first had the idea of building a Wendy house, I researched different designs and sketched a few ideas by hand. I had a general idea of what I wanted to build but was flexible enough to make major changes as I went along. This was either because I developed new ideas as I learnt by doing or because my ideas were not feasible in the first place. The bigger base for the balcony, steeper roof and extra window above the door were major changes I made on the fly but which resulted in a vastly improved finished product. As with any creative process, your best ideas often come from working with the raw material and getting a sense of the form and function of what you are making.

After the Wendy house was built in the real world I tackled the huge task of creating it in the virtual world by building it in SketchUp, a 3D-drawing programme on the computer. It has more than 450 components, each of which I drew to exact dimensions. Usually you would have such a design beforehand, from which you build the real project, but my building process was more of a learning experience. If you decide to tackle this project, you will benefit from having this design upfront and can even improve on what I have done.

My woodworking confidence improved significantly during this project and I benefited from seeing different methods come together. I used every woodworking technique I knew and developed many more. The Wendy house is the last project in the book, because it is the most difficult, but most of the techniques are used in the chapters leading up to it. As you build these projects, you will learn the skills you need, or just start with the Wendy house. Either way you'll never know unless you try.

TRIBUTE

My late father loved working with his hands and I have fond memories of helping him with all kinds of projects and DIY jobs around the house. Even when I was a young boy he patiently involved me in what he was doing and used every opportunity to teach me as he worked. Dad could fix anything and I was proud to be his apprentice, learning the tricks of the trade as we spent quality time together, father and son. I watched him re-tile the bathroom, install bay windows, build a garage and even add a second storey onto our house with two new bedrooms for my sister Mandy and me – all with his precious weekend time. He was an excellent tradesman but it was his love of woodworking that left a lasting impression on me and ultimately led to this book. When I was seven he built a wooden go-kart for me which was the best in the neighbourhood and featured an advanced braking system. I raced it every weekend, telling the children next door ‘my Dad made this for me’ as I pulled it back up

the hill. My earliest awareness of fatherhood was one of building and fixing, creating and learning.

I realise only now, as a father myself, that he was the proud one in the family, watching his son derive joy from something he had lovingly built. When I see James and Juliet play in their Wendy house, sit on the window seat, use their desks or sleep in their new beds, I understand the same fatherly pride he must have felt. When I am working on a project I also remember Dad guiding and encouraging me, looking over my shoulder and reminding me to ‘measure twice, cut once’. He also taught me how to make materials and tools last longer and, most importantly for a woodworker, how to set up a workshop. Even when there was no space for a workshop he made the best of what we had, using what was available and teaching me that life is very much the same. Before I was born my parents lived in a small flat and during the evenings Dad would set up his workshop in the kitchen to build a



The best go-kart in the neighbourhood, built by my late father, driven by me, admired by many! The advanced braking system was on the right-hand side back wheel and is not visible in the photo, but at this stage of the hill, my focus was speed and steering.

bath cabinet for me. The **dovetail joints** on the corner of the drawer, visible in the photo, were lovingly chiselled out by hand – only the best for me, his newborn son, and this was how he showed it.



As a young baby in 1976, I would sit in my pram and watch Dad with keen interest. Fortunately he didn't ask me to hold anything or fetch tools from the garage. As an active and involved father he used his spare time to work on projects, multi-tasking while babysitting and ensuring he got the most out of every day we spent together. *Woodworking for Everyone* is about these projects being part of family life, not only when they are finished and used in the home but also when they are being made and everyone gets involved. Just as I enjoyed those times with Dad, so my children love helping me and treasure the furniture we have made together. The projects are not perfect, because this would require endless and uninterrupted hours in the workshop, which is impossible for a busy and involved father of young children. I have learnt from Dad that neither perfection nor mastery is the goal; rather it is a home of fun and learning for everyone.



We have tried to recreate this environment in our family life as we bring up our children to use their hands creatively and their time wisely. Children love to receive affirmation, and being involved with a family project boosts a child's confidence as they express themselves through their contribution. As the older children use their hands more, the younger children watch them and practise their own special arts and crafts. Thirty-seven years after I watched Dad from my baby seat, our youngest child Genevieve now watches me, and we treasure the role that woodworking continues to play as a special part of our family.





Tools and Techniques

The projects in this book can be constructed in a garage or small workshop with a basic collection of tools. Selecting the right tool and using it properly makes woodworking enjoyable so it's worth getting the right equipment and learning how to use it before you tackle the projects. This chapter will teach you the tools and techniques required to make any of the projects and give you the basics to get started with woodworking. It covers the use of hand and power tools, various woodworking joints and how to use a scroll saw to make decorative projects and gifts. Once you have put these skills into practice and made these projects for your family and friends, you can easily move on to more advanced methods and more specialised (and expensive!) tools.



This chapter is not an exhaustive coverage of the theory of wood-working, but rather an introduction to some of the more common tools and techniques used in this much-loved hobby. Everything you need for the projects is described here and is cross-referenced in the instructions for each project in **bold** text, providing an easy link to the theory as you are building the furniture. As with any hobby, practice makes perfect (and power is best!). The correct body position for comfortable and efficient cutting or abrasion when using power tools is shown in the photographs.

A woodworker's favourite hand tools are the ones most accessible while working and my workshop is no exception. Investing in good tools is important but equally so is the ability to get access to them as soon as you need them, rather than delaying your work by having to look for them. As with any pastime, your tools require

cleaning and maintenance so you can enjoy working smartly each time you tackle a project. The hand tools I use the most are hanging up in front of me when I am standing at the workbench, which is another important part of any workshop (see pages 129–137).

Hand tools are covered first in this chapter, followed by various power tools and accessories, then joints and finishing. Also included is a short description of the scroll saw as well as three projects I have made for my family. Photographs have been included to help you visualise the tool or technique being covered and will assist you in using each one in your workshop. There are many variations in size and model for the tools included here so get the right advice, especially when making a significant investment. Look after your tools and workspace to ensure you enjoy many years of fulfilling craftsmanship and fun family woodworking.

HAND TOOLS

Screwdrivers (1) rotate screws into wood to create a joint between two or more pieces. They consist of a handle and a protruding shaft, the end of which is shaped to fit the head of a particular screw. The two most common tips are flat and cross (or Phillips), but some screwdrivers can take different fittings to tighten any rotating metal fastener. Choose a screwdriver based on its handle, which should feel comfortable in your hand to give you maximum control.

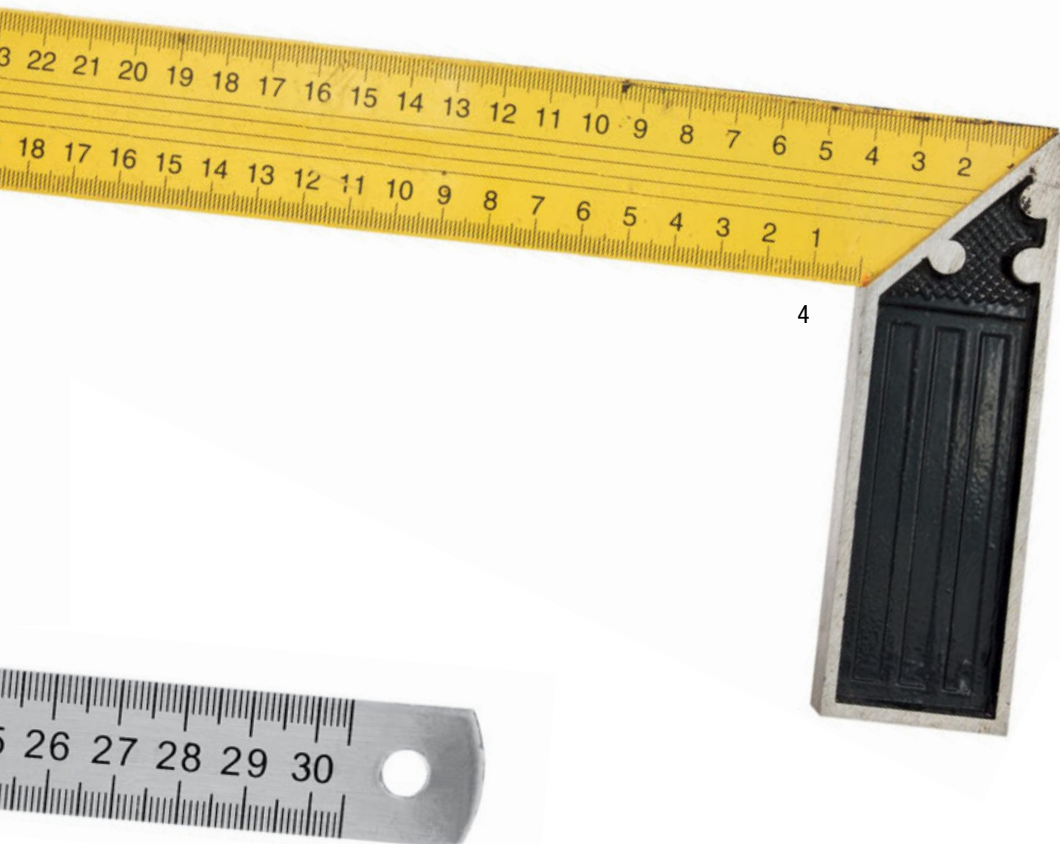
For the measuring requirements of most of the projects included in this book, I used three **steel rulers** (2) of different lengths, depending on the scale of the job: 1m, 60cm and 10cm. The steel ruler shown here is 30,5cm in length and other types also show inches, which is very useful when converting designs from metric to imperial or vice versa. Folding rulers are also very useful; it was the only measuring tool Dad always carried around with him.



The **tape measure** (3) is also used for measuring and consists of a flexible metal strip marked at intervals. It conveniently rolls up and is indispensable when working with long pieces of wood. I used a tape measure extensively when building the Wendy house as the measurements were of a bigger scale and less accuracy was required than when using a steel ruler in the workshop.



A **try square** (4) (sometimes called a set square) is used to measure right angles and consists of a ruler and handle which intersect to form an 'L' shape. A **steel square** is much larger than a standard try square and carpenters use it to construct stairs and roofs. They are particularly useful for measuring a right angle on a large piece of furniture, especially where the adjoining parts are long, such as on the bunk beds (see page 91) and Wendy house (see page 139).



A **claw hammer** (5) was used to hammer in the nails to mount the backing of the bookcases (see page 49) and hang up pictures in the finished Wendy house (see page 154). The **rubber mallet** is another type of hammer which is very useful as it delivers a softer blow, does not leave marks and is used to force-fit parts together. The head is large and shaped like a barrel, while the handle is usually made of wood or steel. I used a rubber mallet on most projects, but it was indispensable for positioning the base slats in the child's bed (see page 81), seating the tongue-and-groove timbers in the Wendy house (see page 149) and assembling the bunk beds (see page 91).



Wood chisels (6) come in different widths and are important for making joints by hand and removing excess material. The cut-out process on the toy shelf (see page 75) required the use of a chisel with a width less than that of the interlocking joint. A jigsaw was used for the long lateral cuts, but at the end of the cut a chisel was needed to remove excess wood along the short end where the jigsaw was unable to make the cut. A special type of **wooden mallet** (7) should be used with a chisel.



Any pencil can be used for marking out measurements, but the **carpenter's pencil** (8) has some unique features which make it particularly useful when making furniture. A carpenter's pencil has an elliptical or rectangular cross-section, which means it does not roll away on sloping surfaces. The lead is also shaped and thus when sharpened in a certain way, the pencil can be rotated in your hand to alternate between thick and thin lines.



The only project with extensive use of **nuts and bolts** (9) is the bunk beds, which means it can be dismantled for storage when required. You need a **spanner** (10) and **socket wrench** (11) to fasten the bolts, typically with the wrench holding either the nut or bolt head in position, while the socket wrench allows for rapid rotation of the other until it locks tight in position. Make sure you add a washer between the nut and the wood and also between the bolt head and the surface of the wood. This will protect the surface of the wood when the nut and bolt are tightened.

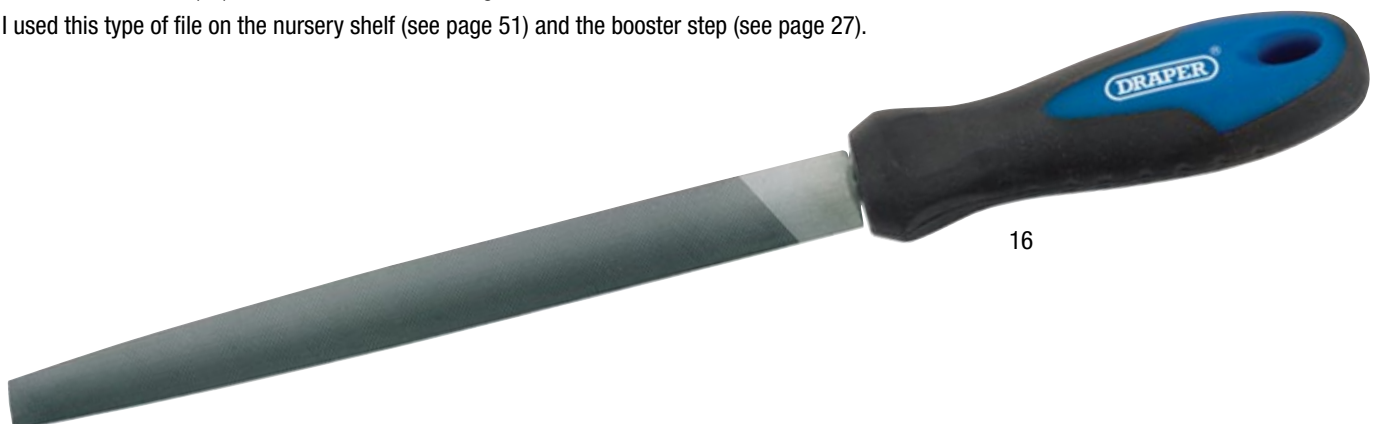


All of the projects in the book make extensive use of different types of clamps. A clamp holds two or more objects together tightly to prevent movement or separation. **G-clamps** (12) are used for exerting very high pressure between two points close together (bunk beds, see page 91) and feature a metal bracket with a steel screw that can be turned to change the distance between the opposing plates. **Quick grip clamps** (13) can be tightened with one hand and work better over longer distances than G-clamps but apply less pressure. They work based on a ratcheting system that moves one arm along the shaft as a lever is pressed and released. **Sash clamps** (14) are

fully adjustable over very long distances (>1m) and are typically used for butt jointing large boards together, such as the back of the nursery shelf project (see page 51). The fourth type of clamp used in these projects is the **light-duty right-angle clamp** (15), which holds two small pieces of wood at right angles to each other. Typically they are used for clamping the corners of picture frames, but I used them to hold the corners of the bookcases, nursery shelf and toy shelf at 90 degrees while I fastened the joints. Larger versions should be used for heavy duty work.



A **file** is a hand tool that has serrated edges and rough surfaces and can be used like a rasp to remove material from wood. The **half-round file** (16) is common in woodworking as it can be used on flat or concave surfaces. I used this type of file on the nursery shelf (see page 51) and the booster step (see page 27).



POWER TOOLS

A **power drill** is the workhorse of any woodworker as it not only drills the pilot holes for fastening two pieces of wood with screws but it can also be used to rapidly tighten screws into position rather than doing so by hand with a normal screwdriver. Normal wood cutting **drill bits** (17) come in different diameters, depending on the



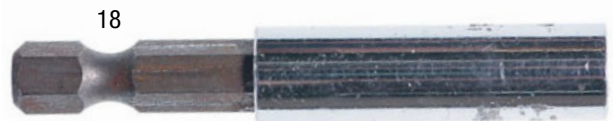
A bench vice is used to hold the piece of wood securely on the workbench while using the power tool. See page 136 for how to set up the bench vice.



size of the hole required. The bolts in the bunk beds required 12mm, while pilot holes for other projects required 4mm. Using a drill to tighten screws requires an **insert bit holder** (18), which is fitted into the drill, into which an **insert bit** (19) is placed. I used screws with a square drive and corresponding insert bit, which reduces stripped heads and offers greater control over the fastening process than normal cross- or flat-style screw heads.

Use a power drill to drill **pilot holes**, then use an insert bit to fasten the joints with **cut screws** (20). When drilling the pilot holes, use a drill bit 1mm less than the screw diameter and set the depth gauge to three-quarters of the cut screw length.

TIP: If you have two power drills you can drill pilot holes with one and fasten the screws with the other, which means you can complete each joint in succession.



The **jigsaw** is used to make any kind of cut in a piece of wood, and is usually used for curves or other custom shapes. It is useful for short, straight cuts but should be exchanged for a circular saw for longer, straight cuts. A jigsaw has an electric motor that controls a saw blade that moves up and down and which can be guided through the wood. Blades are different sizes and have different numbers of teeth, depending on the width and density of the material being cut.





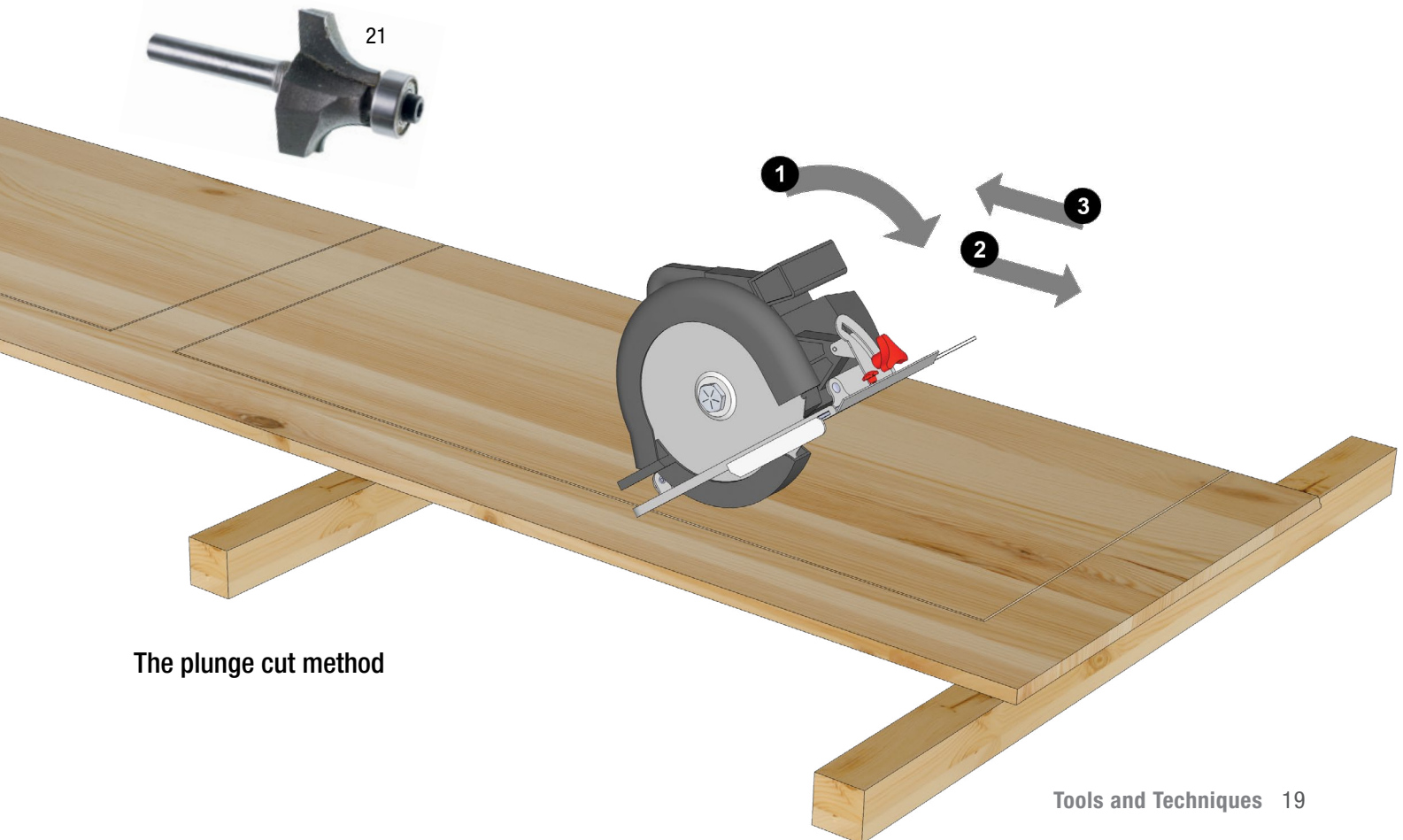
A **router** is a power tool used to cut evenly into the corner edge of a piece of wood to create a decorative cross-section that is made by its rotating cutting tool, called the **router bit** (21). Router bits come in different shapes; the one shown is called a Roman Ogee and was used on the window seat (see page 101). The edges of the top surface of the bookcase (see page 43) were also shaped with a router to achieve a 'beading' profile. In addition to decorative finishing, routers can also be used to make a joinery aid such as the **dados** on the nursery shelf (see page 51).



A **circular saw** is very useful for making long, straight cuts in large pieces of wood. It features a spinning circular blade with teeth along the edge, which makes it a very dangerous power tool and requires the use of safety gear while in operation. The **plunge cut method** (see illustration below) is used to cut a board when the start and end



of the cut does not reach the edges. This technique was used to cut the hinged panels out of the top surface of the window seat (see page 101). Position the circular saw angled upwards on the back of its base plate at a point midway through the cut. Make the cut by rotating the circular saw downwards and into the wood and then cut forwards and backwards to the ends of the cut as normal.



The plunge cut method

An **electric planer** has rotating blades on an adjustable surface and can remove wood up to a couple of centimetres deep. It is the power version of the hand plane and was used extensively on the deck of the Wendy house (see page 139) to remove the irregularities in the boards once they had been installed.



Finer removal of surface material that results in a smoother finish can be achieved using a **belt sander**, which features a belt of sandpaper mounted between two high-speed rotating drums. Sandpaper belts are graded by the density of grit on them and can be changed to achieve the required finish on the wood surface.

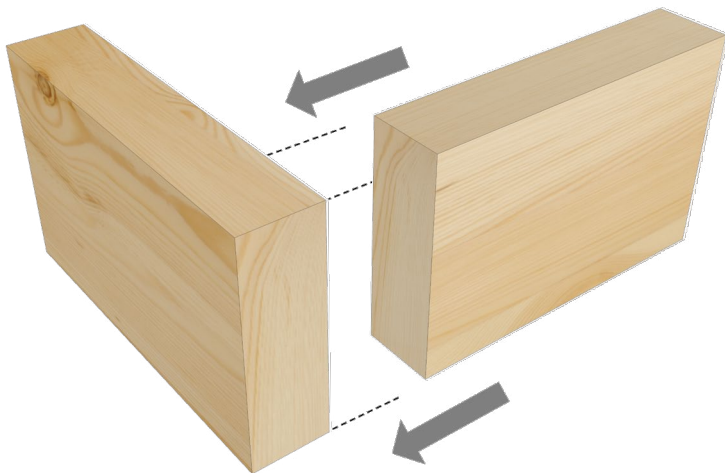


Even smoother finishing can be achieved with a **random orbital sander**, which holds a piece of sandpaper on its base and moves it in a random motion caused by the mechanics of the high-speed motor. It is very useful for smaller areas and confined spaces, such as in the nursery shelf where the inside back surface within each shelf compartment had to be sanded to a fine finish (see pages 58–59).



JOINTS AND FINISHING

The simple **butt joint** is the most common method of joining two pieces of wood together at right angles, usually where a corner joint is required. The end of one piece of wood is fastened against the face of another piece of wood, which makes it the weakest of joints due to the smallest surface area of contact. These joints are usually fastened with glue, nails or screws and often have to be reinforced with dowels or right-angle brackets.



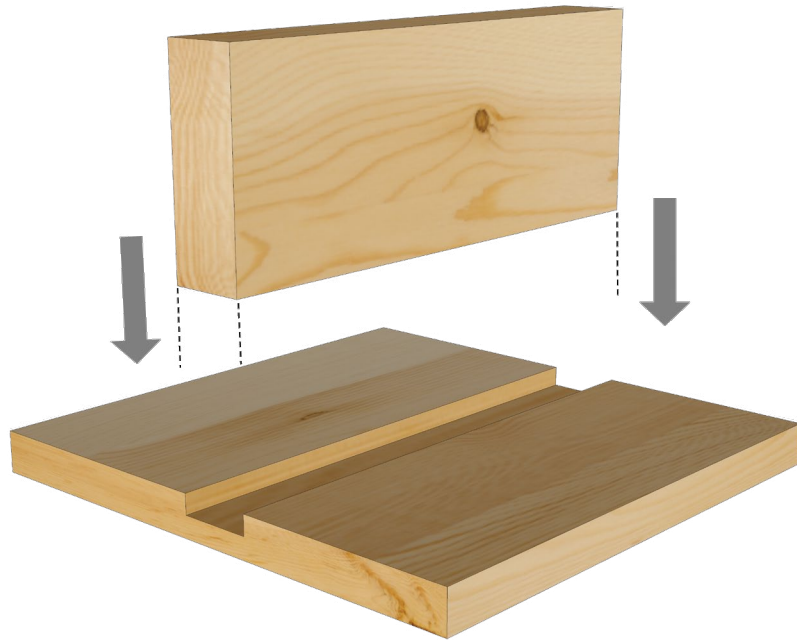
A **chamfer** is a bevelled edge connecting two surfaces at different angles, which can be achieved with special tools or less accurately with a simple plane or sanding block. Most often it is used on right-angle corners, either as a decorative finish or for some practical purpose such as in the gym bench project (see page 119) where it makes the seat more comfortable to sit on.



Pocket hole joinery is a technique that produces a more advanced joint and is often found in cabinets, picture frames and windows. A special **jig** is used to hold one piece of wood and guide the drilling of a hole using a **special drill bit and collar** (21). The piece is then removed from the jig and fastened to the adjoining piece of wood with **self-tapping screws** (22). The toy box project (see page 35) uses this technique to join the sides together. Use **pre-cut fillers** (23) for the oblique holes, which completely fill the drilled hole above the top of the screw head.



The nursery shelf project (see page 51) is built entirely with a **through dado joint**, which requires no screws or nails, only glue. A dado is a groove that is cut into one piece of wood into which the end of another piece of wood will fit snugly. Typically the width of the groove would be the same as that of the adjoining piece of wood. Where the groove runs across the facing width, it is called a through dado, while a limited groove is called a stopped dado.



A **marking template** can save a lot of time, especially where the placement of wood screws is the same on similar joints throughout a project. Cut a piece of Masonite the same size as the contact area between the pieces of wood you wish to fasten together. Make small



holes at the desired positions of the screws and place the template over the joint. Use a sharp pencil to mark the positions of the screws, drill the pilot holes and fasten the screws in these positions to complete the joint. This technique was used on the child's bed (see page 81) where the base slats rested on the side supports and the screws had to be positioned in the same place each time.

To make the school desk (see page 61) it was necessary to use a **countersink** (24) on the pilot holes for the screws that fastened the desktop to the desk legs. A countersink is a conical hole made with a special bit, which positions the screw head below the surface of the surrounding material. This clearance allowed the surface of the desktop to be sanded down by a few millimetres to achieve a smooth finish. The remaining gap can be filled with wood filler.



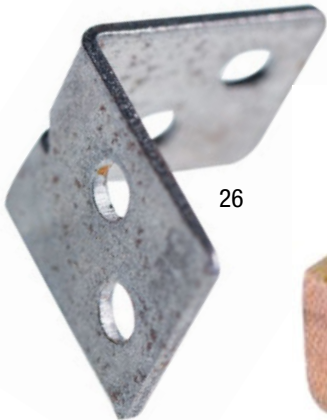
When a design requires the quick assembly of a number of constituent parts without a high degree of accuracy, use the **one-step clamp and assemble** method. Simply clamp as much as possible together in one go and fasten with screws and/or glue as the construction technique requires. It is important not to place the clamps over the intended positions of the fastening screws. The photograph shows four clamps being used to assemble the desk, after which it is very simple to fasten all the joints together with screws. The nursery shelf (see page 51) is the only project that doesn't use any metal fasteners, but all of



the other projects use varying sizes of **wood screws** (25). Select the length and thickness appropriate for each joint. You can use any type of screw but the cut screw variation features a reinforced neck to avoid head snapping as well as cutting points at the start of the thread. This makes it easier to drive into wood even without a pilot hole as it drills its own thread.



25



26

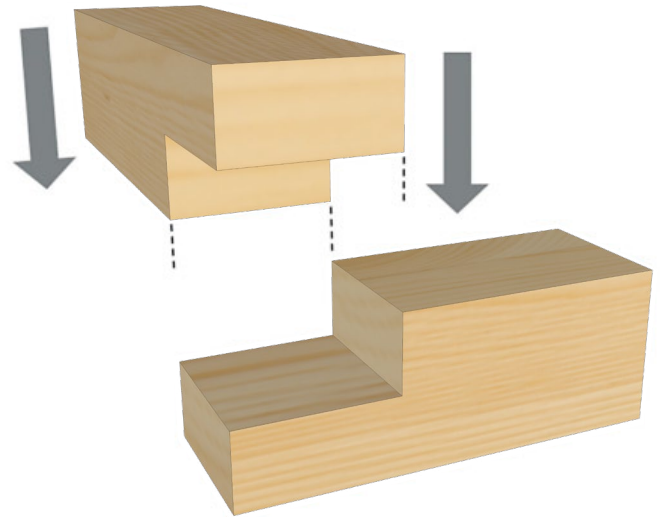


27

A simple **right-angle bracket** (26) is used for corner joints on the bookcase (see page 43) and toy shelf (see page 71). This technique allows for simple butt joints without gluing and should be placed on the underside of any shelving so that it is not visible from the normal viewing position.

A **quarter round trim** (27) is a long, thin piece of wood that has a cross-section in the shape of a quarter circle. It is typically glued or fastened into corners at the bottom of the wall where wooden flooring or carpeting meets the skirting board and hides gaps or imperfections in the underlying join. In the window seat project (see page 101) it was used along all the edges where the panels met the wall and provided an aesthetic finish to this project.

The **half-lap joint** is used in the Wendy house (see page 139), window seat (see page 101) and a slight variation – the halved joint – in the toy shelf (see page 71). It is a common technique for joining



two pieces of wood by overlapping them where material is removed from both sides to create a resulting joint that is the same thickness as the thickest member in the joint.

A **dovetail joint** consists of a series of pins in the end of one board that interlock with a series of tails in the adjoining piece, as shown in the photograph. This advanced joint is not used in any of the projects in this book, but can be seen on the drawers my Dad made for the bath cabinet (see Tribute, page 11).



SCROLL SAW AND PROJECTS

The **scroll saw** is used for cutting small and intricate curves, usually to create a pre-designed pattern out of a thin piece of wood. Modern versions are mostly electric and feature a very thin blade that moves up and down. Some models also include a small light and even a nozzle that blows air to clear the sawdust from the cutting area. A unique feature is that the blade can be removed and reinstalled very quickly, which is useful if the start of the cut begins in the centre of the wood and cannot be accessed by cutting from the sides. In this case a hole would be drilled through the wood at the start of the cut, the blade is then inserted through it and reattached to the top and base of the cantilever arm. Typically, this power tool should be used in a seated position, as shown in the photograph, due to the long periods of usage and concentration required to guide the blade through the wood, along the desired pattern.

Three scroll saw projects are shown, all of which are cut from 9mm plywood. The name plate was for my nephew's bedroom door and is finished with enamel paint. The plaque was for Mum's kitchen and is varnished with two coats after being sanded down to a smooth finish. These designs were produced on a computer and then printed out on paper, which was stuck down to the plywood using temporary wood glue spray. This pattern was then used to guide the scroll saw blade as it cut the wood underneath. Once the pattern was cut out in the wood, any paper still stuck to it was simply sanded off.

This technique is a very popular alternative for woodworking enthusiasts who prefer more intricate projects with less physical work or dangerous tools. It can be used to showcase more artistic, creative skills, which are also important in woodworking. Name plates



KIERAN'S ROOM



for rooms are superb gifts and simply require the ability to produce an artistic, age and gender-appropriate design. The Internet is a great resource for free patterns, and for children any popular character or cartoon can be used, depending on the level of skill required. The more intricate the pattern, the more practice you will need so it's best to start with something simple and develop your skill as time allows.

A fun activity for children is to paint the initials of their names and stick on buttons and other decorations. When we had the children's weekly art group at home, I made 13 such letters for all of their friends to have fun with. My wife chose a font on the computer and printed out the A4-size letters, which I glued onto 9mm plywood and cut out with the scroll saw. Juliet's finished 'J' is shown above.

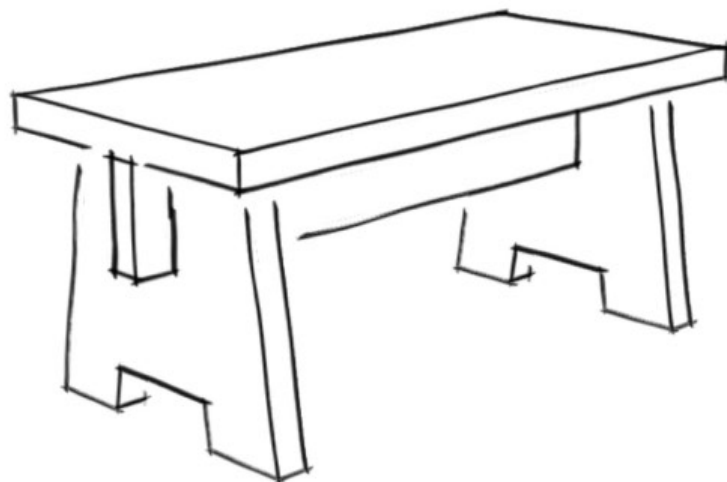




Booster Step



Young children become frustrated if they can't reach certain objects they can see and this booster step will give them some extra height. Our first set of twins used their booster steps to see over the counter top and help in the kitchen, brush their teeth at the basin and reach for books on high shelves. As parents we taught them to fetch their booster steps when they wanted something that was out of reach. This helped develop their independence from an early age, rather than needing us to pass things to them. The booster steps were also useful for sitting around jigsaw puzzles, having family story time in the evening and Amanda even used one to put the star on top of the Christmas tree. I made a third step as a birthday present for one of our children's friends on which I also painted their name.



DESIGN AND CONSTRUCTION

The step is made from 20mm solid pine, consisting of a flat piece on top that is fastened to a rigid base with a crosspiece connected to the two legs. In the first version of the design (see page 30) this crosspiece is connected to the legs with half-lap joints while the alternative design (see page 30) features a simple butt joint between the end of the crosspiece and the inside top surface of each leg. To ensure the step does not rock on a flat surface, each

leg features a cutout along its base which can be straight or curved. In the alternative design the crosspiece also features a matching curved cutout. The construction is very sturdy and can withstand a significant amount of wear and tear. You can finish it with varnish or apply wood primer and then paint it a colour of your choice. I painted each twin's step a different colour and they decorated them with their favourite stickers.

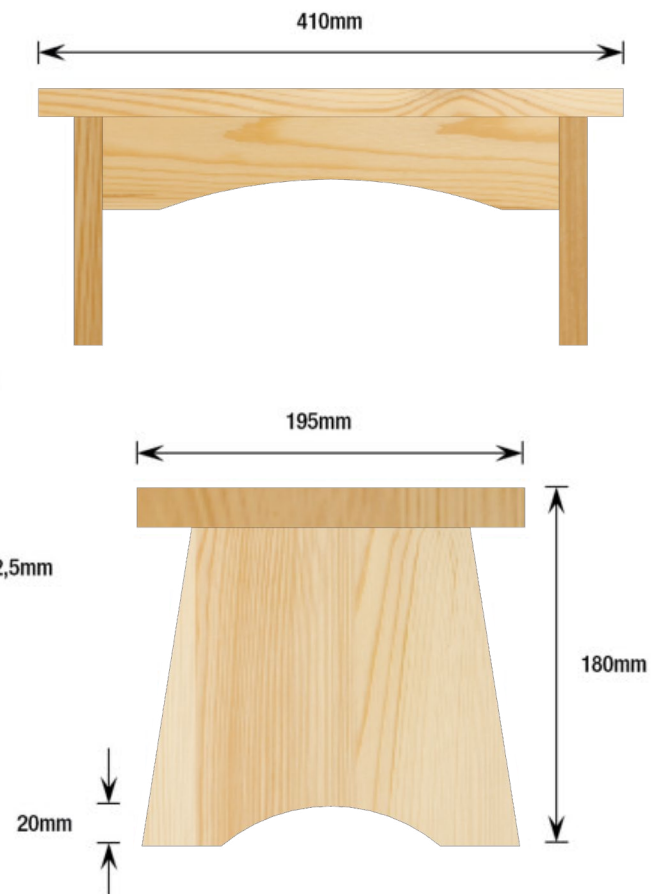
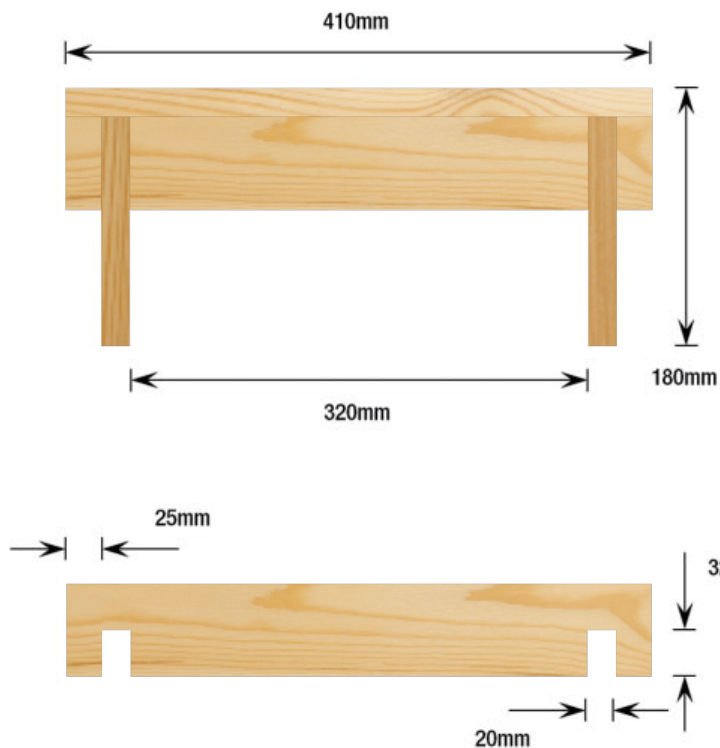
WHAT I WOULD DO DIFFERENTLY NEXT TIME

The corners of the step in the first design should also be rounded to a radius of 25mm, which is both aesthetic and safer than square corners. Sharp corners should be avoided around children as these can cause unnecessary injury, especially when there may also be younger children crawling around and clambering over the step in a

general play area. A useful enhancement would be a non-slip rubberised surface on the top to reduce the chance of slipping and falling. Simply glue a large piece of rubber car mat on the top surface, once dry turn the step upside down onto a work area and trim the edges neatly with a utility knife.

A more sturdy design and construction, which features half-lap joints between the crosspiece and the top of the legs.

Much easier to make using butt joints instead of half-lap joints and also features curved cutouts in the crosspiece and legs.



Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Top	1	20mm	195mm	410mm
B	Crosspiece (half-lap joints)	1	20mm	65mm	410mm
B*	Crosspiece (butt joints)	1	20mm	65mm	320mm
C	Legs	2	20mm	190mm	160mm

Project information

Overall dimensions	410mm long x 195mm wide x 180mm high
Number of parts	4
Special equipment	Wood chisel, half-round file, jigsaw
Techniques	Half-lap joint (first design) – see page 23; Butt joint (alternate design) – see page 21
Difficulty	Easy
Duration	2 hours

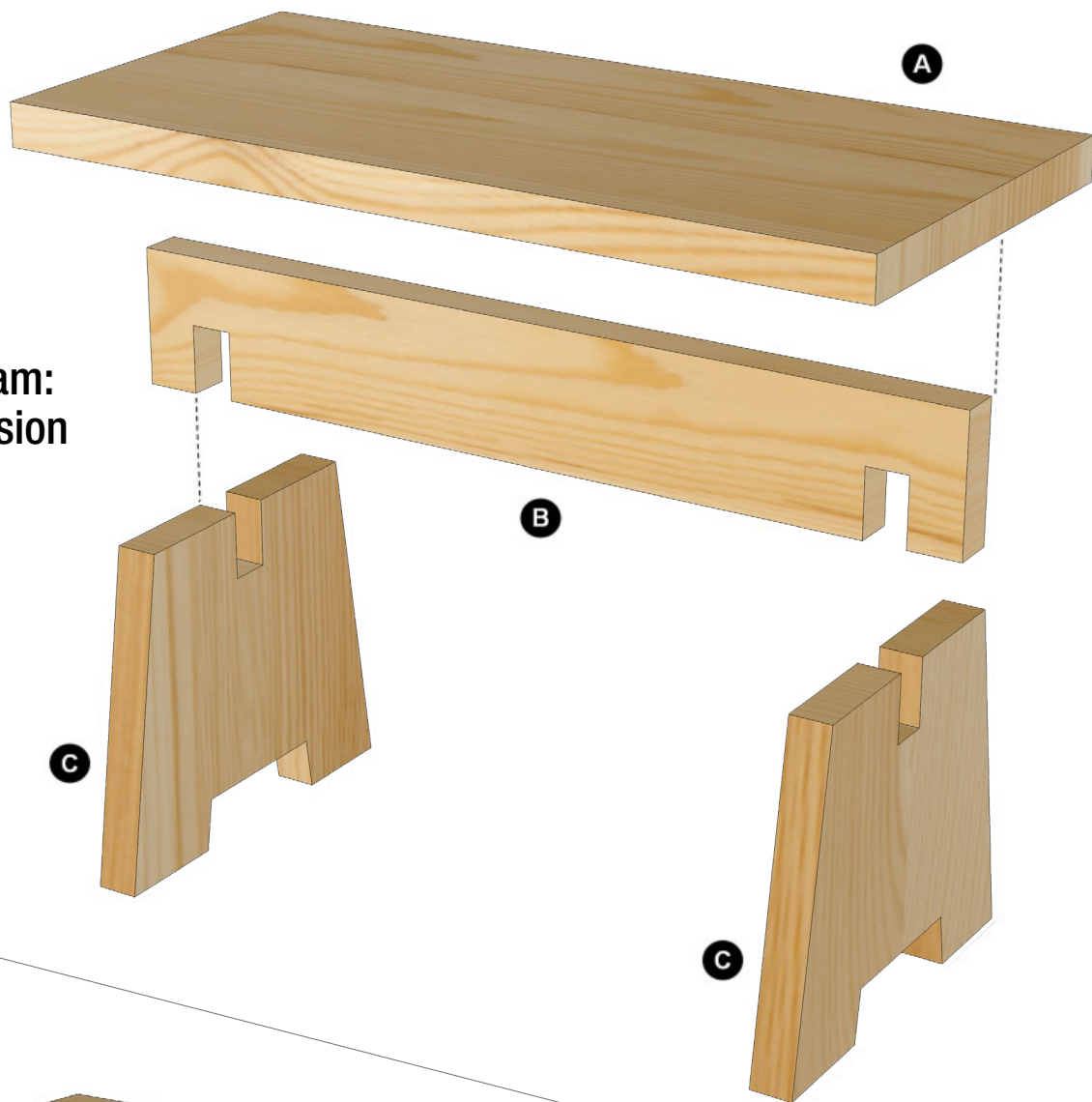
Family fun factor



Juliet uses her booster step to get some extra height as she reaches for her favourite book on the shelf. The booster step shown here is the design that uses half-lap joints between the crosspiece and legs.



**Assembly diagram:
Half-lap joint version**



**Assembly diagram:
Butt joint version**



MAKE THE CROSSPIECE AND LEGS

1 Have the wood pre-cut or mark the outer dimensions of the legs (C x 2) and crosspiece (B), then cut accordingly using a **jigsaw**.

TIP: If cutting from scratch, use a **try square** to ensure that the corners are true right angles.



2 On the rectangular cutout for the crosspiece (B), mark the positions of the two **half-lap joints** and cut out with a jigsaw and **wood chisel**.

TIP: Make sure there are no knots on the edges of the wood in the cutouts because they will weaken the construction.



3 Mount the crosspiece (B) in a vice on your workbench (see page 129 to make a workbench with a vice). Use the flat side of a **half-round file** to smooth the inside edges of the half-lap joints, as shown in the photograph.

TIP: The smoother the surfaces that meet in a half-lap joint, the stronger the final construction.



4 Use a **quick grip clamp**, as shown, and a jigsaw to cut out the legs (C x 2) according to the measurements.

TIP: As with the half-lap joints on the crosspiece (B), use a wood chisel to cut out the wood where needed. You can also use a half-round file to smooth the inside edges of the joints.



MAKE THE TOP AND ASSEMBLE

- 5** Cut out the top piece (A) with a jigsaw. Sand down all four components (A, B and C x 2). Use a **random orbital sander** prior to assembling the step as the inside corners will make it difficult to access the edges of all the surfaces after assembly.



- 6** Join the cutouts in the underside of the crosspiece (B) to the corresponding cutouts at the top of each leg (C x 2).



- 7** Once the crosspiece (B) has been joined to the top of the legs (C x 2), position the top (A) onto the base assembly, as shown in the photograph.

TIP: Use a small **steel ruler** when positioning the top piece (A) to ensure it is positioned symmetrically on top of the base.



- 8** Use **cut screws** and a **power drill** to fasten the top (A) onto the base assembly as shown.

TIP: Use roughly the positions as shown for the cut screws and be sure to drill **pilot holes** to avoid splitting the wood. Use a **countersink bit** to ensure the screw heads are below the surface of the wood.



MAKE THE ALTERNATIVE DESIGN

- 9** Use a jigsaw to cut out the top piece (A) and legs (C x 2) using the same dimensions as before except that the crosspiece (B*) is now 320mm long. As shown in the photograph, mark and cut out a curved template at the base of the legs using a jigsaw (C x 2). Also cut the sloping sides, but do not cut the half-lap joints at the top. The final legs (C x 2) are shown in the photograph for step 10.



10 Mark and cut out a curve from the underside of the crosspiece (B*), as shown on the right of the photograph. Mark and cut curved corners (with a radius of 25mm) on the top piece (A), using a jigsaw.



11 Turn the top piece (A) so that the underside is facing upwards and mark out the positions of the crosspiece (B*) and legs (C x 2), as shown in the photograph. Glue the crosspiece (B*) to the top (A) in the correct position and leave it to dry.



12 Fasten the legs (C x 2) to the assembly using **cut screws** and a power drill, tightening them from the outside into the ends of the crosspiece (B*), as shown in the photograph. Position the legs (C x 2) correctly by placing them on the markings added to the top piece (A) in step 11. You can use a quick grip clamp to hold them in position while fastening.



13 The top (A) has now been glued down to the crosspiece (B*), which is fastened with cut screws to the legs (C x 2) at either side with a **butt joint**. Reinforce this assembly by fastening the top piece (A) onto the top of the crosspiece (B*) and legs (C x 2) using cut screws, as shown in the photograph.

TIP: Mark the top piece (A) with the positions of the base assembly beforehand to ensure the cut screws are positioned correctly.



14 Apply wood primer to the step if you are going to paint it a colour of your choice.

TIP: Hammer four nails into your work surface using a **claw hammer** and balance the step on the heads of these nails while it is drying, as shown in the photograph. This prevents the newspaper from sticking to the bottom of the legs (C x 2).

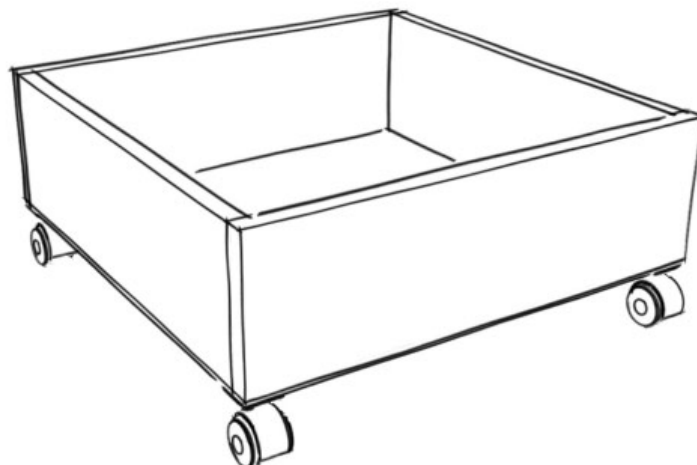




Toy Box



Children always need somewhere to put their toys and this traditional box on wheels offers the perfect storage solution. Tidy up time is quick and easy as it is very convenient to wheel back under the bed at the end of the day. The wheels mounted underneath make the toy box mobile and our children are fond of pulling theirs to other parts of the house. Our son keeps his most precious Lego projects in his toy box, especially those that are still under construction so he can wheel them where he wants to continue working on them. Our daughter uses her toy box to store her favourite books, as well as to make a bed for dolls and teddies to sleep in. The next two toy boxes I make will be for our younger set of twins, who have more fun sitting inside them and being pulled down the passage!



DESIGN AND CONSTRUCTION

Pocket hole joinery is a technique that produces a more advanced right-angle joint between two pieces of wood and requires a special jig and accessories. My family had given me a set of this equipment for my birthday and I used it to fasten the main corners on the toy box. The angled holes that feature in this process can be filled afterwards with pre-cut fillers while the unique wood screws are completely submerged within the two adjoining pieces of wood.

The height of the boxes, including the wheels, could not exceed the lowest edge of the front of the children's beds, with additional clearance for fingers to allow the box to be rolled out. I determined the width by assuming two toy boxes would be used under one bed with sufficient clearance between them. A simple plywood base and four casters on each corner completed the very simple yet sturdy construction.



Helicopters, diggers, dolls and toy horses; Andrew and Amelia can easily push their favourite toys to wherever they are playing.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The height of the toy box was designed to clear the base of the bed, allowing some space for fingers to hold the toy box and roll it out. This is not ideal, however, as there may also be a rug in front of the toy box or something else that obstructs it. If they pull the top edge

of the toy box, they could bump their fingers against the bottom edge of the bed. To avoid this happening, either cut out a shallow curve on the top edge or fasten a suitable handle to the outside face. For cutting curves, see booster step on page 32.

Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Long sides	2	19mm	150mm	500mm
B	Short sides	2	19mm	150mm	462mm
C	Base (plywood)	1	6mm	500mm	500mm
D	Casters	4			

Project information

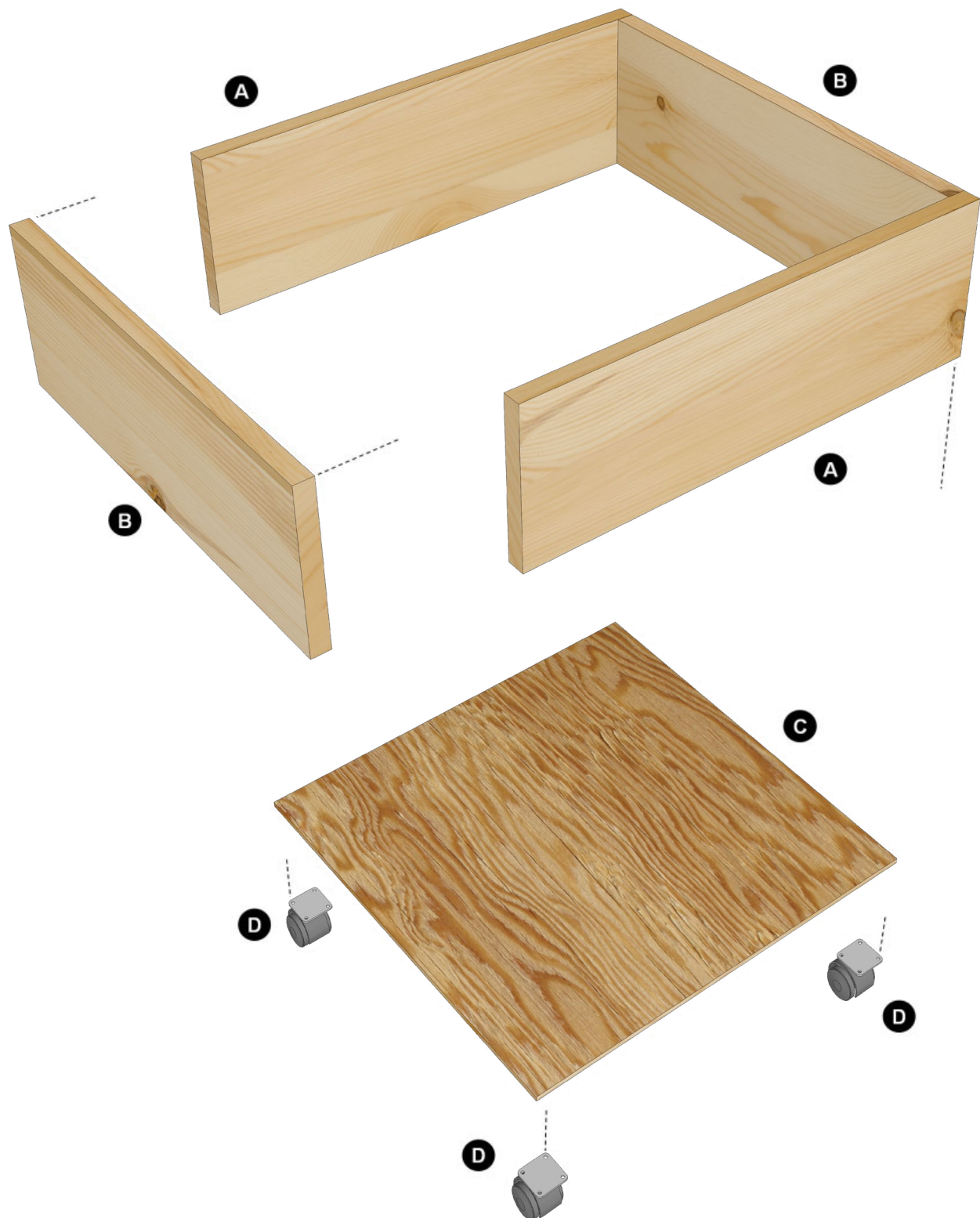
Overall dimensions	500mm long x 500mm wide x 215mm high
Number of parts	9
Special equipment	Pocket hole joinery jig and accessories, Dremel

Techniques	Pocket hole joinery (see page 21)
Difficulty	Easy
Duration	3 hours

Family fun factor



Assembly diagram



MAKE AND ASSEMBLE THE SIDES

1 The toy box has three major components: the short and long sides (A x 2, B x 2), base (C) and wheels (D x 4). Have the wood cut to size or measure and cut it out with a **jig-saw**. The wheels are called casters and should be available from most hardware or building supply stores.



2 Use a **steel ruler** and pencil to measure the location of the pocket holes on the short sides (B x 2). Typically this will be 20% of the width from the edges, as shown in the photograph. Due to the nature of this joining technique these holes will ultimately not be visible on the finished product so the position does not have to be perfect.



3 Drill the holes in the short sides (B x 2) using the **pocket hole joinery jig** and the special **drill bit and collar** as shown. This technique creates angled holes in the wood with a **pilot hole** at the base to allow for the head of the special **self-tapping screw** to be completely hidden once fully tightened.



4 Assemble and clamp each corner with a light-duty **right-angle clamp** at the top and bottom, holding the long and short sides in position. Fasten the joint by driving the self-tapping screws into the angled holes in the short side (B) using an extra length **insert bit** mounted in a **power drill**. The pocket holes will guide the screw tip into each adjoining long side (A) to fasten the **pocket hole joint**. Repeat until all corners are completed in the same way and the clamps can be removed.



ASSEMBLE THE TOY BOX

5 Attach the base (C) to the assembled sides by drilling pilot holes at equal spacing around the base (C). Manually fasten the base to the sides using **wood screws** and a **screwdriver**.

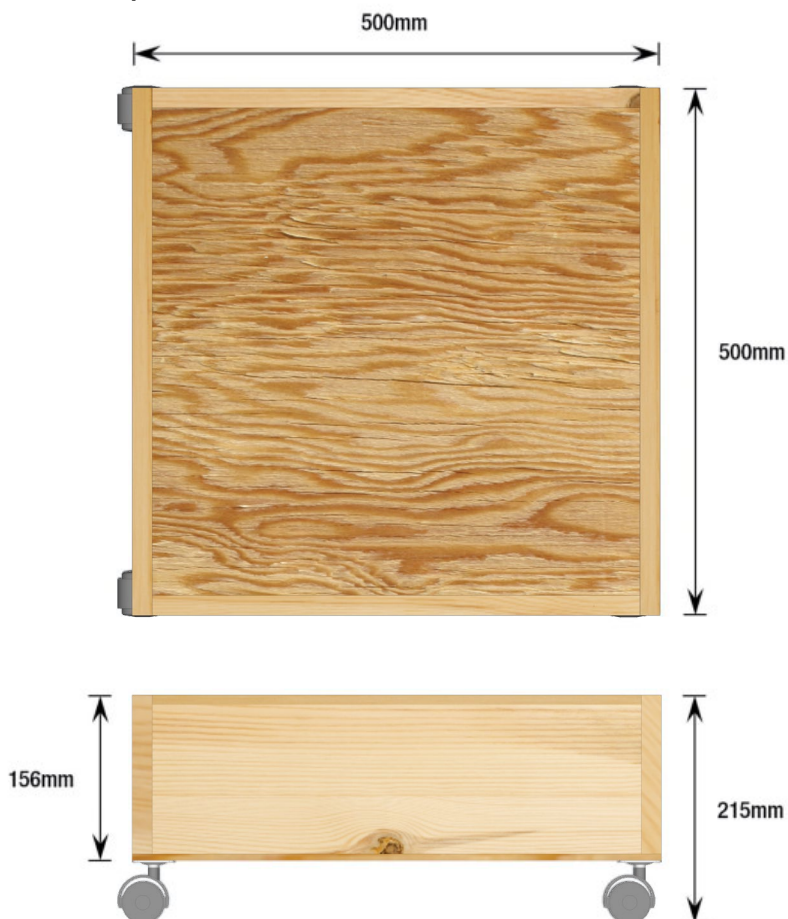
TIP: Use the following method for spacing, which does not require accurate measuring – fasten the four corners first, then measure the midpoints, then divide these halves again and fasten screws in each position on all edges.



6 Pocket hole joinery kits typically come with **pre-cut fillers** that go into the angled holes once the screws have been fastened to create the joint. Use these to plug the pocket holes with a spot of wood glue and fill any remaining gaps with wood filler, as needed.



Top and side view



A caster can swivel in any direction and can be mounted to the bottom of furniture and chairs.

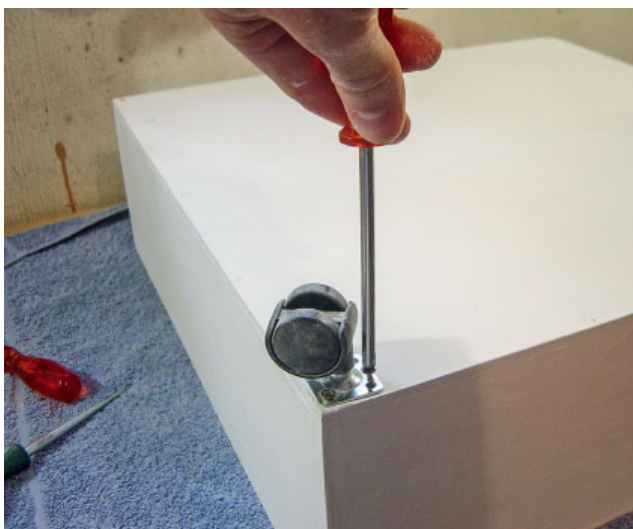
PAINT AND MOUNT THE WHEELS

7 Sand down to at least 100 grit, then apply wood primer and finish with two coats of paint in a colour of your choice – I was fortunate to have some help with the painting from my eldest son, James. Before painting the boxes we placed them on top of nails that I had temporarily hammered into the top of the work surface. As with the booster step (see page 27), this prevents the newspaper underneath from sticking to the drying paint.



8 After the paint has dried completely, fasten the casters (D x 4) to the underside of the four corners of the base (C).

TIP: Re-use the corner screws already holding the base (C), as shown in the photograph.



9 The inside wood screw opposite the corner will come through the base (C) on the inside of the toy box. Use a Dremel or similar tool to grind down the exposed tip of the screw so that there are no sharp points on the inside of the box.

TIP: The Dremel is a small, hand-held power tool that holds a high-speed rotating bit which can be used for grinding, sharpening, carving and engraving. It uses speed rather than power to do fine work such as removing points of screws that protrude above wood surfaces.



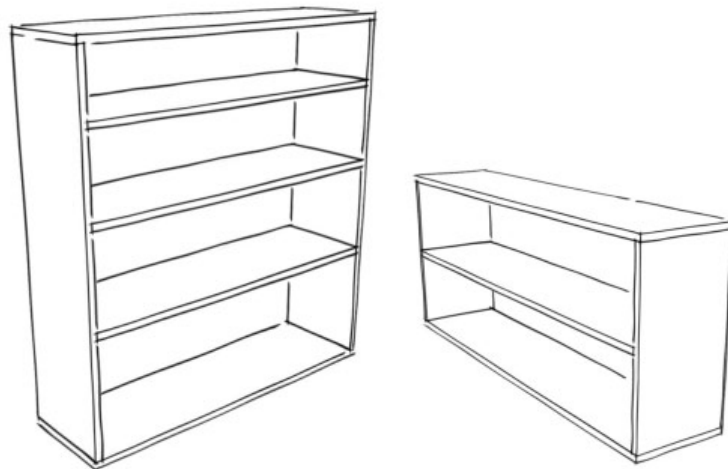
Andrew has more fun sitting inside the toy box, and the design is sturdy enough for children under two.



Bookcases



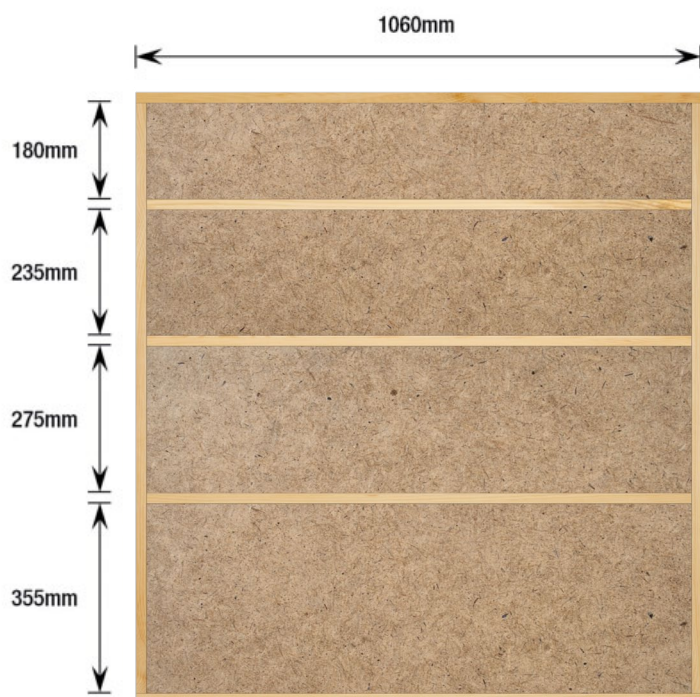
Children love a good story and bedtime is a wonderful opportunity for families to gather around a favourite classic so that Mum and Dad can bring the characters to life once more. Juliet never tires of *Little Red Riding Hood* or *Hansel and Gretel* and usually picks these from her bookcase when it's story time. Any child who loves reading will want a special place to keep different sized books and this bookcase offers a stylish but practical solution that looks great anywhere. The playroom also needed extra storage space so we made two more bookcases of the same design, except lower and wider and featuring two internal shelves of the same height. This alternative design is useful because of the extra width, so that games, toys and puzzles can easily be stacked on top of each other.



DESIGN AND CONSTRUCTION

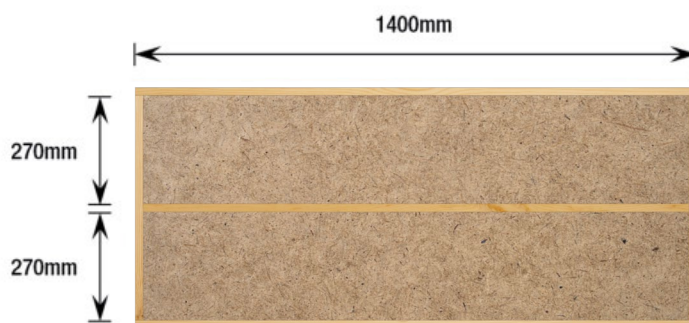
The large bookcase was painted white to match other furniture in our house and finished off with a routed edge around the front and sides of the top surface to add a stylish feature. All joints are simple butt joints fastened with right-angle brackets, which are positioned on the underside for aesthetic purposes. To determine the shelf heights I used different sized books, with the largest ones on the lowest shelf and progressively smaller sizes higher up. Of the two bookcases made with the wider design, one was varnished

and the other was painted blue, but no edging was done on either. Should you wish to alter the design, additional vertical supports at the midpoint would be required for shelf lengths greater than 1,5m. This chapter explains the construction steps of the small bookcase; however, the principles apply equally to both or any other variation of the design. If you want a different size and configuration of shelves, then just the dimensions and shelf heights would vary according to your needs.



The large bookcase design is suitable for children's bedrooms and can take books of different heights.

Family fun factor



The small bookcase fits well under windows, as seen in the Wendy house (see page 140).

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The design of the outer frames of both bookcases is such that the top and bottom horizontal pieces run over the width of the sides. The inner shelves are thus shorter than the top and bottom by twice the width of the wood, as per the illustrations. For the large bookcase it would be easier to have all the horizontal pieces cut to the same size and simply butt joint both side pieces onto all of them in the

same way. As the bookcases will be painted, the nature of the joints between the horizontal shelves and side supports will not be visible, and because the design uses right-angle brackets, this construction will be sufficiently strong. Most of the steps for the large bookcase would thus be done in such a way that it can be constructed lying on its side, which is much easier than building it up from the base.

Cutting list and materials

LARGE BOOKCASE

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Top and bottom	2	20mm	300mm	1060mm
B	Backing (Masonite)	1	6mm	1060mm	1145mm
C	Inside shelves	3	20mm	300mm	1020mm
D	Sides	2	20mm	300mm	1145mm

SMALL BOOKCASE

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Top and bottom	2	20mm	300mm	1400mm
B	Backing (Masonite)	1	6mm	1400mm	600mm
C	Inside shelf	1	20mm	300mm	1360mm
D	Sides	2	20mm	300mm	600mm

Project information

Overall dimensions	1060mm wide x 300mm deep x 1145mm high (large) 1400mm wide x 300mm deep x 600mm high (small)
Number of parts	8 (large) and 6 (small)
Special equipment	Router
Techniques	Decorative edging (see page 19)
Difficulty	Medium
Duration	2 hours each

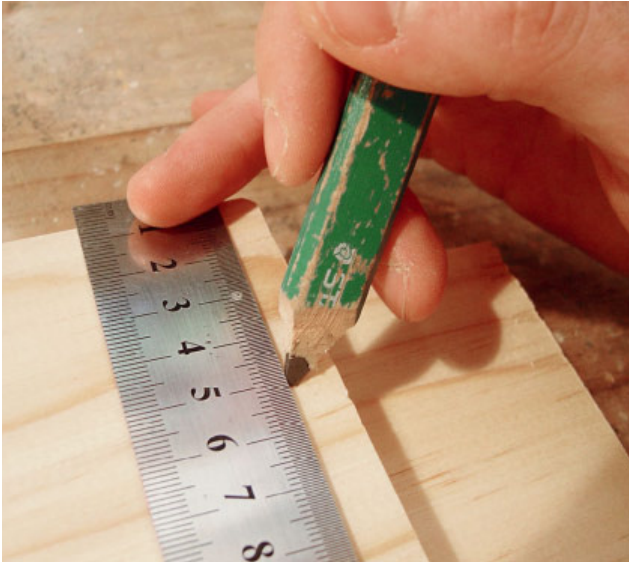


Assembly diagram



MEASURE AND MOUNT THE BASE

- 1 Use a **steel ruler** and **carpenter's pencil** to measure and mark 50mm from the long edge of all the shelves. This will indicate the position of the **right-angle brackets**, which is easier to mark before assembling the bookcase.



- 2 Mount the bottom shelf (A) on the work surface using two **quick grip clamps**, as shown in the photograph.

TIP: Select which side is the front of the bookcase now so that you can rotate the rest of the shelves to ensure there are no knots on the front edges, which will most likely chip out and require filling.



INSTALL THE SIDES

- 3 Use a **right-angle clamp** to position and hold one of the sides (D) in place at one end of the bottom shelf (A). Use a **rubber mallet** to ensure that all adjoining surfaces of the two pieces of wood are aligned, as this will reduce the amount of sanding and smoothing required later on.



- 4 Add the other side (D) of the bookcase in the same way, using a right-angle clamp on both sides of the corner, as shown in the photograph. These clamps will preserve the right angles when fastening.



5 Place a right-angle bracket on the 50mm marking created in step 1. Use an awl to make surface holes in the wood which correspond to the positions of the screw holes in the right-angle bracket.

TIP: You can use a carpenter's pencil to mark the positions of the screws, but a surface hole helps position the tip of the drill bit quicker and more accurately, as required in the next step.



6 Use a **power drill** to make **pilot holes** so the wood does not split when the screws are tightened. Select a thin **drill bit** and be careful not to drill too deep as it is easy to push too hard and create a hole on the other side, which will then need to be filled with wood filler.



7 Use a screwdriver to fasten each right-angle bracket with four small wood screws, as shown in the photograph. The joints are likely to become misaligned during this step unless the right-angle clamps remain tightly in place.



8 Check for right angles with a **try square** and make any adjustments to ensure an accurate assembly. Minor gaps can be filled with wood filler just before finishing the project. If you want to varnish the bookcase, too much wood filler in the joints will look unsightly.



INSTALL THE TOP SHELF

9 Add the top shelf (A) and clamp in place with extra long quick grip clamps (or **sash clamps**), then fasten the top corner joints with wood screws and right-angle brackets as before. Keep the right-angle clamps in place on the bottom corners to preserve the right angles on the top corners.



10 Measure the position of the inside shelf (C) according to the design and mount in the same way as the top and bottom shelves (A) with right-angle clamps. Fasten the joints on both sides with right-angle brackets as before, but make sure they are mounted on the underside of the shelves so they are not visible.



MOUNT THE BACKING

11 Lay the shelf face down on your work surface and position the pre-cut backing (B), ensuring that its outer edges are within those of the bookcase – make adjustments if needed. Use a steel ruler and carpenter's pencil to mark the position of the inside shelf (C) on the backing (B) and use a **claw hammer** to fasten it down with large head nails in the four corners, along the back of the inside shelf and along the top and bottom shelves (A) and sides (D).



12 Turn the bookcase over and clamp onto two trestles, as shown in the photograph. Use a **belt sander** to smooth all surfaces and corners, then fill any gaps with wood filler and sand down again with a **random orbital sander** to prepare for finishing.



13 The completed assembly is shown in the photograph – it is upside down to show the right-angle brackets for the inside shelf. Note again that there should be no knots (or as few as possible) along the front edges of the bookcase as these will chip and require additional filling work.





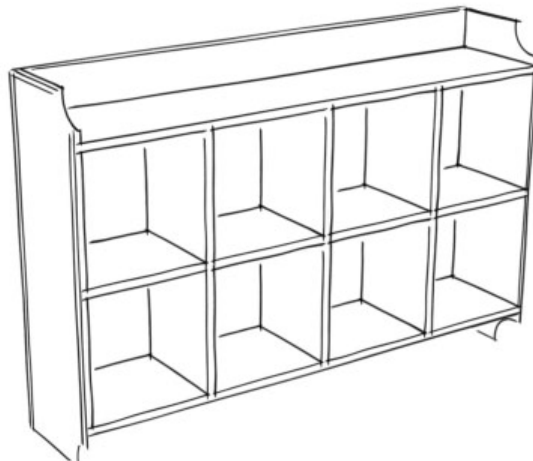
love



Nursery Shelf



Planning a nursery is one of the most enjoyable activities for expectant parents preparing for their new arrival. Getting everything just right is important and organising the room highlights the need for sensible but aesthetic storage. A compactum or nappy changing station is a minimum furniture requirement, as well as a cot, crib or more than one of either if needed! Many items need to be stored for easy access when caring for the baby, while photo frames, toys and other sentimental items will need to be displayed by proud parents for visiting friends and family. For our first set of twins we had three single shelves in the room, but we felt we needed more shelf space above the compactum. To meet these requirements, we designed this stylish and practical nursery shelf for our second set of twins.



DESIGN AND CONSTRUCTION

Knowing what type of storage and display space we needed the second time around was very beneficial in putting together some initial drawings, which we refined based on our interior design. The width is the same as the compactum, as it is intended to go above it, and the height is in proportion to the available wall space. The eight internal square compartments are extremely useful and well sized,

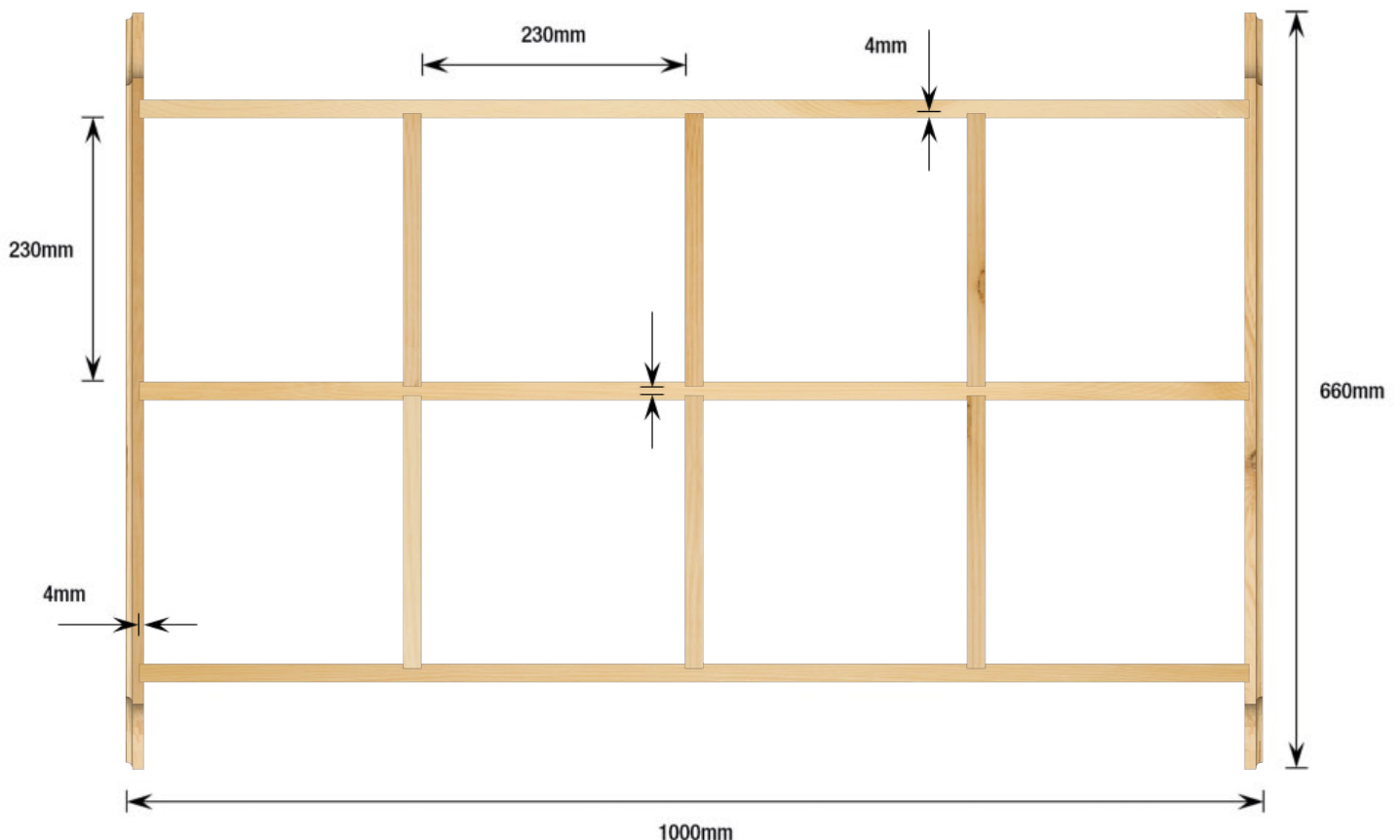
while the top shelf provides a wider space that can display taller items. We also added decorative hooks to the lower shelf, which provided quick hanging space when needed. The solid backing ensures a very sturdy construction and the joints are all dados without any metal fasteners. A routed edging on the side pieces of the shelf completed the stylish finish.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The top and bottom front corners of the nursery shelf feature a quarter-circle cutout, which is an aesthetic part of the design. To achieve this I marked the wood with a suitable sized circle and then used a jigsaw to make the cut. A more accurate method would have been to use a hole saw of the required diameter mounted in a drill press.

A hole saw or hole cutter is a blade in the shape of a ring which has a pilot drill bit at the centre. To make this cut, the side of the shelf is mounted and clamped in place and the quarter-circle is drilled out. Because the teeth of the hole saw are spinning around a fixed centre, the accuracy of the quarter-circle would have been far superior.

You can build this nursery shelf to fit your space; simply adjust the overall dimensions but ensure the interior box compartments remain square. For clarity of shelf and joint dimensions, the illustration is shown without the backing board.



Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Back board	1	16mm	660mm	1000mm
B	Sides	2	16mm	200mm	660mm
C	Partitions	6	16mm	200mm	238mm
D	Shelves	3	16mm	200mm	976mm

The back board (A) is shown as one piece in the cutting list and could be purchased in this size, if preferred. When I constructed the project, however, I used three narrower boards (220mm wide) joined together, and the construction is provided in steps 1 and 2.

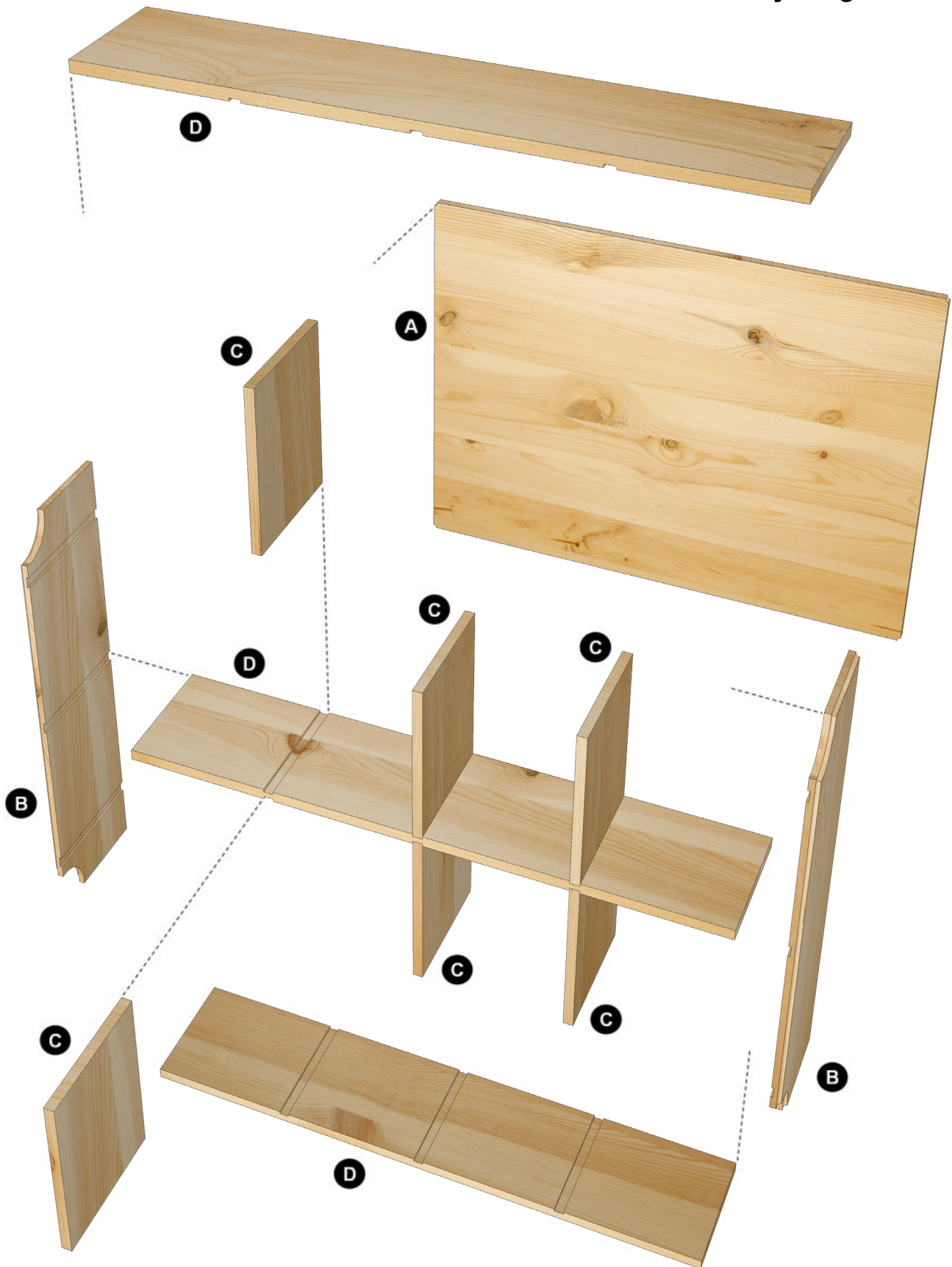
Project information

Overall dimensions	992mm long x 216mm wide x 660mm high
Number of parts	12
Special equipment	Router, jigsaw
Techniques	Through dado joint (see page 22), decorative edging (see page 19)
Difficulty	Medium
Duration	8 hours

Family fun factor



Assembly diagram



MAKE THE BACK OF THE NURSERY SHELF

1 Rest the three backing boards (A x 3) on the rails of the **sash clamps**, as shown in the photograph. Position the end slide with its holding peg so that the head slide will compress all boards against their edges once glued and tightened.

TIP: Use pieces of scrap wood between the faces of the clamps and the edges of the boards to prevent damaging the wood when tightening up.



2 Glue along the adjoining edges and tighten the sash clamps. Sufficient pressure should be applied so that the glue is squeezed out along the joints. Use a wet cloth to wipe away excess glue.

TIP: Just before the final tightening, use a **rubber mallet** to tap the edges at the ends until they are aligned.



MARK THE DADOS AND CUT THE QUARTER-CIRCLES

3 Mark the positions of all 18 grooves on the shelves and sides for the **through dado joints**.

TIP: When marking, make sure you measure from both ends of the boards and on both long edges to achieve an average which you must then true up by using the accurate groove width. This will account for any imperfections in the cutting to ensure the overall shelf dimensions remain square and regular.



4 Make the quarter-circle cutouts in the front top and bottom corners of the sides (B). I used a paint tin to mark the quarter-circle but you can use anything with the correct diameter. Clamp the board to your work surface with a **quick grip clamp** and use a **jigsaw** to cut the quarter-circle as accurately as possible. As you will **router** along this edge, any imperfections in the cut will be magnified so ensure that you work accurately.

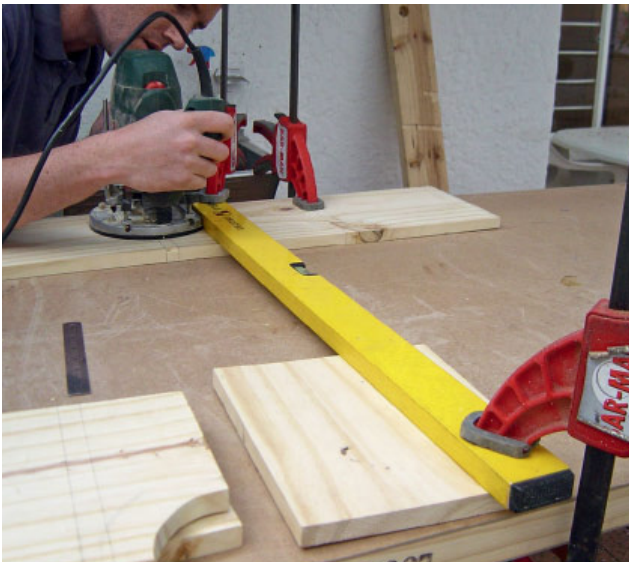


5 Use a **half-round file** to smooth the edges of the quarter-circle, as shown. As indicated in What Would I Do Differently Next Time (see page 52), this quarter-circle would be more accurate if cut with the correct diameter hole saw.



CUT THE DADOS IN THE SHELVES AND TEST ASSEMBLE

6 Router all the dados with a straight **router bit**. Clamp a straight edge, such as a builder's level, across the work piece to guide the router while cutting the dado groove across the grain of the wood. Set the router to a 4mm depth for all grooves and be sure to cut consistently and accurately through each groove.



7 It is important to position the straight edge very accurately prior to cutting the dado. Most routers also come with an adjustable edge guide, but this will only work for grooves that run alongside a parallel edge. In the picture you will see how the final groove is just wide of the 16mm markings, which is based on the width of the wood. Use a 17mm diameter straight router bit to allow 1mm extra clearance for imperfections in the ends of the boards.



8 The top, bottom and middle shelves (C x 3) showing the completed dados into which the top and bottom edges of the partitions (D x 6) will be inserted during the assembly.

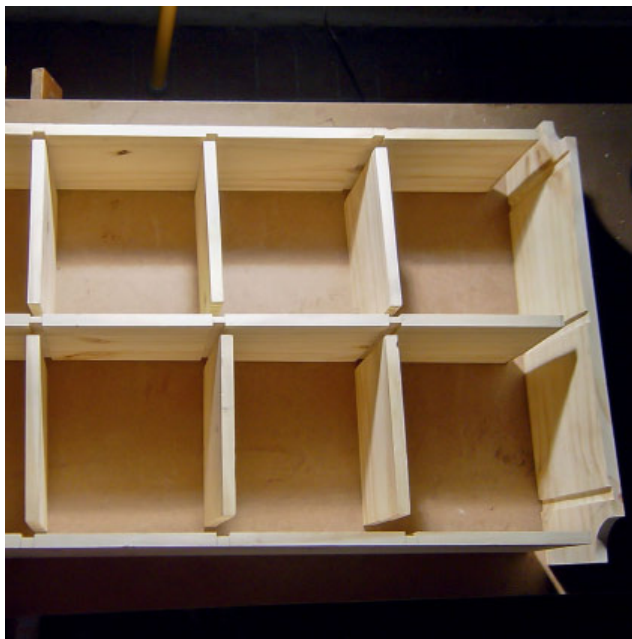


9 The left and right sides of the nursery shelf show the completed dados into which the left and right sides of the shelves (C x 3) will be inserted during assembly. The photograph also shows the decorative quarter-circles cut out from the four front corners.



10 Position all components as a mock assembly to check that all edges fit into their corresponding dados. Also ensure that there are no knots or chips in the front corners or edges. Some repositioning may be required, particularly of the middle shelf (D) which has grooves on both sides for the through dado joints to attach shelf partitions above and below.

TIP: Should you need to re-assemble at a later stage, mark the parts at the joints to show which edges correspond to which grooves.



CONSTRUCT THE FINAL ASSEMBLY

11 Glue the edges of the top, middle and bottom shelves (D x 3) and insert into the dados in the sides (B x 2). Hold in place with sash clamps and use a **try square** to test for right angles before finally tightening up. Make sure the grooves for the through dado joints face inwards for the top and bottom shelves (D x 2).



12 The vertical partitions (C x 6) will be inserted into the dados between the corresponding shelves (D x 3), as shown. It is a far more accurate method of making compartmentalised furniture than with **right-angle brackets** because the dado straightens the edge of the vertical partition (C) in exactly the position required. Although 1mm clearance was allowed for when using a router to cut the dados, a rubber mallet may be required to tap the partitions into place.



13 Glue and insert the top and bottom vertical partitions (C x 2) in the middle of the shelf and then glue and install the left and right partitions (C x 4).

TIP: As demonstrated in the picture, before gluing each set of partitions, check the dimensions along the top, bottom and middle shelves and use an **electric planer** to plane down the edges of the vertical pieces until accurate.



FINISH AND ADD THE BACKING BOARD

14 Once all the joints are dry, sand down the assembled shelf and use wood filler for any gaps in the joints or to fill knots and imperfections in the surface of the wood. Make sure the back edges of the assembled shelf are straight in preparation for affixing the back (A).



15 Plane and sand the back board (A) with an electric planer and **belt sander** respectively. Glue along the back edges of the nursery shelf and clamp the final assembly in place onto the front of the back board. Ensure you apply equal pressure to minimise any gaps between the back edges of the shelf and the back board (A). Fill in gaps with wood filler as needed. Allow sufficient time for the glue to dry, then sand down the left and right outside edges of the back board (A) to ensure a smooth surface at the joint with the shelf sides (B x 2).



ROUTER THE OUTSIDE EDGES OF THE SIDES

16 Use a router to make the decorative edging along the sides (B x 2) of the nursery shelf, including the quarter-circle cutout, as shown.

TIP: This is done only after fastening the backing board onto the shelf because the four corners of the backing board form part of this edging detail in the final assembly.



SAND, PAINT AND INSTALL

17 Use a **random orbital sander** to sand down all surfaces, edges and corners to ensure a smooth final surface for varnishing or painting. Prime and paint with a colour of your choice.

TIP: If using a random orbital sander, make sure it is small enough to fit inside each shelf compartment, as shown.



18 Below the bottom shelf, measure and drill at intervals through the back of the nursery shelf (A) to create holes for the decorative hooks. **Countersink** the back of these holes so that the nut and bolt for the decorative hook does not protrude beyond the surface of the back (A) of the nursery shelf.

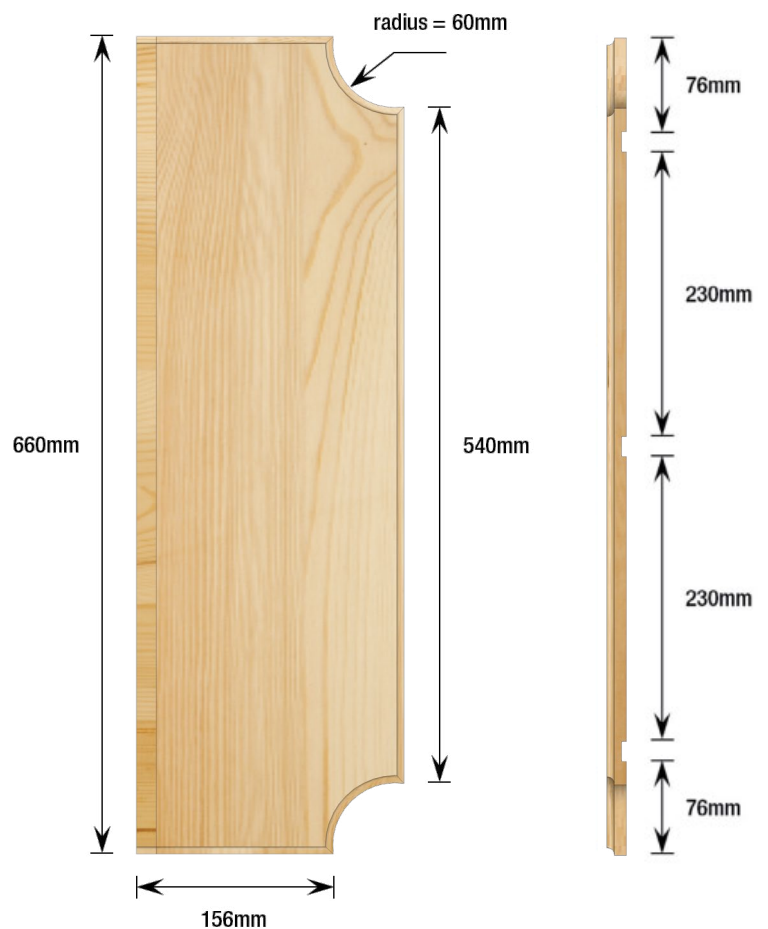


19 Mount hooks on the back of the nursery shelf so that the screws go into the back of the top shelf (D). Use a Dremel to remove sufficient wood behind the hook, as shown in the photograph. Install corresponding wall plugs and hang the nursery shelf safely in position.



Side view of nursery shelf

Front view of side piece

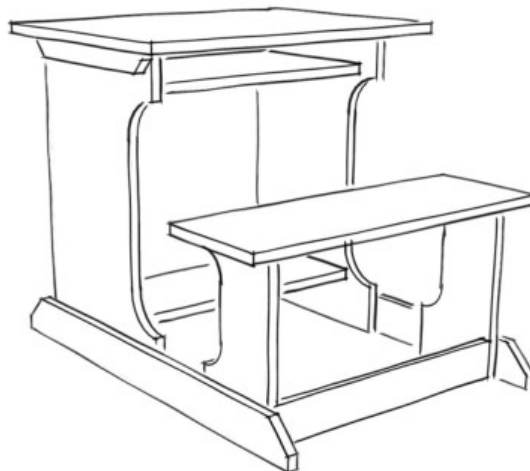




School Desk



Writing and colouring in stimulates the joy of learning in children from an early age and access to a good desk cultivates a love of learning. The desk needs to be low enough for the child's age but large enough for the paper and writing materials they will accumulate. I built a desk for each of our first twins, painted them pink and blue and faced them to each other in our family room. Initially, when they were younger, they knelt on the seat, but later on they sat normally and used the footrest. Facing the desks against each other is perfect for shared activities or games. The younger twins also loved the desks, pulling themselves up and clambering around the inside, which is quite solid and safe for them to do. Our older twins' first game of chess together, with Dad adjudicating, was played on these desks.



DESIGN AND CONSTRUCTION

This traditional desk is a classic schoolhouse design with a footrest and a storage shelf underneath the work surface. It features runners along the base, which connect the seat with the work surface and sides. There are also aesthetic runners underneath either side of the desktop, which feature a 45-degree tapering that matches the base runners. The desk and bench legs also feature quarter-circle cutouts at the top and bottom, which ensures the design balances form with function – it is a very solid construction without looking too bulky. All

material is 20mm thick pine and ergonomically the desk is suitable for children aged 3 to 10 years. Cutting, gluing and colouring in also means the surface will take wear and tear so it needs to be practical enough to be repainted when needed. Wood screws were used as fasteners, ensuring the length of the screws were selected according to the overall thickness of pieces being joined. Only the screws fastening the top work surface need to be countersunk so that when it is sanded and finished, the screw heads are not visible.



This classic desk is perfect for playrooms and classrooms, and also looks great in a wood finish with two coats of varnish. The footrest and storage shelf are practical, child-friendly features.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The shelf underneath the desktop proved very useful for storing books, pens and paper. You could add a second shelf for extra storage, although it may interfere with the ergonomics of the design by restricting movement of the child's knees. It would be preferable to make the desktop as a hinged flap, which the child can open from

the front to get full access to the shelf underneath. If you decide to modify the design in this way, don't fasten the desktop surface down; simply mount a length of piano hinge at the back corner. Make sure you add a lid stay to prevent the hinged desktop from banging shut on little fingers.

Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Desktop	1	20mm	508mm	660mm
B	Shelf back	1	20mm	76mm	520mm
C	Bench seat	1	20mm	229mm	660mm
D	Bench legs	2	20mm	178mm	337mm
E	Bench crosspiece	1	20mm	76mm	520mm
F	Desktop runner	2	20mm	51mm	381mm
G	Shelf	1	20mm	330mm	520mm
H	Desk legs	2	20mm	381mm	641mm
I	Main runners	2	20mm	76mm	864mm
J	Footrest	1	20mm	203mm	520mm

Project information

Overall dimensions	864mm long x 660mm wide x 661mm high
Number of parts	14
Special equipment	Jigsaw, belt sander, countersink bit
Techniques	Countersink (see page 22)
Difficulty	Medium
Duration	8 hours

Family fun factor



Assembly diagram



CUT OUT THE LEGS, DESKTOP RUNNERS AND MAIN RUNNERS

1 Use a **carpenter's pencil** to mark out the desk legs (H x 2) and bench legs (D x 2), using the correct radius for the curves, as per the design. You can use a paint tin or round template of the correct size. Avoid drawing markings over knots in the wood, which may cause edge defects when painting.



2 Use a **jigsaw** and a thin blade with fine teeth to cut out along the markings for the desk and bench legs. You may want to practise cutting such a curve on a scrap piece of wood before attempting the four such cuts required for this project. A **half-round file** can be used to file off irregularities after making the cut.



3 Use a carpenter's pencil and a **steel ruler** to mark off the desktop runners (F x 2) and main runners (I x 2), both of which require 45-degree taper cuts at both ends. Clamp the pieces to the work surface with **quick grip clamps** and use a jigsaw to cut the taper.



4 Ensure that all parts are correctly sized, ready for assembly, and mark off the positions of all joints by using the design drawings provided. Pieces of the same shape can be placed against each other to check for accuracy and then be sanded or filed down until the two parts match exactly.



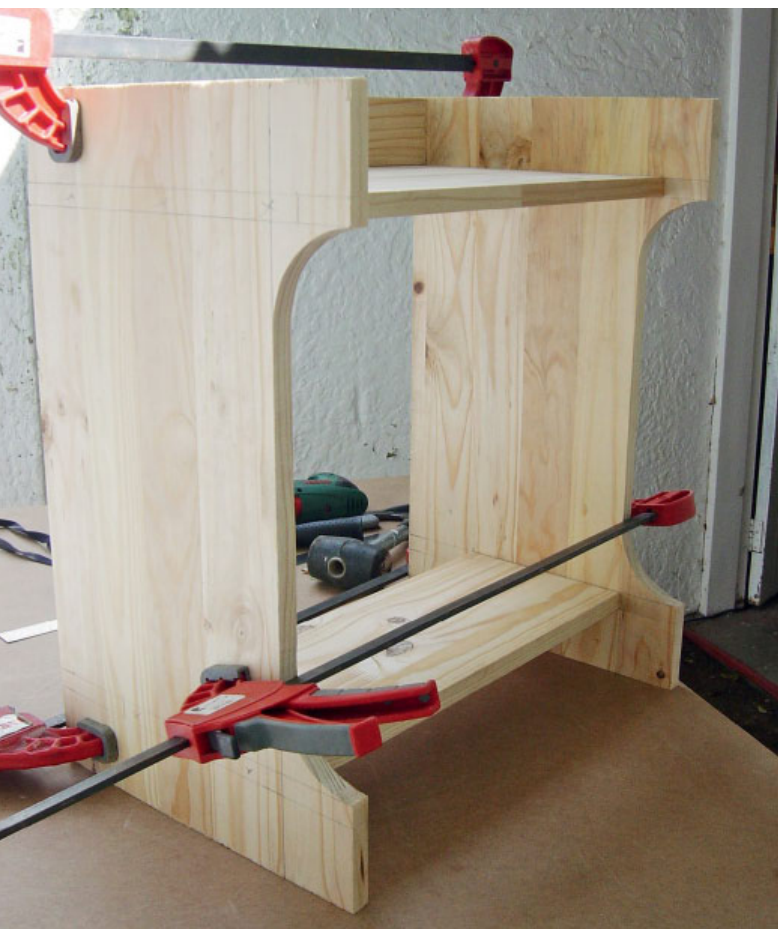
CONSTRUCT THE DESK AND SEAT

5 Assemble the seat by clamping the parts with quick grip clamps, as shown: bench seat (C), bench legs (D x 2) which were cut out earlier, and the bench crosspiece (E). Use wood screws to fasten in place by drilling **pilot holes** and using a **power drill** with an **insert bit** to tighten.

TIP: Use the **one-step clamp and assemble** method for this step where all parts are clamped and fastened at once rather than each join one at a time. This also requires placement of the clamp heads away from the intended positions of the screws. Such a technique does require more clamps than usual, but this is a worthwhile investment.



6 Assemble and clamp the desk components in the same way, as shown in the photograph: footrest (J), desk legs (H x 2), shelf (G) and shelf back (B). In this step and the previous, a **rubber mallet** is useful to tap components into place before final tightening of the three long, quick grip clamps.



7 Mark the positions of the **cut screws** by spacing them evenly along the outside of the butt joints, as shown in the photograph. Drill pilot holes, **countersink** and drive in cut screws to fasten all joints.

TIP: Wood filler can be used prior to painting to hide gaps, knots on surfaces and edges, or imperfections in the construction process.



FASTEN DOWN THE DESKTOP

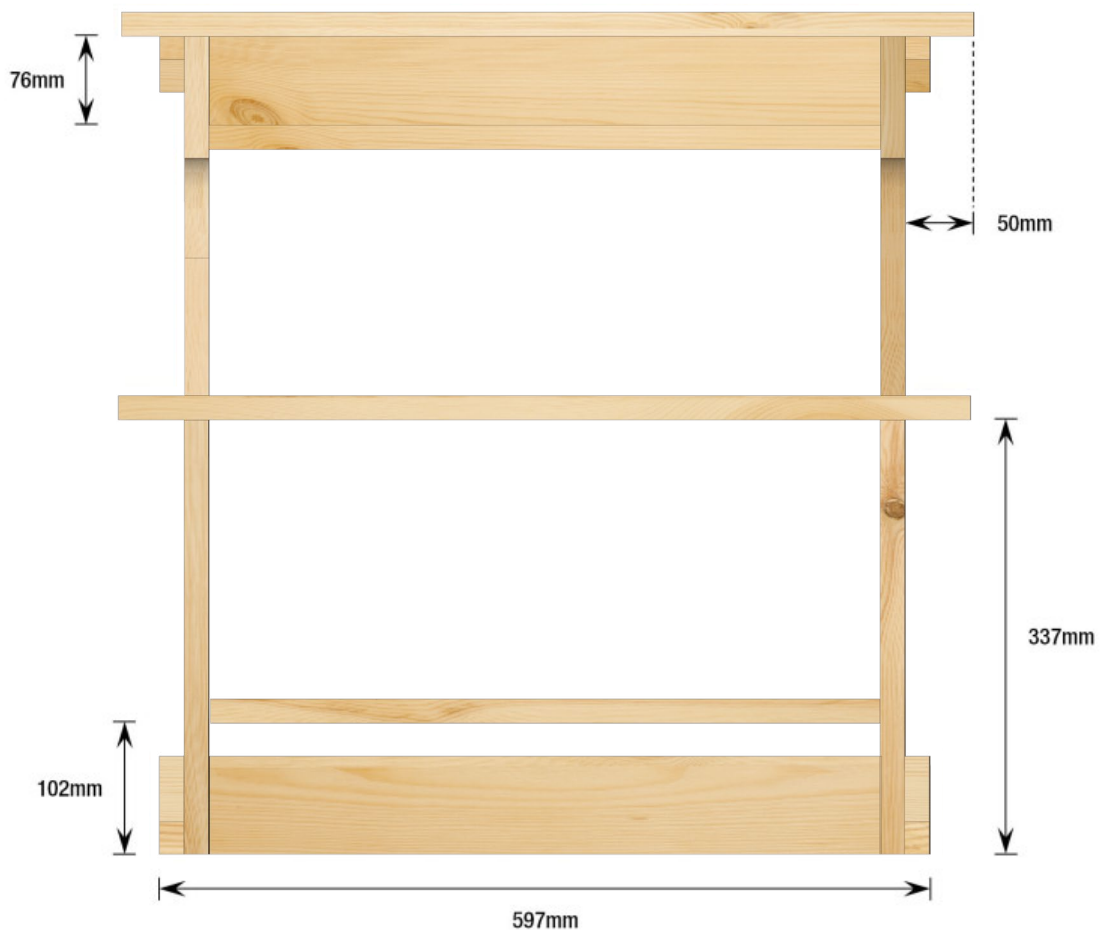
8 Mark out the assembly lines on the top and underside of the desktop (A) with a steel ruler and carpenter's pencil. The reason for marking the joining position underneath is to enable you to attach the desktop (A) to the desk legs (H) accurately and ensure precise positioning of the cut screws.



9 Clamp the desktop (A) to the desk legs (H x 2) with quick grip clamps, as shown in the photograph. Fasten with cut screws between the lines drawn on the desktop (A). Use countersinks for all screws in the top surface so that you can fill with wood filler and sand down for a flat surface.



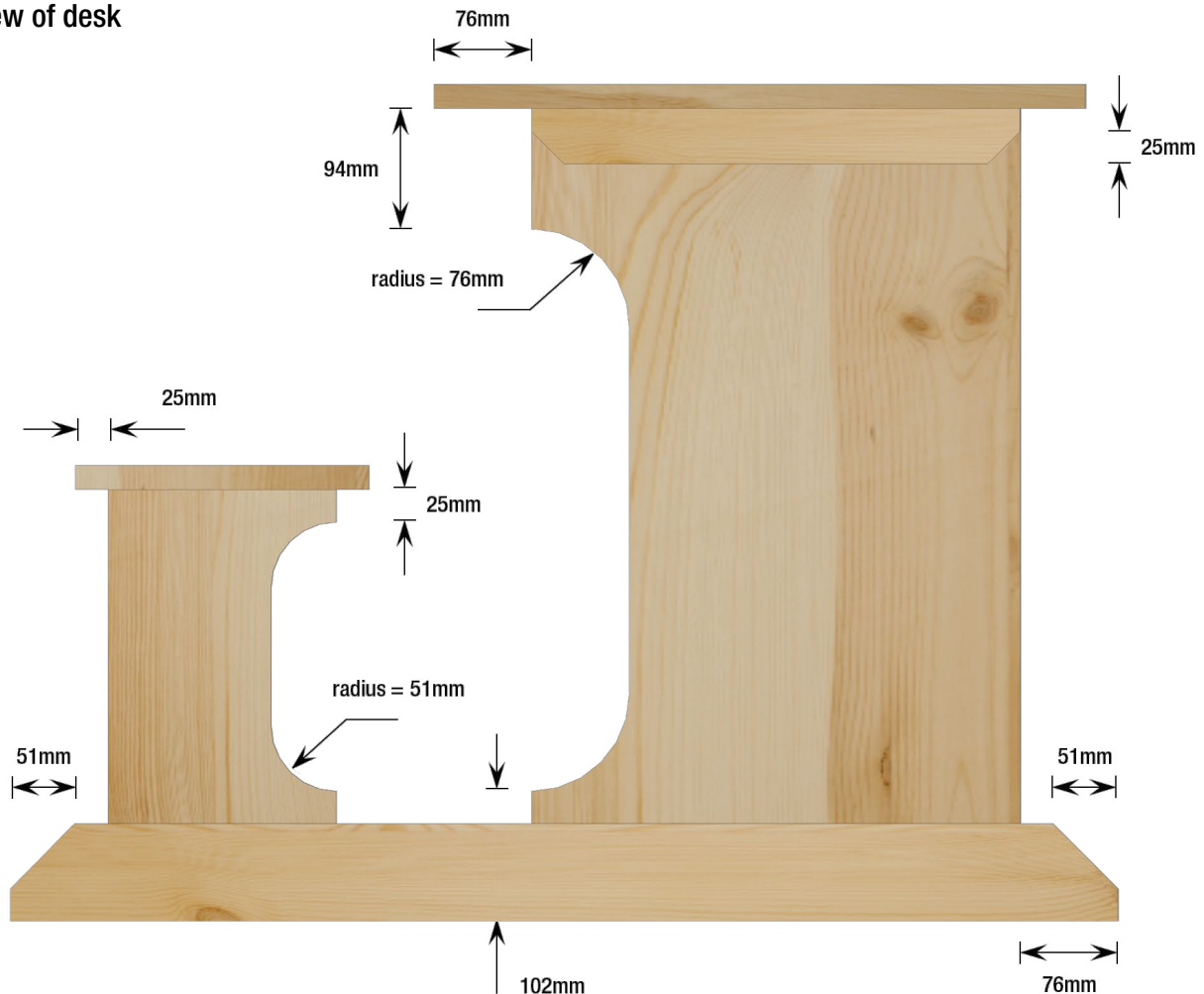
Back view of desk



10 The seat and desk assemblies are now complete and ready to be joined at their base with the runners (1 x 2). Please note that the bench and desk components, as shown separately in the photograph, are not stable enough to be used individually without being fixed together. Check for right angles with a **try square** and accuracy of assembly with a steel ruler before proceeding to the next step.



Side view of desk



INSTALL THE RUNNERS AND DESKTOP RUNNERS

11 Use quick grip clamps to clamp the runners (1 x 2) to the seat and desk assemblies on both sides, ensuring the spacing between the ends, bench and desk assembly along the length of each runner (1) is accurate. Use a power drill, insert bit and cut screws to fasten the runners (1 x 2) to the seat and desk assemblies along each of their lengths (see the photograph in step 13 for the positions of these screws).



12 Follow the same procedure given in step 11 to attach the desktop runners (F x 2) on both sides of the desktop (A). These runners are for aesthetic purposes and balance the overall look and feel with the runners (I x 2) at the base. In the photograph you can also see the markings and positions of the cut screws used to fasten the shelf (G) to the right-hand desk leg (H).



13 Fill any gaps or knots with wood filler, including above the cut screw heads on the desktop, and sand the final assembly as required. Prime and paint with a colour of your choice.



Photographer extraordinaire Doug Place working his magic on the other side of the camera, ensuring the finished item is well showcased, as on the front cover.





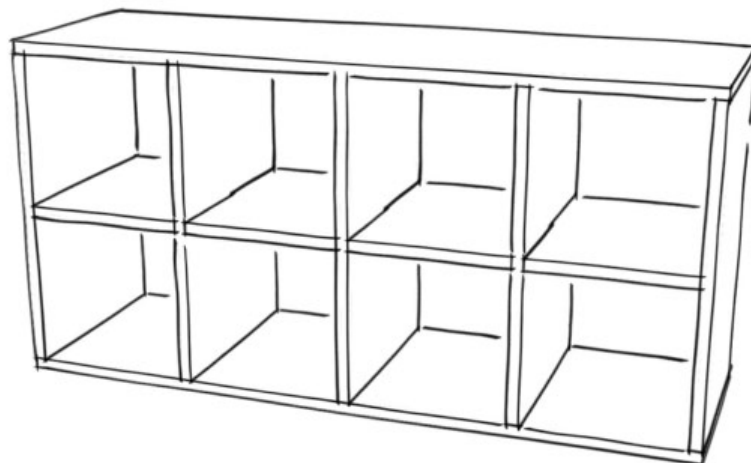
James
two



Toy Shelf



This freestanding toy shelf is very useful for a child's room because it has a low surface and eight separate, easily accessible storage compartments, which are handy for books and toys. It was custom-made to fit the space we had available between the two beds in our older twins' room and they love having the different sections to use. Storage baskets can be placed inside the compartments which add style and provide tidy storage for smaller items. The height of the toy shelf was also just right for night lights and clock radios, which the children could access without having to get out of bed in the middle of the night. Our daughter used the basket in one of her compartments for all her hair accessories, while our son made one of his compartments into a prehistoric cave for his dinosaurs.



DESIGN AND CONSTRUCTION

The eight compartments are square and deep enough for medium-sized toys and books. To calculate the size of the compartments I divided the space between our children's beds into four equal sections and made the overall height twice the size of the section. The backing is Masonite, which is nailed on with the smooth side facing inwards. All other corners are made with butt joints fastened with simple right-angle brackets and short wood screws. Halved joints are used between the middle shelf and vertical partitions

which add rigidity to the shelf but these joints are difficult to cut accurately so the assembly usually requires some wood filler and painting to produce an adequate finish. You may wish to adjust the dimensions to accommodate larger toys or different size containers, or vary the design by merging adjoining compartments. A larger variation of this design that is suitable for a playroom could have additional rows, additional columns or even be made in a L-shape for a very contemporary feel.



Tidy up time is quick and easy with a place to put everything, and having separate compartments is useful for shared bedrooms. Use pull-out baskets or containers in some of the compartments to store all the smaller items.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The joints between the three vertical internal sides and the middle shelf should have been done accurately as I had substantial gaps that needed filling and sanding down before painting. Additionally, once I had done the cutouts for these joints, the wood warped overnight and made the assembly very difficult indeed. A better ap-

proach would be to cut the shelf sides in half and mount the six verticals either side of the middle shelf to achieve the same internal structure. There would be no loss in overall strength due to the right-angle brackets, but at least I was able to learn a new woodworking joint by doing it the more advanced way.

Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Top and bottom shelf	2	20mm	380mm	1200mm
B	Backing board (Masonite)	1	3mm	600mm	1200mm
C	External sides	2	20mm	380mm	560mm
D	Middle shelf	1	20mm	380mm	1160mm
E	Internal sides	3	20mm	380mm	560mm

Project information

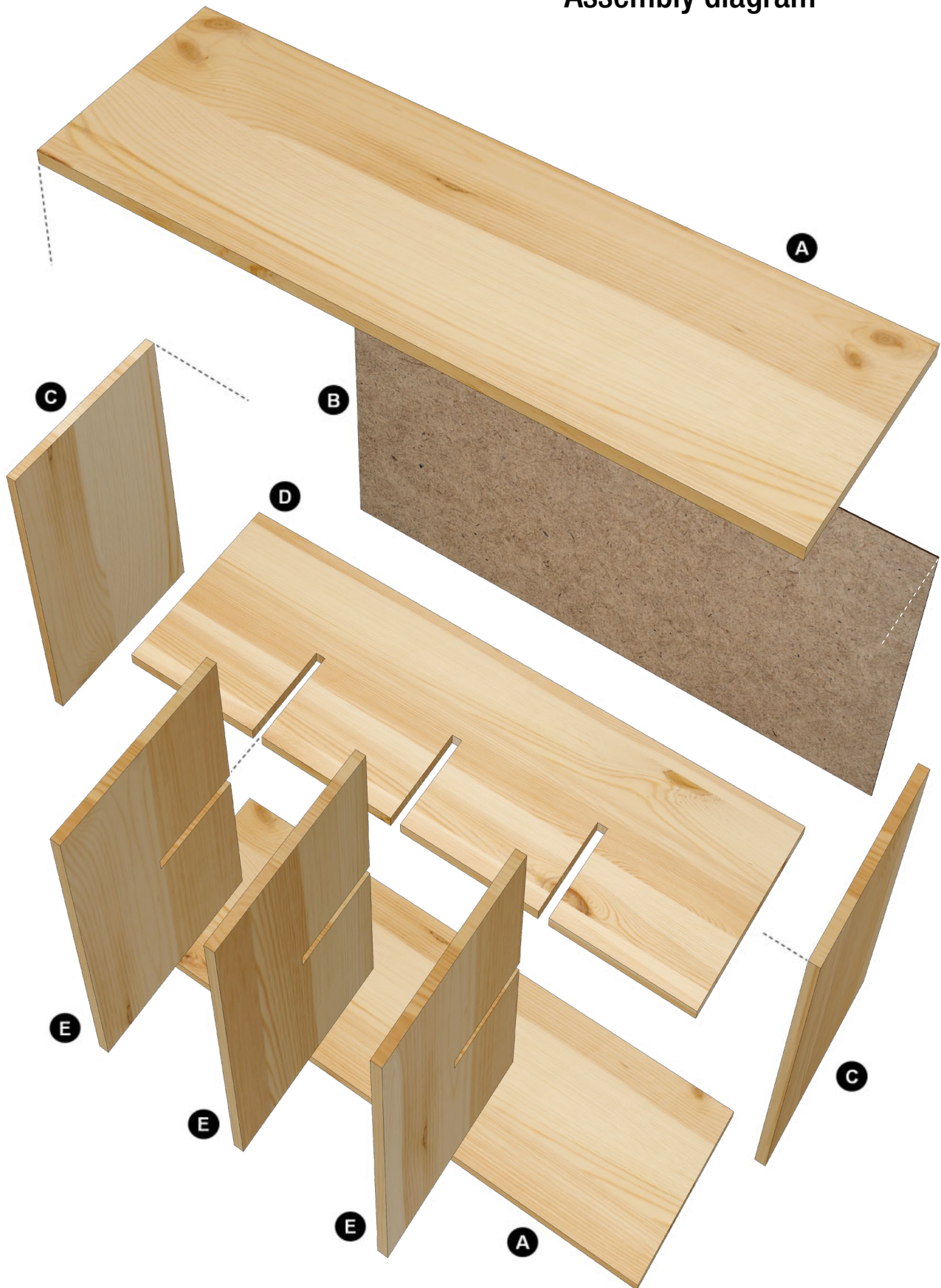
Overall dimensions	1200mm long x 383mm wide x 600mm high
Number of parts	9
Special equipment	Wood chisel, electric sander

Techniques	Halved joint (see page 23)
Difficulty	Hard
Duration	6 hours

Family fun factor



Assembly diagram



BUILD THE OUTER FRAME

- 1 Join the top and bottom shelves (A x 2) with the left and right sides (C x 2) to make the outer frame for the toy shelf. This construction is exactly the same as the bookcase (see page 43) so the same steps can be used, which include the use of **right-angle brackets**, **quick grip clamps**, a **power drill**, **screw-driver** and short wood screws.



- 3 Make the long cuts using a **jigsaw**. Ensure the necessary safety gear is worn and that the correct jigsaw blade is fitted to the saw.



- 4 Use a **wood chisel** to make the short cut in the middle of the wood at the end of the long cuts, as shown in the photograph. Repeat this step for the other two cutouts in the middle shelf (D), as well as the corresponding cutouts in the internal sides (E x 3).



ASSEMBLE THE INSIDE SHELVES

- 2 There are three cutouts required in the horizontal middle shelf (D) for the **halved joints** that connect to the vertical internal sides (E x 3). Transfer these measurements from the illustration provided to the middle shelf (D). You will need a **carpenter's pencil**, a **try square** and a **steel ruler**. Double-check all these measurements because any inaccuracies cannot be resolved and a new piece of wood will have to be cut if a mistake is made (I learnt this the hard way).



- 5 The photograph shows the internal sides (E x 3) and middle shelf (D) with the completed cutouts, ready for assembly. Ensure that the correct measurements are used or else the pieces will not fit together and the internal compartments will be inaccurate.

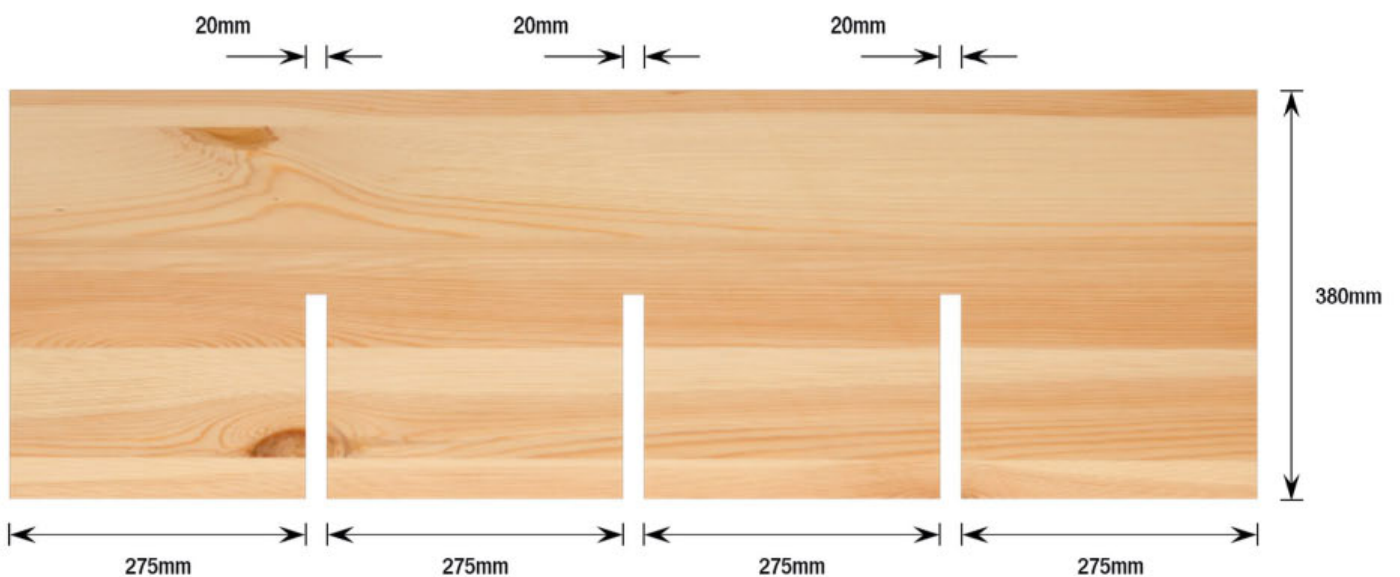


COMPLETE THE FULL ASSEMBLY

6 Join these pieces by interlocking the cutouts to create the internal assembly as shown – this joint is known as the halved joint.



7 Once you have joined the three internal sides to the middle shelf by interlocking the corresponding cutouts, this internal assembly can be positioned inside the outer frame.



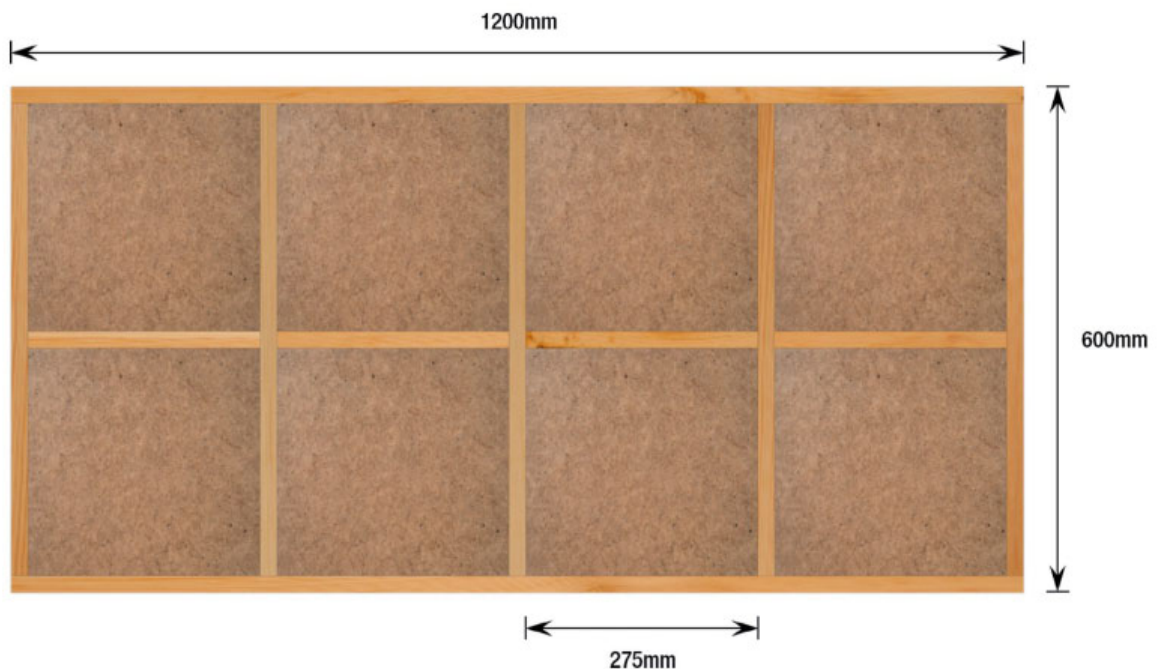
8 Clamp the full assembly with long quick grip clamps, as shown, or preferably use **sash clamps**. Square up all right angles by checking with a try square and steel ruler. Adjust where necessary using a **rubber mallet**.

TIP: If you have extra clamps, use them at equal intervals to exert consistent force on the top shelf while fastening the interior components together. This will avoid bending the wood and leading to further inaccuracies.



9 Use simple right-angle brackets and short **wood screws** to fasten all joints, while the clamps remain in place. You will need a drill driver or **power drill** that fits between the inside shelves, as shown in the photograph.

TIP: The internal assembly makes **butt joints** with the top, bottom (A x 2) and external sides (C x 2). Strengthen the assembly further by fastening these butt joints with wood screws from the outside. While not necessary to **countersink**, ensure the screw is driven a few millimetres below the surface of the wood. This will allow for some wood filler to be used before painting to restore the surface and hide the head of the screw.



FILL GAPS AND SAND DOWN

10 I used laminated pine shelving, which is prone to warping, and which distorted the halved joints significantly. Combined with imperfect measuring and amateur cutting, my toy shelf project required extensive filling of gaps. However, if the joints are all at right angles and the measurements are accurate to within 3mm, the filling and painting process still produces very good end results.



11 Additionally, the front face will need sanding down to ensure smooth surfaces, particularly at the joints since there will be some misalignment between the pieces of wood during the assembly process. Use an **electric planer**, as shown, and finish off with a **belt sander**, **random orbital sander** and fine sanding by hand, as required.



INSTALL THE BACKING BOARD

12 Have the backing board cut professionally to the right dimensions or use a jigsaw to cut it yourself and then sand down the edges. Note the twin sets of right-angle brackets used as the fastening mechanism for each of the halved joints between the shelves.



13 Position the backing board so that the rough side faces to the back and mark the back edges of all the shelves on the outside, using a carpenter's pencil and long steel ruler. With these markings as a guide, use a **claw hammer** to drive in nails at the corresponding edges and intersecting corners to fasten the backing board to the back of the toy shelf.



FINISHING

14

The final assembly can be painted or varnished, depending on your décor requirements, although if you have used wood filler as extensively as I did, it is recommended that you paint the piece. James and Juliet were keen to try it out even before I had painted it, as shown in the photograph. The baskets were added much later when we realised the need for better storage of smaller items.

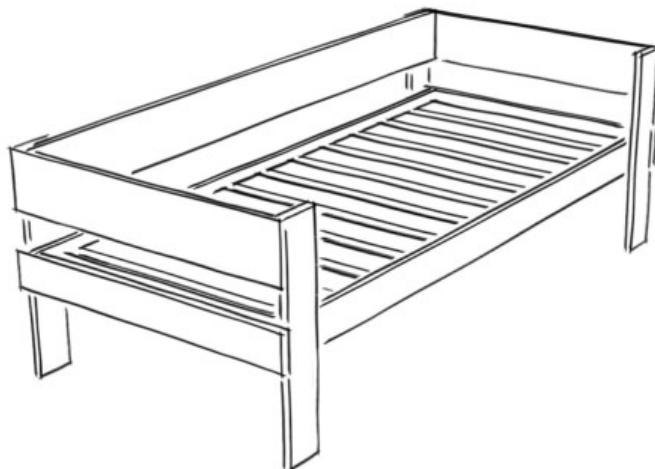




Child's Bed



When a young child progresses from a baby's cot to a small bed it is a milestone of development from infant to toddler. At two and a half our older twins became too big for their cots and we decided to make these beds for them, with foam mattresses cut to size, waterproofed and covered. After dismantling the cots and installing the beds in the children's bedroom, it no longer seemed like a nursery and we realised our babies were quickly growing into young, independent children. The twins felt very grown up in their new beds and we put their cots into storage, not knowing that we would need them both again for our second set of twins. Luckily the first set of twins outgrew these beds before the younger ones needed them, otherwise I would have had to make another two beds!



DESIGN AND CONSTRUCTION

This three-quarter size child's bed is lightweight and space efficient, yet strong and sturdy. It is made from only two different widths of 19mm thick wood. The final assembly consists of three main parts: two end assemblies and the base. The latter consists of equally spaced slats mounted on supports with side and end rails. The two end assemblies feature two legs and an end guardrail, and these are joined by the side guardrail. Use a foam mattress that fits the

inner dimensions of the base and has a thickness of 100mm, which is sufficient ergonomic support for sleeping toddlers. To allow for dismantling and storage, the bed could be constructed as three sub-assemblies that are made and painted separately, then bolted together when needed. The slats could also be left loose and connected along two parallel lengths of rope with the same spacing as in the design.



A very simple design for a lightweight bed that will look great in any child's bedroom. The size is also perfect for young children who are too big for a cot but too small for a full-size bed.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

Marking out the positions of the base slats (E) with a tape measure proved quite laborious, whereas a spacer would have been much quicker. Simply cut two pieces of wood the same size as the required gap between the slats and use these to position each successive slat as it is clamped in place (see Wendy house, step 20,

page 150). It would also be more efficient to fasten each slat in place while it is positioned using the spacers, which avoids the clamping process entirely. As the base is hidden by the mattress, accurate positioning of the slats is not critical, as long as you can build it efficiently and they provide enough support for the sleeping child.

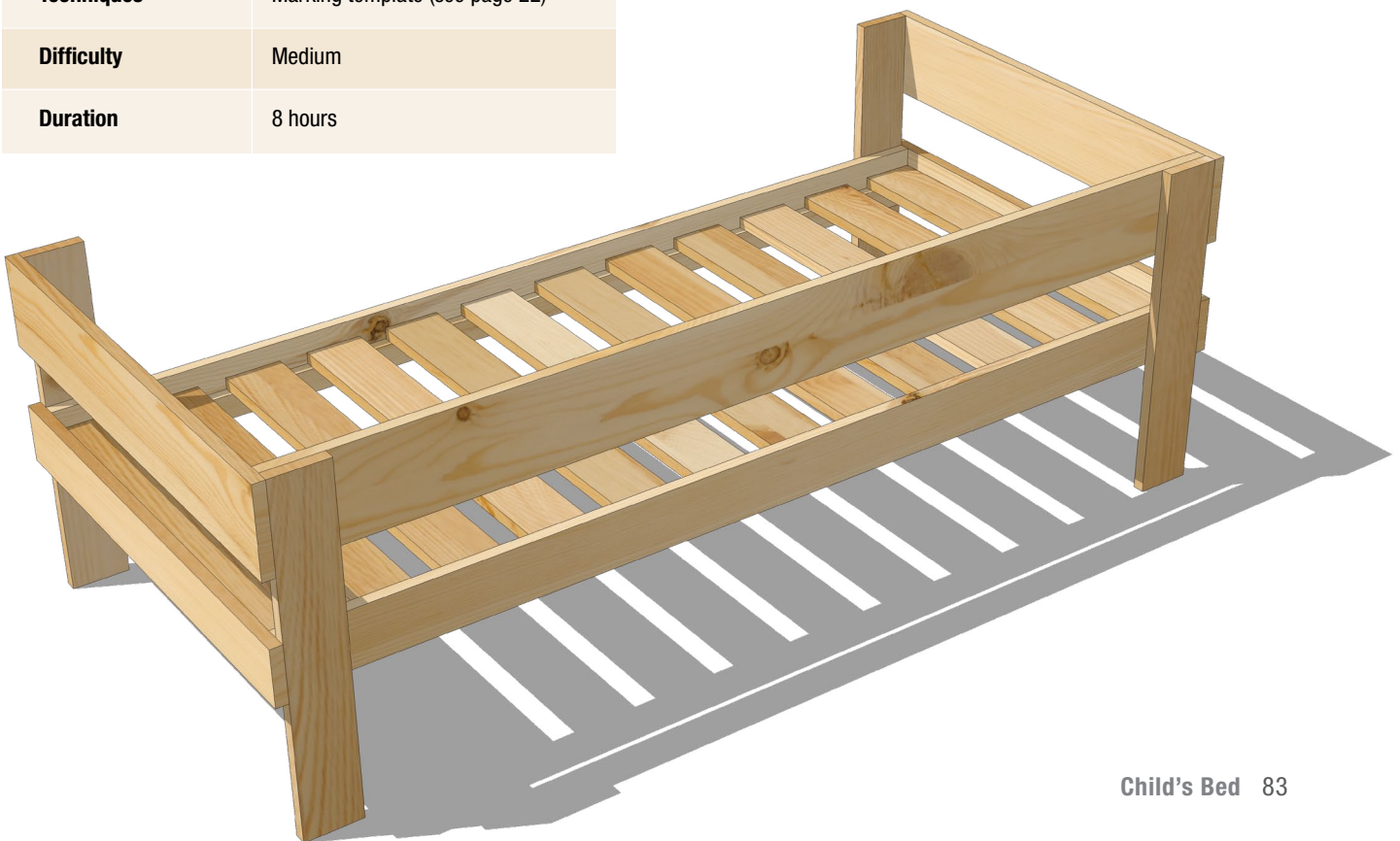
Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	End guardrail	2	19mm	140mm	750mm
B	End rail	2	19mm	90mm	750mm
C	Leg	4	19mm	90mm	550mm
D	Side guardrail	1	19mm	140mm	1575mm
E	Bed slat	12	19mm	90mm	675mm
F	Bed slat support	2	19mm	40mm	1575mm
G	Side rail	2	19mm	90mm	1575mm

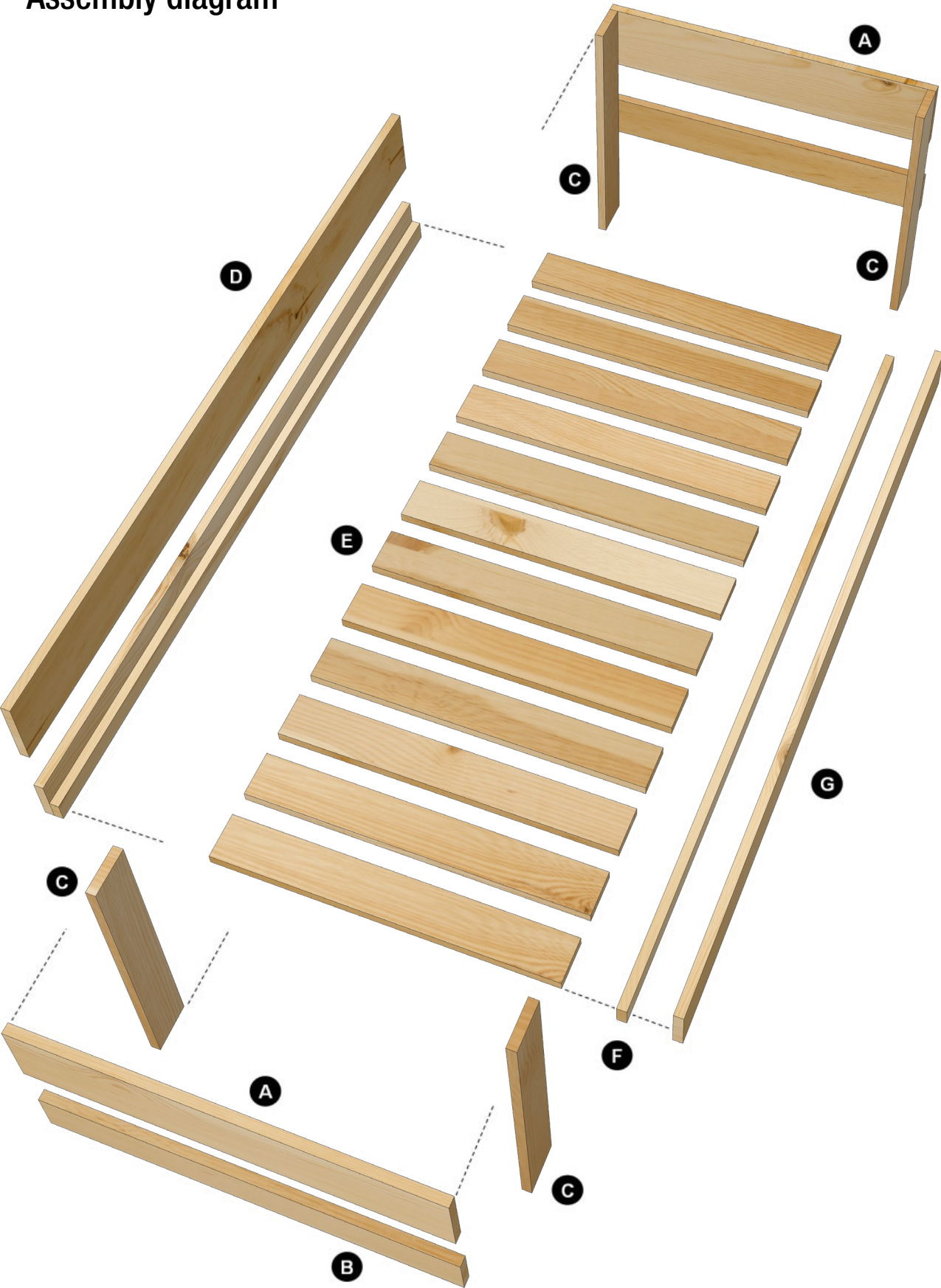
Project information

Overall dimensions	1613mm long x 750mm wide x 550mm high
Number of parts	25
Special equipment	None
Techniques	Marking template (see page 22)
Difficulty	Medium
Duration	8 hours

Family fun factor



Assembly diagram



MAKE THE BASE

1 On the top edge of one of the slat supports (F), mark the positions of the bed slats (E) by spacing them evenly along the length. Place this slat support (F) on top of a side rail (G) as shown, place over two trestles and clamp the two pieces together with **quick grip clamps**. Use a **power drill** to make **pilot holes** in the spaces between the slats, as shown in the photograph.



2 Fasten the slat support (F) to the length of the side rail (G), using a power drill to drive in **cut screws** at each pilot hole. Turn the assembly so it is standing on its edge, as can be seen in the photograph. Repeat these two steps with the other slat support (F) and side rail (G) and place it opposite the other side assembly, with both slat supports (F x 2) facing inwards.

TIP: The spacing of the cut screws between the slats (E) will ensure they do not obstruct the **wood screws** that fasten the slats (E x 12) downwards onto the slat supports (F).



3 Use long quick grip clamps or **sash clamps** to clamp the end slats (E) onto the slat supports (F) at either end of the side rail (G) and slat support (F) assemblies, as shown. Ensure this is done at right angles by checking with a **try square**. Don't clamp too near the middle of the length of the side assemblies as this will cause the side rail (G) and slat support (F) assembly to bend inwards. Mounting the base frame on two trestles, as shown in the photograph, will make the following steps much easier.



4 Make a **marking template** for the positions of the screws on the ends of all the slats, as shown in the photograph. This will speed up assembly of the 12 slats (E x 12), which require 48 screw positions in total.



5 Remove the clamps, position the rest of the slats (E x 10) in line with the markings and tap into position with a **rubber mallet**. Mark the positions of the cut screws at both ends of all the slats, using the marking template.

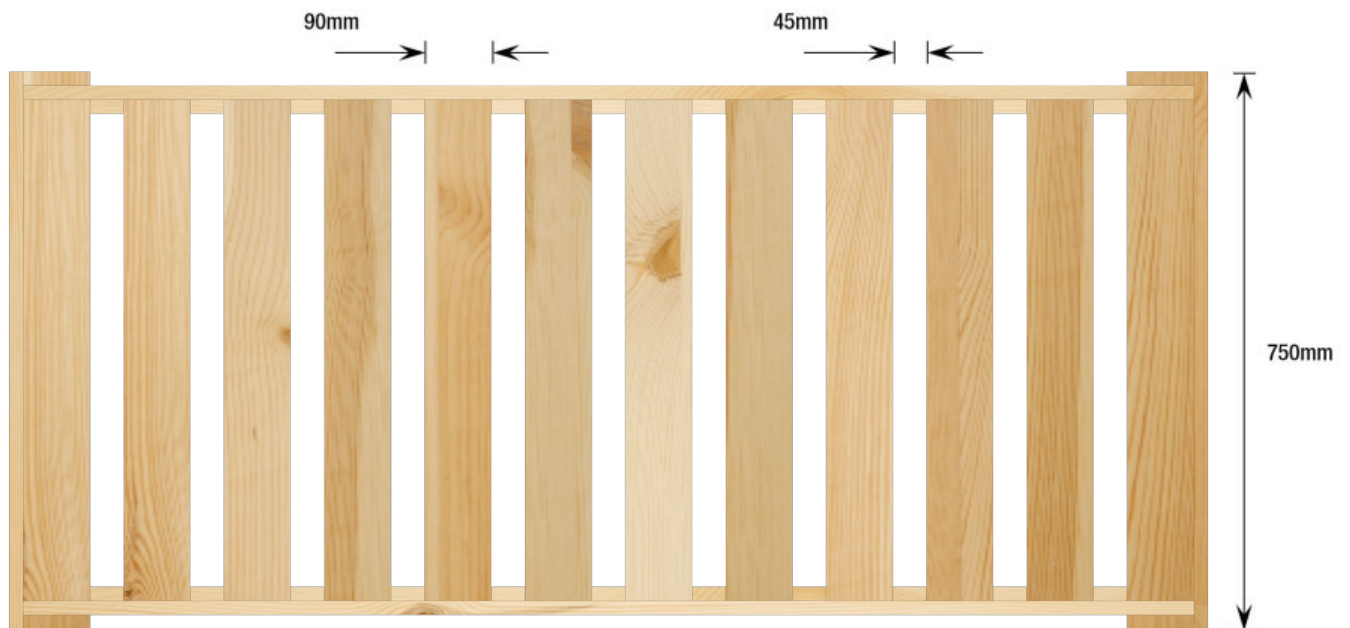


6 Once all the slats are in place and the screw positions have been marked, re-clamp at regular intervals along the side rails (G) to hold the whole base assembly in place. Use a power drill to make pilot holes at all the marked screw positions and then fasten all the slats (E) to the slat supports (F) with cut screws.

TIP: You might need to **countersink** as well as drill pilot holes, otherwise the wood may split when the screws are tightened, because they are fastened so near the end of the slat.



Top view



MAKE THE BED ENDS

7 Assemble the four components of one of the bed ends – end guardrail (A), end rail (B) and two legs (C x 2) – and use quick grip clamps to clamp in place. Re-use the marking template and a power drill to make pilot holes, then fasten with cut screws. Do not clamp too far from the ends of the rails or they will bend inwards and lead to inaccurate construction. Repeat for the other bed end.



8 The three sub-assemblies that comprise the bed are now complete and ready for final assembly together with the side guardrail (D). Check all right angles, measurements, spacing and screws.



Side view



FINAL ASSEMBLY

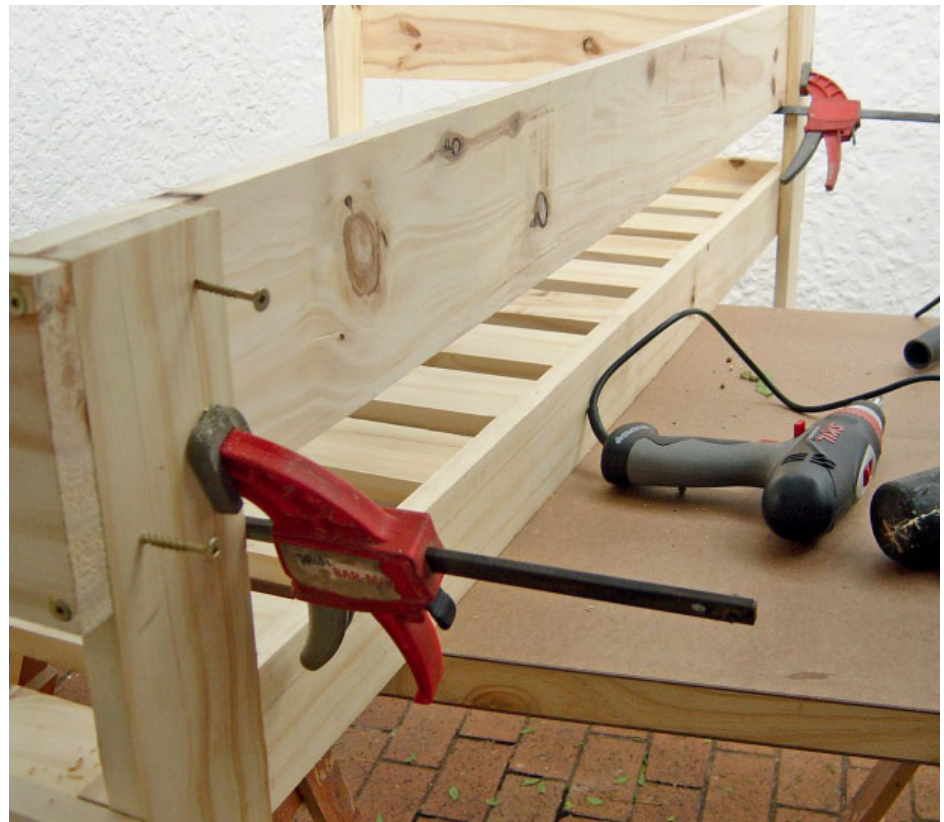
9 Position the bed ends at both ends of the base, as shown in the photograph, ensuring that the long edges of the side rails (G x 2) align with the width of the end rails (B x 2). Use a try square to make sure the bed ends are positioned at right angles to the base assembly.



10 Once the bed ends are clamped in place with quick grip clamps, drill pilot holes and fasten with cut screws using a power drill.



11 Choose which side is the front of the bed, based on the quality of assembly and avoiding any knots on the front edges. Use two quick grip clamps as shown to clamp the side guardrail (D) onto the inside of the top corners of the legs (C x 2). Fasten with cut screws in opposite corners of the rectangular overlap between the side guardrail and leg, as shown.



12 Use wood filler on any gaps in the joints, defects or knots before giving the bed a final sanding, priming and painting as needed. You can make two of these beds and combine them into bunk beds as explained on page 97.



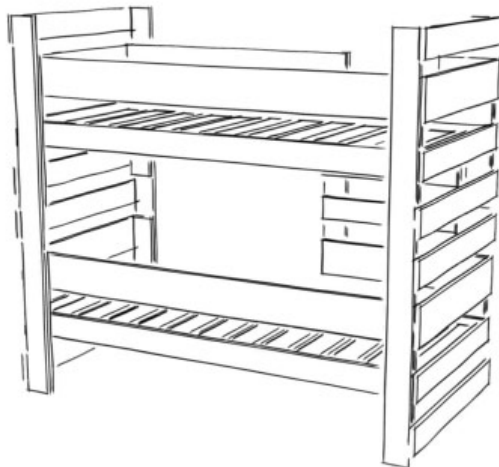
Limited time and a small workshop meant that for many projects I had to work at night and outside. In the photograph you can see two beds in progress, which I needed for our first set of twins. You will also need to make two beds for step 7 of the bunk beds project in the next chapter.



Bunk Beds



These bunk beds will be a classic feature of your children's bedroom and save a lot of floor space. They are perfect for boys to play castles, girls to play house or just useful to keep as a spare bed for sleepovers. Siblings love to share bunk beds, especially once they have sorted out who goes on top, although Mum and Dad may need to mediate. Bunk beds are useful wherever space is restricted in a sleeping area – dorms, hostels, submarines, ships – and a house with five children is no exception! For our first set of twins we used the two beds separately without assembling as bunk beds (see page 82) and now they have moved on to full-size beds. When the younger twins are older we will assemble the bunk beds in their room, which will save space and create a safe sleeping experience for them.



DESIGN AND CONSTRUCTION

The most important design feature of bunk beds is safety and ensuring that the children who use them do so within strict guidelines. You can find clear regulations for making and using bunk beds on relevant consumer and home safety websites, and I would recommend consulting this information before attempting this project. Such requirements include size and positioning of guardrails, flush and smooth fastenings, sturdy and secure joints

and maximum gap size between parts. The overall construction of these bunk beds consists of two child's beds, two bunk ends and one ladder. All of which are assembled with nuts and bolts to allow for quick dismantling and storage. The fully assembled bunk beds are sturdy and strong without looking bulky and over-engineered. Children can easily clamber up and down the ladder or jump into the bottom bunk as needed.



These bunk beds are very safe and sturdy for children to use while also saving space and adding a stylish piece of furniture to your home. You can quickly dismantle them using a spanner and socket wrench (see more information in the Tools and Techniques chapter, page 16).

WHAT I WOULD DO DIFFERENTLY NEXT TIME

The design does not allow for any clearance between the inside surfaces of the bunk corner posts and the outside edges of the legs of the individual beds (see steps 7–9). After I had primed the bunk end assemblies, I tested the final assembly and, because the primer and paint had added 2–3mm on each of the joining surfaces, the

assembly was not possible and would have broken if I tried to force it. I then had to remove the primer as well as 1.5mm from the inside surface of all four corner bunk posts. I used an electric planer and electric sander to do this, but next time I would plane down these surfaces before building the bunk end assemblies.

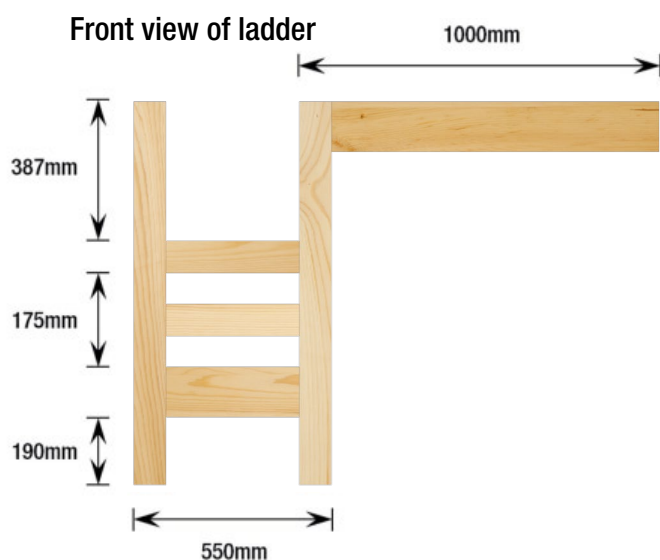
Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
H	Bunk corner post	4	19mm	90mm	1437mm
J	Bunk end rails	8	19mm	90mm	787mm
K	Ladder side	2	19mm	90mm	1037mm
L	Ladder rung (wide)	1	19mm	140mm	550mm
M	Ladder rung (narrow)	2	19mm	90mm	550mm
N	Bunk guardrail	1	19mm	140mm	1000mm

The parts above exclude the beds (A–G) in the previous chapter, see page 83. Ensure you double the quantity for two beds.

Project information

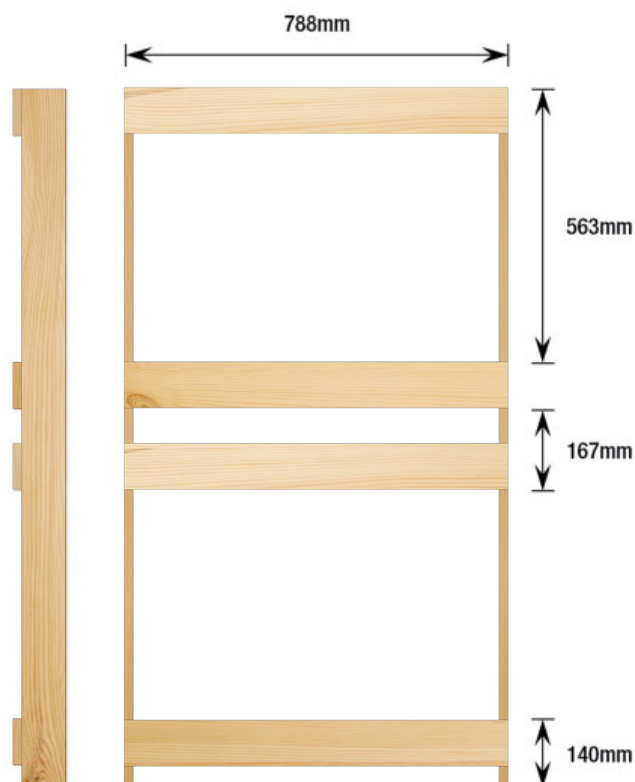
Overall dimensions	1613mm long x 788mm wide x 1437mm high
Number of parts	68
Special equipment	Socket spanner
Techniques	Nuts and bolts assembly (see page 16)
Difficulty	Hard
Duration	16 hours



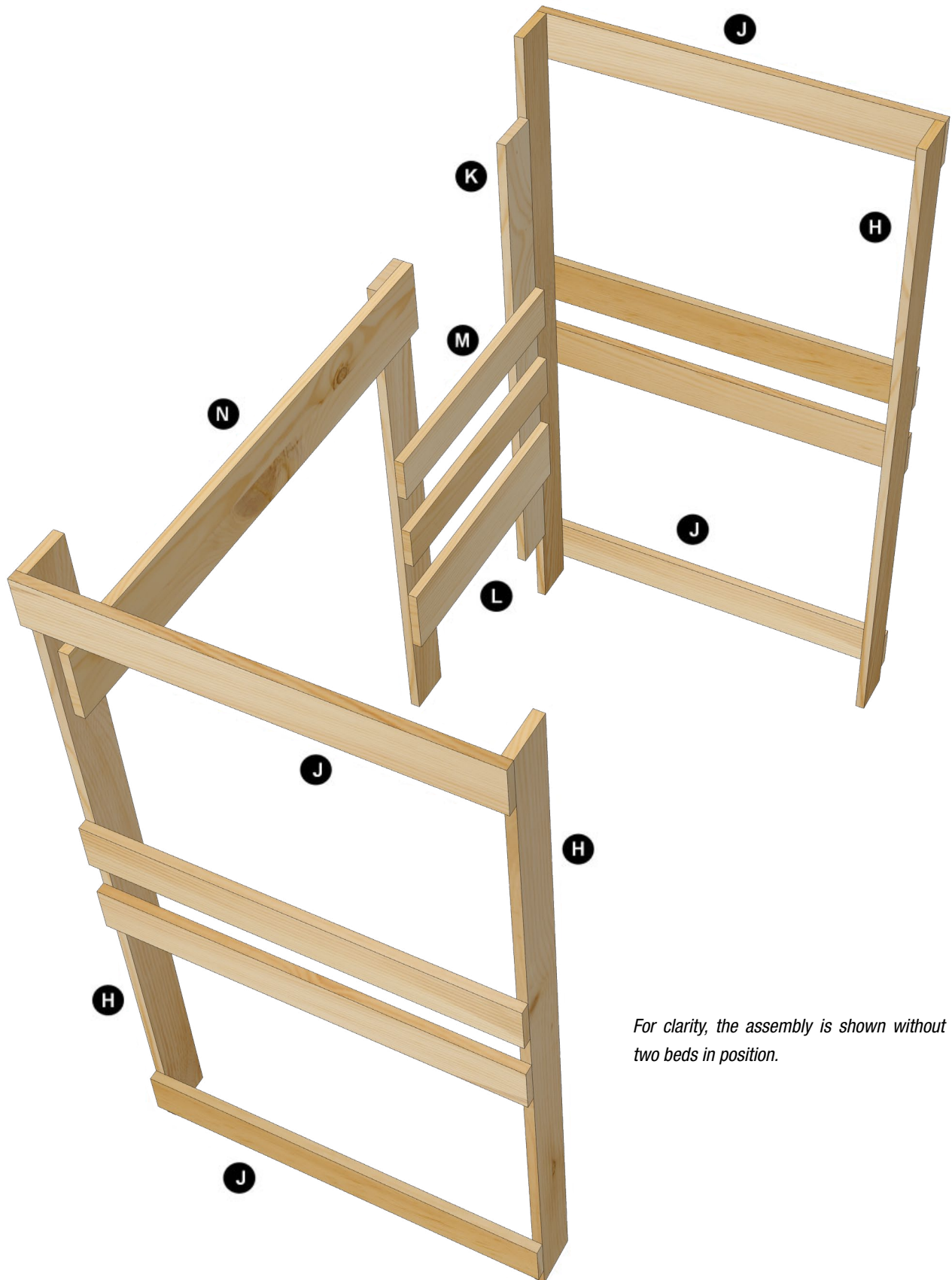
Family fun factor



Front and side view of bunk end



Assembly diagram



For clarity, the assembly is shown without the two beds in position.

MAKE THE BUNK END ASSEMBLIES

1 Lay out the bunk corner posts (H x 2) on your work surface and use a long **steel ruler** to ensure they are positioned at the correct distance apart. Use a **try square** to position the bunk end rails (J x 4), as shown in the photograph.

TIP: Align the bunk corner posts with the edges of your work surface, which will aid in ensuring the bunk end rails are placed at right angles.



2 Use a **marking template** to mark the positions of the **cut screws** in the bunk end rails (J x 4) and use a **power drill** to fasten them with cut screws at each joint, as shown in the photograph.



3 After completing one bunk end assembly, repeat the above steps to build a second one. Fill any gaps, knots or other imperfections with wood filler and use a **random orbital sander** to achieve a smooth finish. Double-check measurements with a steel ruler and use a try square to check all right angles.



MAKE THE BUNK LADDER

4 Lay out the ladder sides (K x 2) and three rungs (M x 2 and L x 1), as shown in the photograph.

TIP: Align one of the ladder sides to the edge of your work surface to make it easier to assemble accurate right angles with the rungs.



5 Position and clamp with **quick grip clamps**, then fasten each successive ladder rung (M x 2 and L x 1) to the ladder sides (K x 2) with cut screws and a power drill, as shown in the photograph. Use a marking template, drill **pilot holes** and fasten the six joints with four cut screws each.

James and Juliet love their bunk beds. It's so safe and easy to use the ladder to get up and down; race you to the top bunk!



6 Position the bunk guardrail (N) at the top of the right-hand ladder side (K) and fasten with two cut screws. Check the right angles with a try square and also check that all of the screw heads are below the wood surface. If not, grind them down if necessary.



ASSEMBLE THE BUNK BEDS

7 Make two of the beds from the previous chapter, place one of the bunk end assemblies on the ground and then insert the end of one of the beds into position at right angles to the ground. (Please note: These steps show the beds as painted; this is because I had finished them previously and we used them for the children before I made them into bunk beds. If you make the bunk beds from scratch, the individual beds would have a natural wood surface during these steps.)



8 Insert the second bed into the lower position on the bunk end assembly, at right angles to the ground, as shown in the photograph. Make sure that both beds face the same way and that the ends of the bottom bed's legs align with the ends of the bunk corner posts (H).



9 Place the other bunk end assembly on top of the other ends of the beds. You may need to stand on a small step ladder, or borrow your child's booster step (see pages 26–33).

TIP: Do not force the bunk end into position, rather tap it in lightly with a **rubber mallet**. The fitting is tight and the bunk corner posts might break if forced into position.



10 Measure and adjust the distance between the top and bottom of the beds until accurate, according to the design. Use a rubber mallet to adjust if necessary and ensure that you tap evenly on both sides until the desired position is achieved.



11 Clamp the top ends of the assembly together and rotate the bunk bed through 90 degrees to stand in a normal upright position. Clamp the other ends of the beds to the bunk end assembly with quick grip clamps, as shown in the photograph.

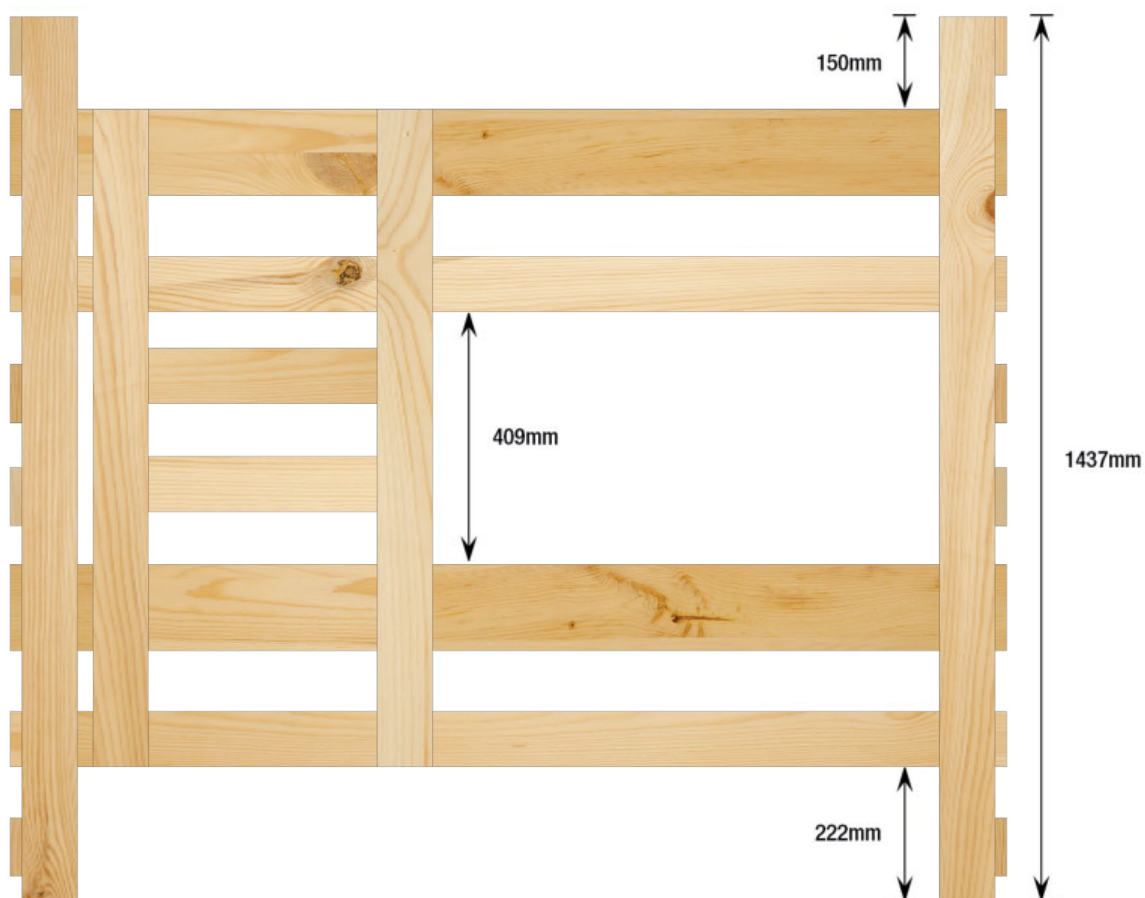


12 Clamp the ladder in position according to the design, as shown in the photograph.

TIP: When clamping the bunk ends to the beds, as well as the ladder to the beds, ensure you do not place the quick grip clamps in the positions where you need to drill holes for the final assembly bolts.



Front view



FASTEN THE ASSEMBLY WITH NUTS AND BOLTS

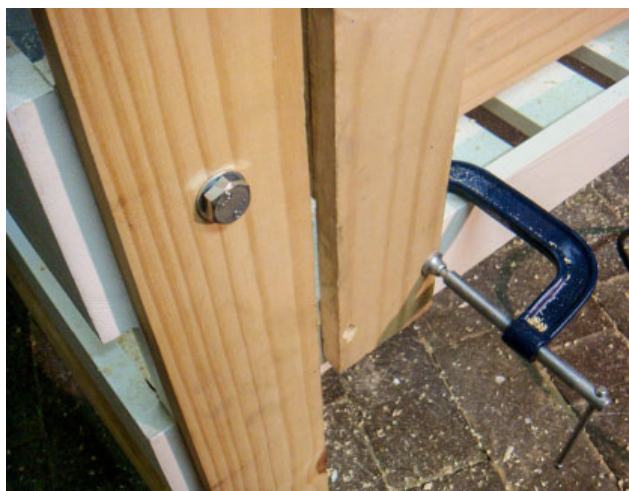
13 Use a power drill with a 12mm wood drill bit to drill holes through the assembly to accommodate the 10mm bolts you will use.

TIP: Use a rubber mallet to ensure that the faces and edges align neatly as this will be the position of the final assembly once the bolts are used to secure all the components in place.



14 Where the holes have been drilled, insert the **nuts and bolts** with washers on both ends and tighten with a **spanner** and **socket wrench**. Ensure the bolt is not too long – it should not protrude more than 5mm beyond the nut, otherwise it could be dangerous to the child using the bunk beds. Cut off any excess length with a hacksaw and grind down any sharp edges.

TIP: Release only one quick grip clamp at a time to insert and tighten the bolts in succession. Do this until all the bolted joints are completed. This will prevent the beds from slipping out of position during assembly.



PAINT AND FINAL ASSEMBLY

15 Dismantle the bunk beds, prime all wood surfaces and paint two coats with a colour of your choice. Allow the paint to dry, reassemble in the required place, and then add mattresses and linen. I was grateful to finally have a large workshop to make this project, which meant I could work inside, even though I still had to work at night!

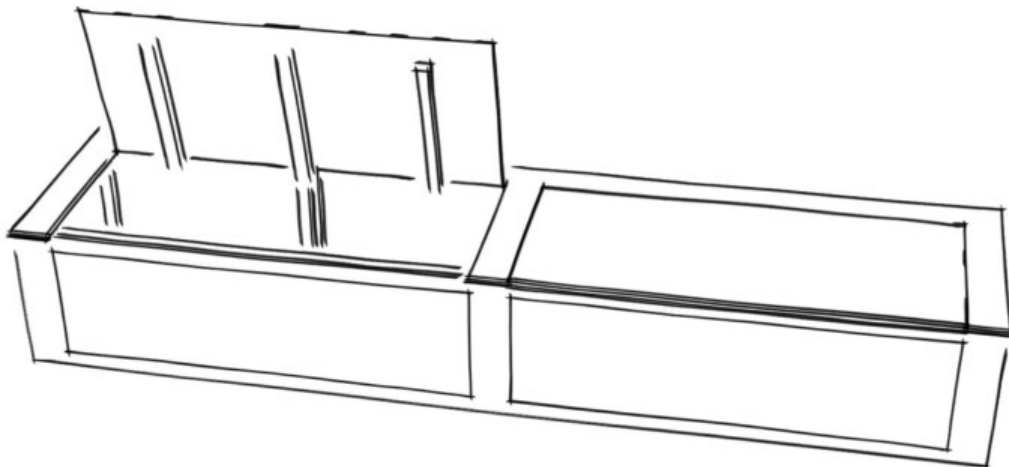




Window Seat



A window seat will create a new living space in your home for relaxation and laughter. Reading a good book and enjoying a mug of coffee next to a window with sunshine streaming through it can do wonders for the soul. The passage in our home features a nook area in front of a large window which was perfectly suited to this project. Building this custom-made window seat in front of it virtually created an extra room in the house and a focal point for the whole family. We had two foam cushions cut to size and covered, which we put on top of the seat to create a comfortable and stylish space in our home. The storage facility beneath the seat is also very practical and it is easy to open the seat panels and pack away large toys, board games and books.



DESIGN AND CONSTRUCTION

The project must be customised to the available space and the measurements in this chapter will need to be adjusted for the specific area you have in mind. However, the design and construction principles remain the same. The dimensions of height and width are ergonomically sound, while providing a deceptively large storage area accessible through the two hinged seat panels. A simple internal skeleton provides the support to a top and front

panel, which can be routed and decorated or painted to suit your internal décor. The two seat flaps are cut from the top panel using the plunge cut method with a circular saw and fastened to the back of the window seat with piano hinge running the length of the back. Cabinet magnets were used to ensure the lids close properly. Hooks can also be added to hold the seat panels open and prevent them from falling onto little fingers.



Family fun factor



The innovative design of this window seat can be adjusted to fit any suitable space by changing the dimensions, although the overall structure remains the same. The seat flaps hinge upwards to provide access to the large and convenient storage area underneath.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

There is an electrical plug located on the wall inside the window seat. This means we have to open the seat to use the plug and run the cord through the seat flap each time we need it. I should have either moved the wall socket or mounted one on the front of the window seat and connected it to the actual wall socket inside.

You will need to be aware of electrics and plumbing in the walls where you are installing the window seat, but ensure you use certified electricians or plumbers if you need any work done that you are not qualified to do. Instead of adding three supports under each seat flap as shown above, you could use thicker wood for the seat panel.

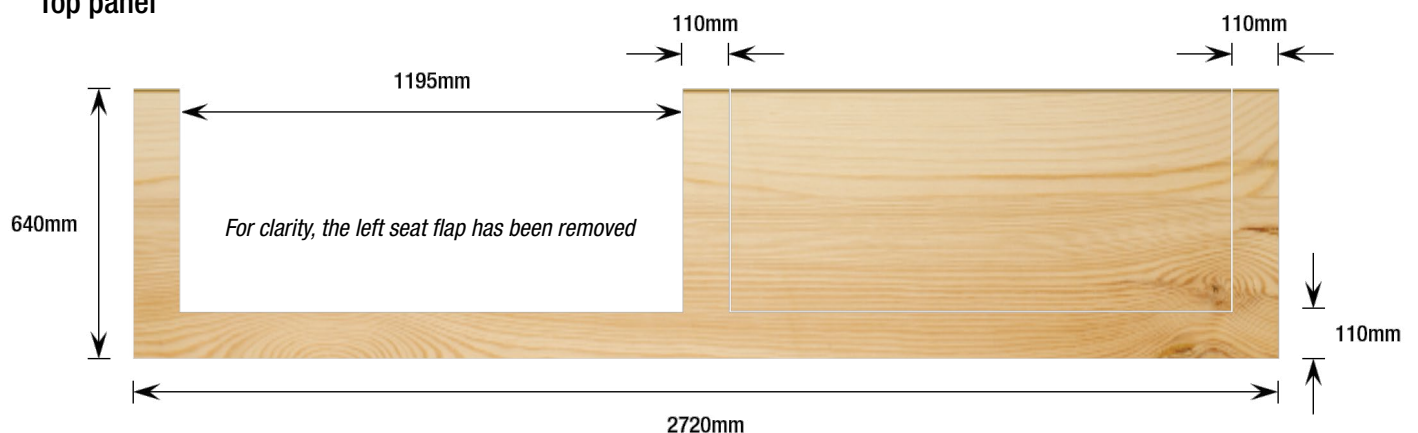
Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Seat flap (cut from C)	2	18mm	527mm	1189mm
B	Seat reinforcement	6	36mm	36mm	442mm
C	Top panel	1	18mm	640mm	2720mm
D	Top panel support, long struts	2	36mm	36mm	2720mm
E	Top panel support, short struts	3	36mm	36mm	600mm
F	Vertical struts	12	36mm	36mm	394mm
G	Front panel	1	20mm	430mm	2720mm
H	Braces	2	36mm	36mm	143mm
I	Spacers	2	36mm	36mm	43mm
J	Bottom front panel support	1	36mm	36mm	2648mm
K	Bottom struts	3	36mm	36mm	528mm
	Quarter round trim	2	12mm	12mm	3m

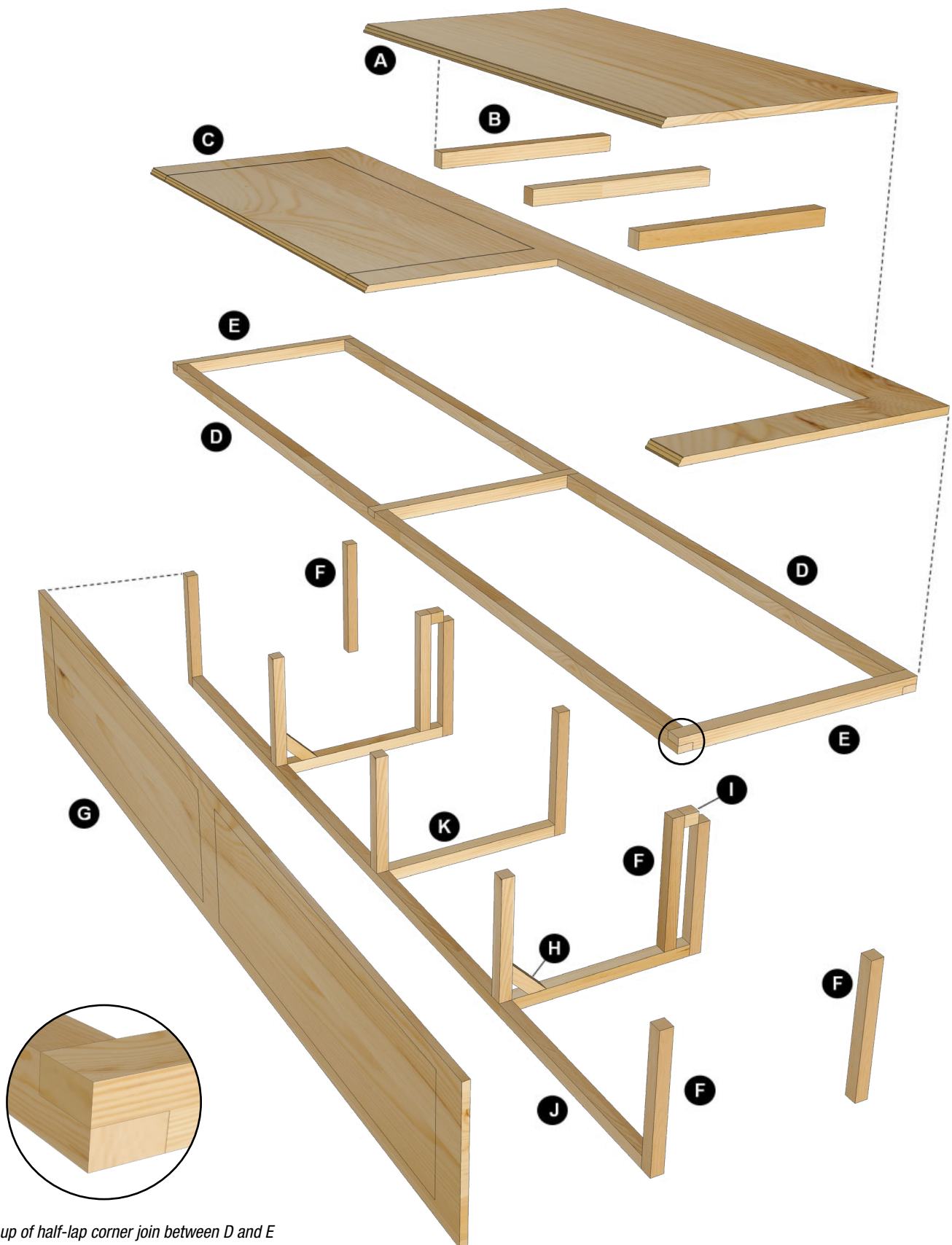
Project information

Overall dimensions	2720mm long x 630mm wide x 450mm high	Techniques	Half-lap joint (see page 23), plunge cut method (see page 19)
Number of parts	37	Difficulty	Hard
Special equipment	Circular saw, router	Duration	16 hours

Top panel



Assembly diagram



Close up of half-lap corner join between D and E

MEASURE AND ASSEMBLE A TEST STRUCTURE

1 Use a large **steel ruler** and measure the dimensions of the area in which you are building the custom window seat. Take special note of internal right angles, floor and wall irregularities, as well as skirting boards (if any). The biggest impact of imperfect right angles will be on the back corners of the top panel, which will require a good deal of adjusting to fit correctly. Mark out the desired dimensions of the window seat in pencil on the walls.

TIP: To get an idea of the final window seat dimensions once you have marked it out on the walls, mount some planks on bricks to simulate the planned dimensions.



2 Place the vertical struts (F) in the positions of the load-bearing internal frame, as shown in the photograph. Adjust the lengths of the vertical struts (F) until the long support struts (D) are level and use **half-lap joints** at the top corners where they intersect with the short support struts (E) at the ends. Fasten the vertical supports to the walls with a **power drill**, masonry bit, wall plugs and masonry screws.

TIP: If you have skirting boards, you will need to cut away from the bottom edges of the vertical struts (F) that are affixed to the wall. You can see in the photograph below that the base of the corner vertical strut has been cut away on two sides to accommodate the skirting boards.



MAKE AND INSTALL THE INSIDE STRUCTURE

3 Build up the internal frame using the required components, as shown in the photograph and with reference to the exploded view diagram opposite. Use a power drill to make **pilot holes** and then fasten all joints using **cut screws**. The middle and outer front vertical supports (F) have reciprocal horizontal supports, but the other two require reinforcing, which is shown in the photograph for the next step.



4 The 45-degree supports for the front vertical struts (F) are shown on the left-hand side of the photograph. The portion of seat panel directly behind the hinged seat flaps also needs reinforcing. Secondary vertical supports (F) need to be added to the second and fourth uprights, as shown on the right-hand side of the photograph. Add the spacers (I) to join the top of these secondary vertical supports (F) to the midpoint of the long support struts (D) at the back of the window seat. If these are not added, the seat (C) will bend along the hinge, which is the weakest part of the seat assembly.



ADD THE PANELS

5 Install the front panel (G), cut out the seat flaps (A) from the top (C) using a **circular saw** and the **plunge cut method** and fasten as shown. All edges against the walls or floor will be finished off with a quarter round trim so there can be some margin of error between the panels (G and C) and the walls or the floor. In the front panel (G), I routed two rectangles into the surface to add some detail, which has to be done before fitting it.

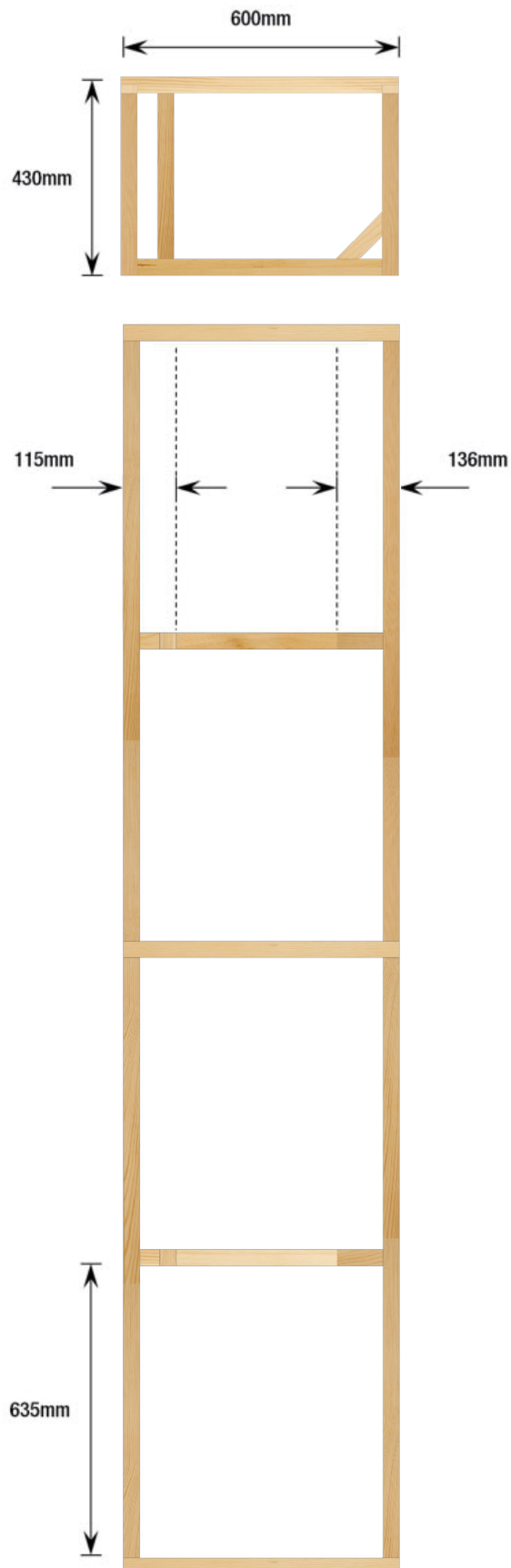
TIP: When installing the top panel, have some thin spacers available to adjust the height as needed to achieve a perfectly level seat.



6 Strengthen the seat flaps (A x 2) with three supports (B x 3) each on the underside as shown, since these will take the full weight of any load and may bow or break after continued usage. Install the reinforced seat flaps (A x 2, B x 6) using piano hinge along the adjoining edges at the back. Take care to align the sections accurately and with equal spacing since this will be visible from the exterior.



Side and top view of internal frame



FINISH THE SURFACES

7 Use a **router** to make some decorative edging along the front of the top panel (C) and hinged seat flaps (A). You will have to remove the entire seat assembly to router the full length of the front edge if the ends of the window seat are mounted against the wall. Prior to painting, ensure there is alignment at the inside corners so that, once painted, the edging is continuous along the gap between these components, as shown in the photograph.



8 Also prior to painting, install quarter round trim along all wall and floor edges, as can be seen in the photograph. This will hide any gaps between the wall and the panels to create a finished look for your window seat. Use wood filler to hide any remaining gaps before priming and painting.



9 Prime and paint the exterior surfaces using a spray technique to ensure a smooth, Duco-style finish. While using a spray gun inside, take any necessary safety precautions and ensure sufficient ventilation in the room. There is no need to paint the inside of the window seat as this will not be visible when it is closed. However, you can if you want to.



10 Accessorise with a fitted cushion and use as storage for toys and other items. To ensure proper closure of the hinged seats, I used cabinet magnets attached to the inside edge of the seat. You can add scatter cushions or even custom-make a covered cushion for the full length of the seat.

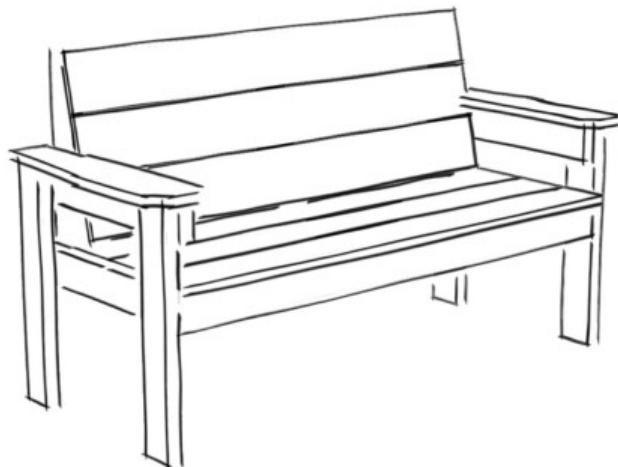




Garden Bench



Is there something missing on your patio or in the garden? Do you need somewhere to sit and contemplate the world or just enjoy your morning coffee with the newspaper? A bench always adds a classic feature to any garden and this sturdy design looks great in a simple wood finish or painted in a colour of your choice. If you make this bench in the wood finish for use outdoors, you must apply at least three coats of an exterior varnish. The first version of this bench was a birthday present for my brother-in-law that he has used in his garden ever since. I made another one for our home which we put next to the children's trampoline in the garden and later on next to the porch at our front door. It has been a feature in family photos and my favourite part of the day is when I arrive home and see Juliet sitting on the bench waiting for me.



DESIGN AND CONSTRUCTION

This exceptionally sturdy bench will last many years if it is finished well. It is aesthetically very bold and features strong, clean lines. The four main parts are the seat, the back and the two arm support and leg assemblies. The seat consists of a frame mounted with slats at equal spacing for comfort while sitting. The back is slanted and consists of three supports on which are also mounted equally spaced slats. The armrests are wide enough to hold a mug of coffee

and the seat is positioned at an ergonomically suitable height. Altering the dimensions with thinner wood will reduce the bulkiness of the design, but may require additional supports in the frame for the back and seat. For the second bench my assembly process was slightly different as I added the middle back support at the end of the construction process rather than making the back completely before mounting it to the seat frame.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

When attaching the seat slats to the seat frame, I had to use a long screwdriver to get past the armrest support to tighten the wood screws. Doing this by hand proved to be extremely laborious and even painful because it needed to be tight in order to achieve a rigid

assembly. It would have been far easier to remove the armrest support so that I could access the screw heads with an insert bit placed in a power drill to achieve the desired strength of the joint between the ends of the seat slats and the seat frame sides.

After a tiring game of football in the garden, cousins Kieran, Juliet and James relax on their favourite bench.



Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Armrest supports	2	38mm	89mm	584mm
B	Seat slats	3	22mm	140mm	1321mm
C	Armrests	2	22mm	140mm	622mm
D	Seat frame long sides	2	38mm	89mm	1321mm
E	Legs	4	38mm	89mm	587mm
F	Seat frame short sides/ stretchers	4	38mm	89mm	508mm
G	Back supports	3	38mm	140mm	543mm
H	Back slats	3	22mm	140mm	1245mm

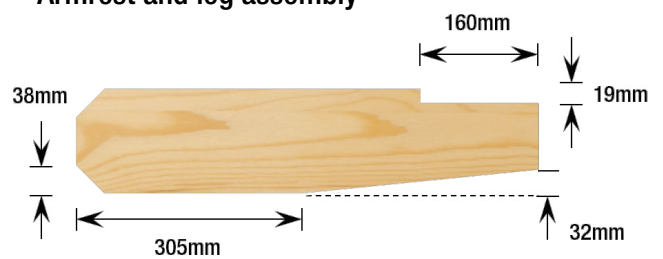
Project information

Overall dimensions	1487mm long x 622mm wide x 839mm high
Number of parts	23
Special equipment	Circular saw, Jigsaw
Techniques	Marking template (see page 22)
Difficulty	Medium
Duration	16 hours

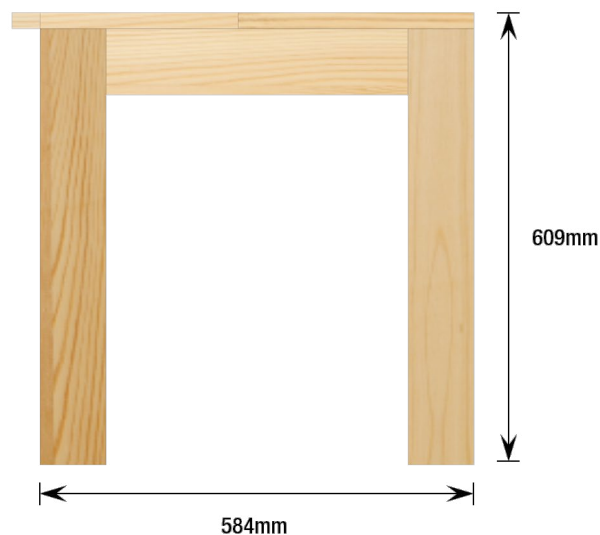
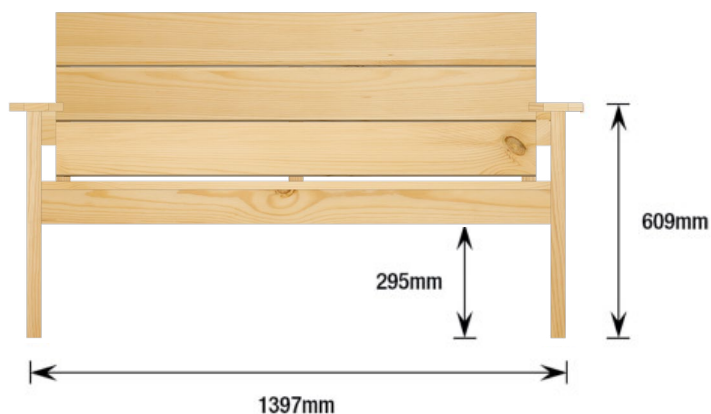
Family fun factor



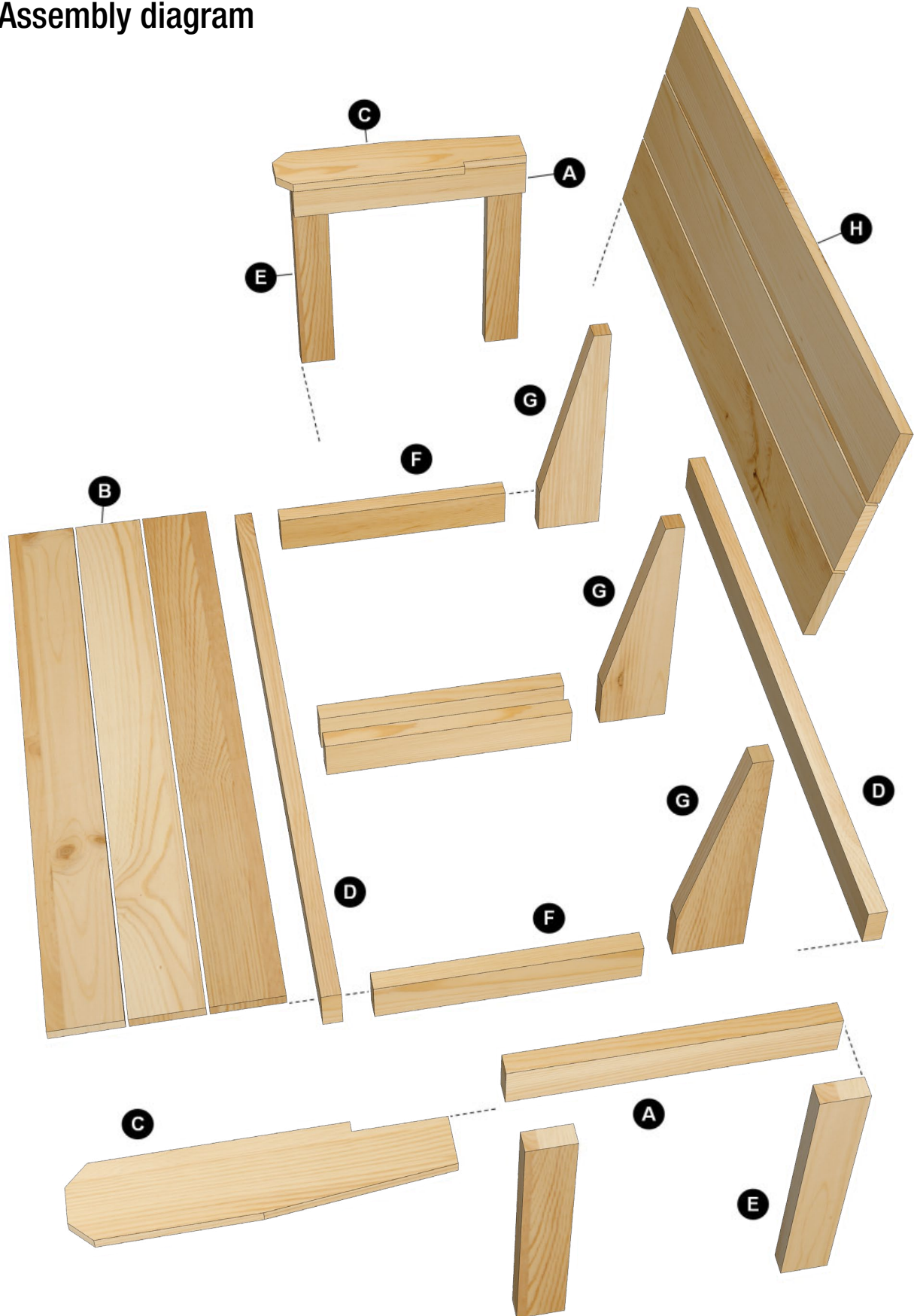
Armrest and leg assembly



Front view



Assembly diagram



MAKE THE SEAT FRAME

1 Lay out the components of the seat frame according to the design; short sides/stretchers (F x 4), and long sides (D x 2). Use long **quick grip clamps** or **sash clamps** to clamp the seat assembly in place, as shown in the photograph. Check for right angles with a **try square** and make sure that all edges are flush and there are no protruding corners.

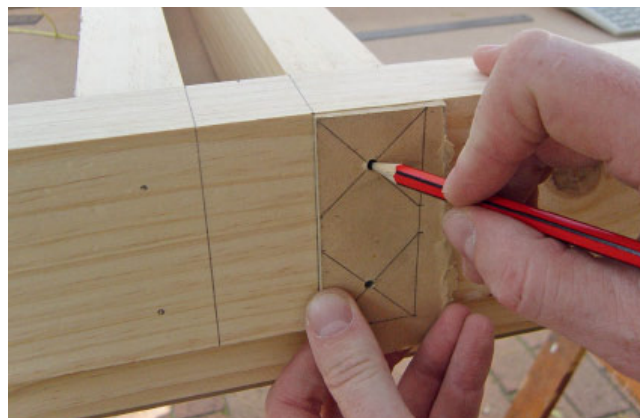


TIP: Later in the assembly we will be inserting the middle back support (G) between the stretchers (F x 2) in the middle of the seat frame. I found it useful to place the back support between the stretchers while clamping up the seat frame. This will ensure the back support can be inserted later.



2 Make a **marking template** for the **cut screw** positions and mark off two screw holes for each **butt joint**, as shown in the photograph.

TIP: The marking template is simply an offcut of thin board that has been marked with the end dimensions of the short sides and stretchers (F x 4). Structurally, the best position for fastening the screws is found by intersecting 45-degree lines from the corners of the marking template. Re-using this template at each butt joint rather than remeasuring the positions each time makes the marking process much quicker.



3 Use a **power drill** to drill **pilot holes**, then use an **insert bit** to fasten the joints with cut screws.



ASSEMBLE THE LEGS

4 Lay out the components of one armrest support (A) and legs (E x 2) assembly. I used the edge of the work surface as a straight edge against which to measure a right angle between the armrest support and the legs. Clamp the assembly in place using quick grip clamps.



5 Mark screw holes, drill pilot holes and fasten with cut screws, as shown in the photograph. Repeat for the second armrest and leg assembly.

TIP: I used a **socket wrench** to tighten the cut screws the last few threads until the screwhead is flush with the wood surface, which locks the screw tightly in place and makes for a sturdier construction.



COMPLETE THE FINAL ASSEMBLY

6 Lay the seat frame on its side and clamp the leg assemblies in place on both sides using long quick grip clamps, a **rubber mallet** to tap the parts into place and a try square to check for right angles. Make sure this is done according to the design dimensions, ensuring the underside of the seat frame is at the right distance from the end of the legs as this will ensure that the top of the seat will be at the ergonomically designed height.



7 Drill pilot holes and fasten the full assembly with cut screws as before. This step requires a fixed workbench as you need to apply pressure higher up above the surface on which you have clamped the assembly.

TIP: When clamping, make sure the connecting surfaces of the seat frame and legs are tight against each other. This will ensure maximum strength in your final construction.



8 The seat frame, legs and armrest supports are now fully assembled. I found it practical to place this assembly on the ground for the following steps. Check again that the height of the seat frame is correct and use a try square to verify all right angles. Make any adjustments now to correct mistakes as it will be far easier than when the seat slats (B x 3) and back slats (H x 3) are in place.



9 Mark and cut the back supports (G x 3) according to the design dimensions. It is best to use a **circular saw** and mount the cutting piece on the edge of the workbench with a guide held in place with a quick grip clamp, as shown.

TIP: To position the cutting guide correctly, clamp it loosely to the work piece and position the blade of the circular saw at the beginning of the cut. Tap the cutting guide with a rubber mallet until the blade is in the right place, then clamp on that side. Repeat at the end of the cut and clamp fully before cutting. Also ensure you check the clearance between the cutting line and the work surface underneath the work piece so that you do not cut into your work surface with the circular saw!



10 Use quick grip clamps to clamp and fasten the right and left back supports (G x 2) to the seat and armrest support assembly, using pilot holes and cut screws as before.

TIP: You may wish to turn the assembly onto either end to ensure sufficient pressure as you drive in the **wood screws**. I simply sat on the assembly to hold it in place!



INSTALL THE ARMRESTS AND SLATS

11

Clamp and fasten the back slats (H x 3) to the back supports, working from top to bottom.

TIP: Use 6mm thick spacers to ensure a consistent gap between each slat on both sides, but do not clamp too tightly or you won't be able to remove the spacers afterwards.



12

Mark the screw positions for the ends of the seat slats (B x 3) and clamp them all in position, making use of spacers again. You will need a long **screwdriver** to work past the armrest supports to fasten them in place. Instead of driving the screws all the way in by hand, you can also use an extension drill driver **insert bit**.



13

Mark out and cut the armrests (C x 2), using either a circular saw and guide or a **jigsaw**, as I did in this case. If you use a jigsaw you will find the cutting piece will slip away from you unless you block it using a quick grip clamp, as shown on the left of the work piece in the photograph.

TIP: Once both armrests are cut, place them together and file down any irregularities until the two shapes are exact replicas.



14

Clamp and fasten the armrests (C x 2) to the armrest supports (A x 2). Remember that unless you are painting the bench, the screw heads on the armrests (C x 2), back slats (H x 3) and seat slats (B x 3) will be more visible than elsewhere on the bench. You must therefore be completely certain that they are properly spaced, aligned and flush with the wood surface.



INSTALL THE MIDDLE BACK SUPPORT AND FINISH

15 Insert the middle back support (G) between the stretchers (F x 2) in the seat frame. Line it up against the back slats (H x 3) and fasten them to it in the same way as with the right and left back supports (G x 2).



16 Use a bolt-headed screw to secure the middle back support to the rear of the seat frame, as shown in the photograph. This will ensure sufficient strength in the final step of assembling the bench because you can achieve greater torque when tightening it with a **spanner** than when using an insert bit or screwdriver.



17 Use a **random orbital sander** to sand off any burrs and to round off the edges of the armrests (C x 2) and the front edge of the front seat slat (B x 1). Do not round the edges too much as you may lose the aesthetically tight lines of the design, which is square and straight. Depending on your intended use, finish with outdoor paint or wood preservative. Apply an extra two coats of wood preservative if the bench is to be placed in constant sunlight.

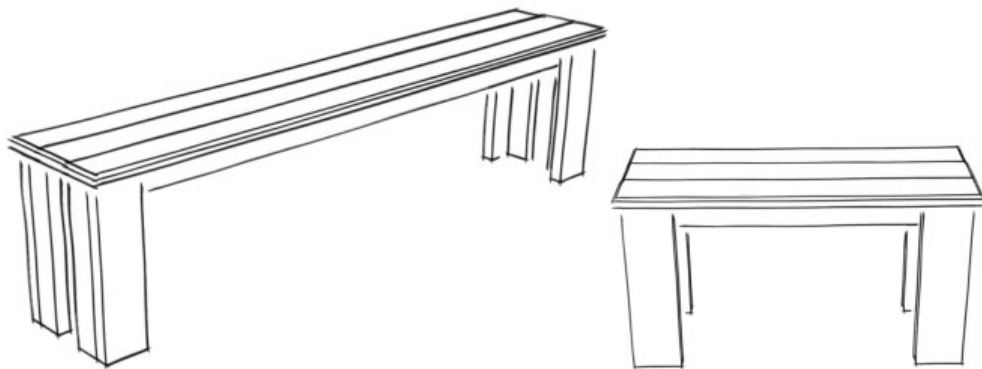




Gym Bench



When my place of work installed a gym at the office, I made some additional benches in two different lengths for the changing rooms and workout areas. This style of indoor bench can be laid out in different seating configurations, such as classroom, campfire style and even end-to-end along the sides of a large room. Unlike more traditional benches with a back, they can be used from both sides or even at either end, which allows for more people to use them at the same time. For the gym at work, they are used by people needing to sit down while they change or stretch before a workout. Gym bags, clothes and other equipment may also be placed on or underneath them for temporary storage. In a family home these benches would be well suited to a table in a traditional farm-style kitchen.



DESIGN AND CONSTRUCTION

Two different lengths were made – 830mm and 1800mm – each with a standard width of 93mm and a height of 324mm. The design is very solid and functional, using slightly thicker wood than for a more decorative garden bench. These benches are designed to take a significant amount of wear and tear, which usually takes place in gyms from excessive moving around. I put a chamfer around the edges to avoid a sharp corner underneath people's legs when they

are sitting down, especially as they may be in shorts or loose gym wear. The longer version of the bench features an extra brace centred on the underside of the seat support assembly. The rest of the design is exactly the same for the two benches; only the length of the seat slats and seat supports vary according to the different overall length. Wood screws are used throughout, and there are six main components: four legs, the seat support and the seat.



Family fun factor



This bench is hard wearing and very sturdy, with the long version being particularly useful in classrooms and school halls. Only the seat panels and supports have to be changed if you want to make a different length.

WHAT I WOULD DO DIFFERENTLY NEXT TIME

In the original design I kept the joints between the seat slats flat and sanded them down to create a smooth surface. Adding a chamfer to the adjoining faces is a better idea, which improves form and function. Aesthetically this creates the slatted bench style and emphasises the use of multiple boards to create the seat, rather than one single piece of wood. This does add additional time to your

project and as I was working toward the gym opening deadline, I had to cut the building tasks right down to the absolute minimum. Putting two of the short design benches together end to end can substitute for one long bench if you don't have one. If you need to do this regularly, you could also add hooks on the sides of the legs to hold them together.

Cutting list and materials

SHORT BENCH

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Seat slats	3	23mm	108mm	830mm
B	Legs part 1	4	35mm	115mm	430mm
C	Legs part 2	4	35mm	70mm	430mm
D	Seat supports, long	2	23mm	70mm	730mm
E	Outer braces	2	23mm	178mm	105mm

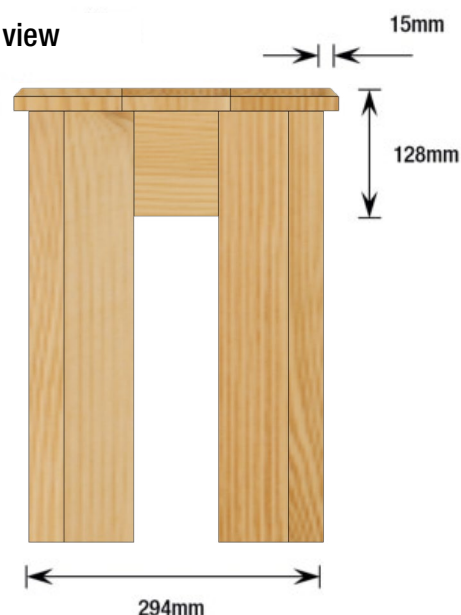
LONG BENCH

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Seat slats	3	23mm	108mm	1800mm
B	Legs part 1	4	35mm	115mm	430mm
C	Legs part 2	4	35mm	70mm	430mm
D	Seat supports, long	2	23mm	70mm	1700mm
E	Seat supports, short	2	23mm	105mm	178mm
F	Centre brace	1	23mm	178mm	105mm

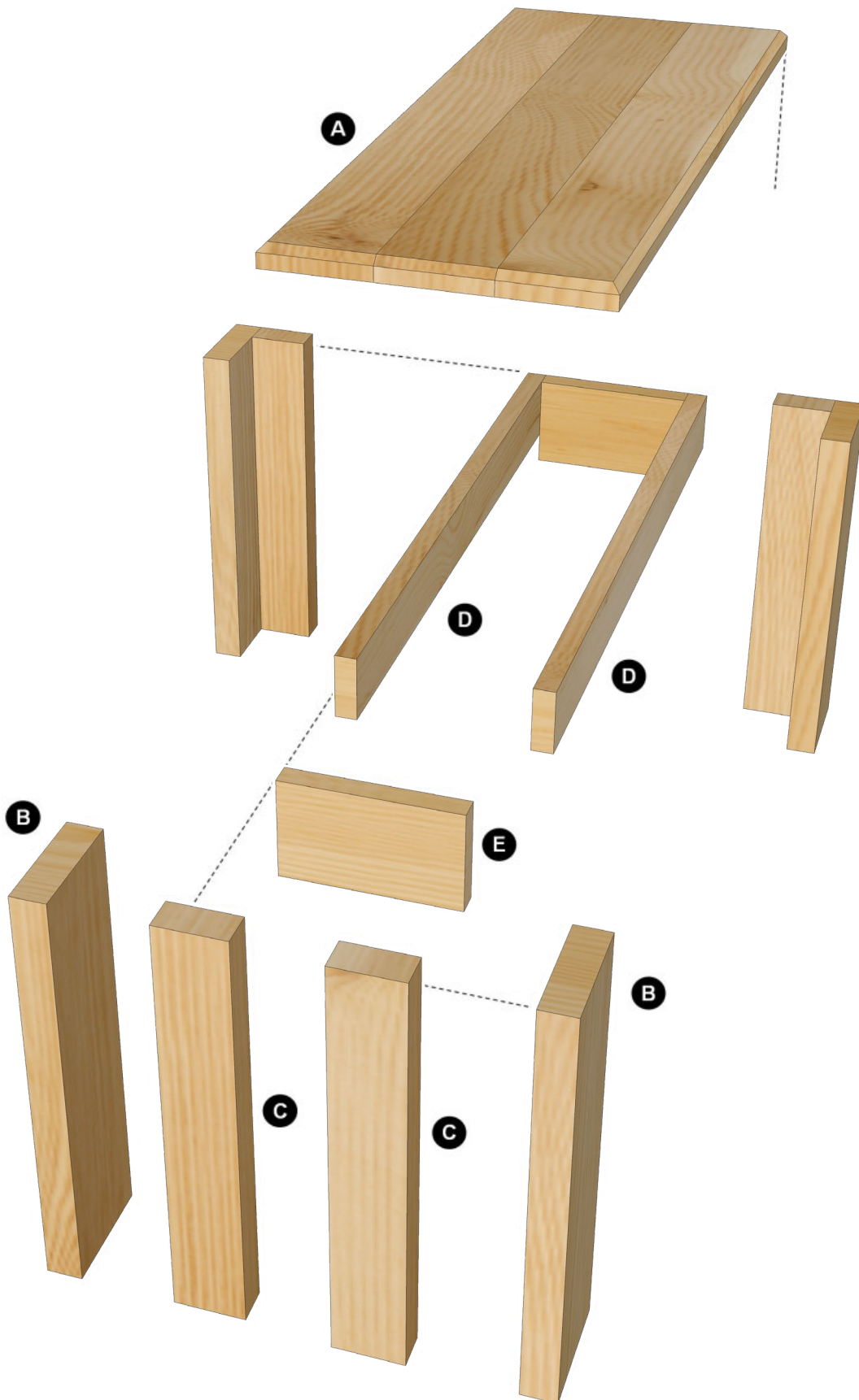
Project information

Overall dimensions	830mm long x 324mm wide x 453mm high (short bench) 1800mm long x 324mm wide x 453mm high (long bench)
Number of parts	15 (short bench) and 16 (long bench) (includes the centre brace F)
Special equipment	None
Techniques	Chamfer (see page 21)
Difficulty	Easy
Duration	4 hours each

Side view



Assembly diagram



MAKE THE SEAT SUPPORT ASSEMBLY

1 Position the centre brace (F) between the long seat supports (D x 2) by marking a centre line on all pieces with a **carpenter's pencil**. Line up the brace (F) with the inside centre of the seat supports (D x 2), as shown in the photograph.



2 Position and clamp the seat support assembly, which consists of the parts aligned above with the outer braces (E x 2), as shown in the photograph.

TIP: Position and clamp the **quick grip clamps** firmly but not too tightly so that you can then tap the braces into position with a **rubber mallet** as required and then tighten up.



3 Fasten the centre brace (F) in position between the seat supports (D x 2) using a **power drill** and two **cut screws** on either side. There is no need for a **countersink** but ensure that you drill **pilot holes** for each cut screw, otherwise the wood will split.



4 Fasten the outer braces (E x 2) with the same technique used for the centre brace (F). The entire seat support assembly is now complete and ready for the attachment of the four leg assemblies.



MAKE AND ATTACH THE LEG ASSEMBLIES

5 Each leg assembly consists of two parts (B and C) that need to be fastened with a simple **butt joint**. Clamp these to your work surface with quick grip clamps, as shown in the photograph. Use a power drill to make pilot holes at equal spacing and fasten the parts together with cut screws.



6 Repeat step 5 for the remaining three leg assemblies and check overall dimensions and right angles with a **try square**. As thick wood is being used, and if the edges of the wood are straight, the right angles will be quite accurate. These are now ready for fastening onto the seat support assembly at all four corners.



7 Fasten the leg assemblies onto the corners of the seat support assembly, as shown in the photograph. Use cut screws and a power drill with pilot holes, as before. The wider of the two components in the leg assembly must align with the length of the bench so that the joint in the leg assembly is not visible from the front.



MAKE THE SEAT AND FINAL ASSEMBLY

8 Rest the three seat slats (A x 3) on a level work surface and clamp in position with quick grip clamps, as shown in the photograph.

TIP: There is no need to glue these together as they will independently be fastened to the seat support.

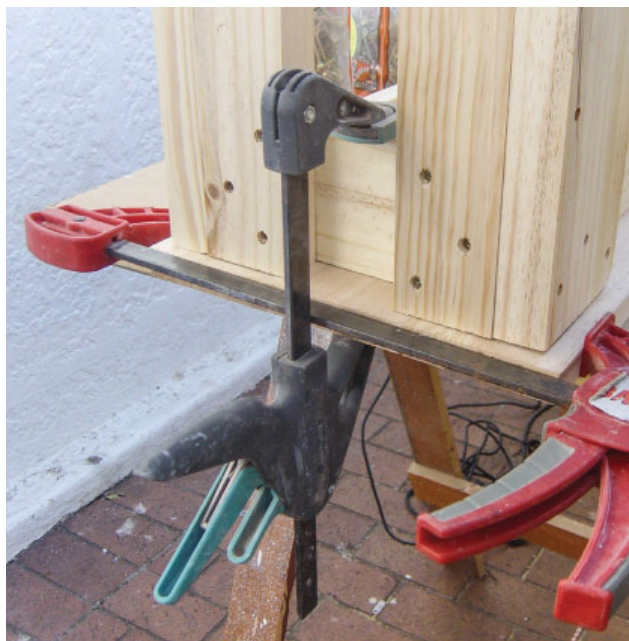


9 Turn the completed seat support assembly upside down and place on top of the clamped seat slats (A x 3). Use a small steel ruler and adjust the position of the seat support assembly so that there is equal spacing all the way round the underside edge of the seat.



10 Once the spacing is correct, clamp the seat support assembly to the seat slats (A x 3) with quick grip clamps on either end, as shown in the photograph.

TIP: Do not clamp down to the work surface as later on you will turn the total bench assembly right side up and fasten the seat down.



11 Drill a pilot hole through the centre brace (F), as shown in the photograph, and then fasten it to the bottom of the middle seat slat with a cut screw.

TIP: Ensure that the length of the cut screw is less than the combined thickness of the brace and the seat slat, otherwise you will need to grind down the tip of the screw with a Dremel (see page 41).



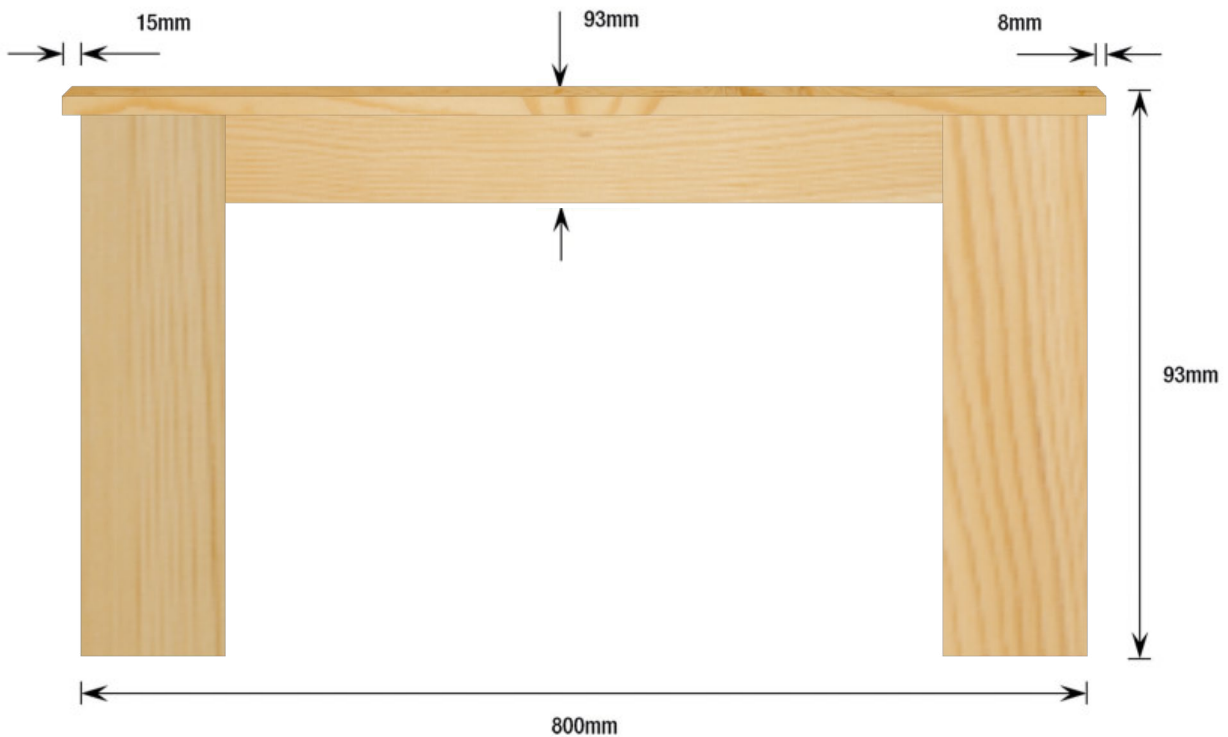
12 Turn the assembled bench right side up and place it onto the ground for easier positioning while fastening. Drill pilot holes with a power drill at adequate intervals all round the edges and fasten down the seat slats to the rest of the bench, using cut screws.



13 Sand the top of the bench with a **random orbital sander** to ensure a smooth finish. Also apply the random orbital sander to the edges of the seat to achieve a 45-degree **chamfer** all the way round.



Front view of short bench



14

Prime the wood with one coat of wood primer and, once dried, finish with a paint colour of your choice.

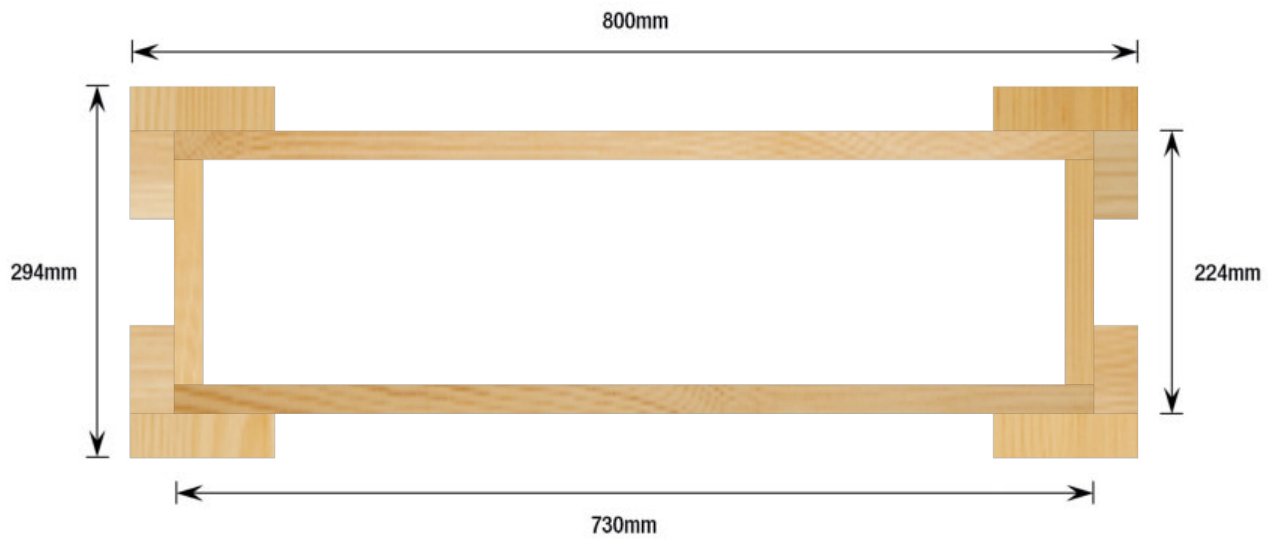


15

To build the shorter version of the bench, use the relevant cutting list and omit steps 1 and 11.



Top view of short bench



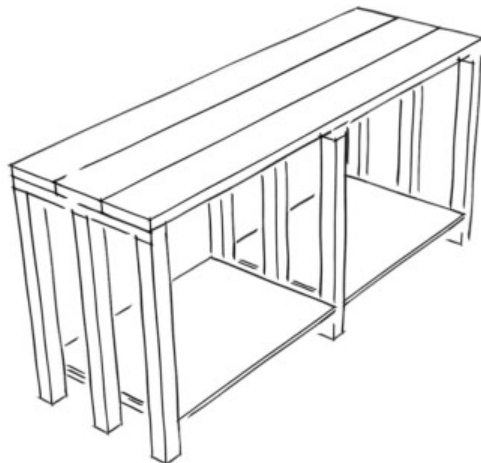
For clarity, the illustration is shown without the seat



Work-bench



Every home needs a DIY area, no matter how much is done around the house or what size projects are tackled. Whether there is an expert craftsman in the family, a weekend hobbyist or a busy Dad with some hand tools, a suitable work surface and basic storage will be needed. The dining room table just isn't a good idea as the jigsaw blades tend to get mixed up in the children's cornflakes and jars of nails just don't go with the décor. In a previous workshop I had limited space so I designed this workbench to take up the full width of the small room I was using. Later, when I had a larger workshop, I set it up as a freestanding bench and again it proved useful for all types of DIY requirements. You will find this workbench a welcome addition to your garage or workshop and you can make it in just a few hours.



DESIGN AND CONSTRUCTION

An important aspect of any work surface is ergonomics and how you will be positioned when you use it. Usually workbenches are for standing next to while desks are lower because we sit at them in one position for longer periods. To get the right height for my requirements, I built this workbench with a higher work surface than I needed and trimmed off the legs until it was comfortable to stand at for long periods of time. However, there are some tasks that

will require sitting at the workbench, such as using the scroll saw, soldering and model work, in which case an ordinary stool will be useful to sit on while working. If you are sitting you can rest your feet on the lower surface of the workbench, which is also useful for storage of larger tools and materials. I mounted a bench vice on the left and installed a drawer on the right to hold a socket spanner set, but these are optional and can be omitted if preferred.



This sturdy workbench is easy to make and best positioned against a wall and fastened in place. Tools can be displayed above it and a second storage shelf could be added underneath the work surface, if required. It's also quick to make so there's no need to miss the game on Saturday afternoon!

WHAT I WOULD DO DIFFERENTLY NEXT TIME

I used solid pine for the bottom shelves, but thick plywood is sufficient and much cheaper, which helps if you are on a tight budget. The illustrations in this chapter show a version with a plywood bottom shelf while the photos show the solid pine version that I actually built. You must fasten the back of the work surface to the wall, but

for extra rigidity you can also fasten the lower portions of the three back legs. This will require simple right-angle brackets mounted with wood screws to the legs, and masonry screws and plugs to fasten onto the wall. A second storage shelf would also be useful; place it halfway down and make it half the width of the bottom shelf.

Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Work surface	3	45mm	220mm	2080mm
B	Bottom shelves	2	20mm	660mm	935mm
C	Bottom shelf supports	4	35mm	35mm	660mm
D	Work surface supports	3	45mm	70mm	660mm
E	Legs	9	70mm	70mm	900mm

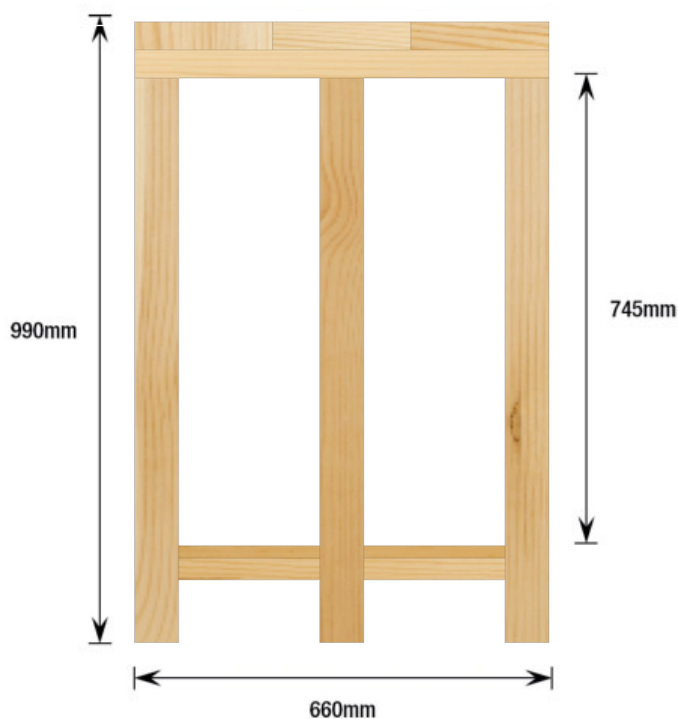
Project information

Overall dimensions	Number of parts	Special equipment-
Techniques Difficulty	Duration	

Family fun factor

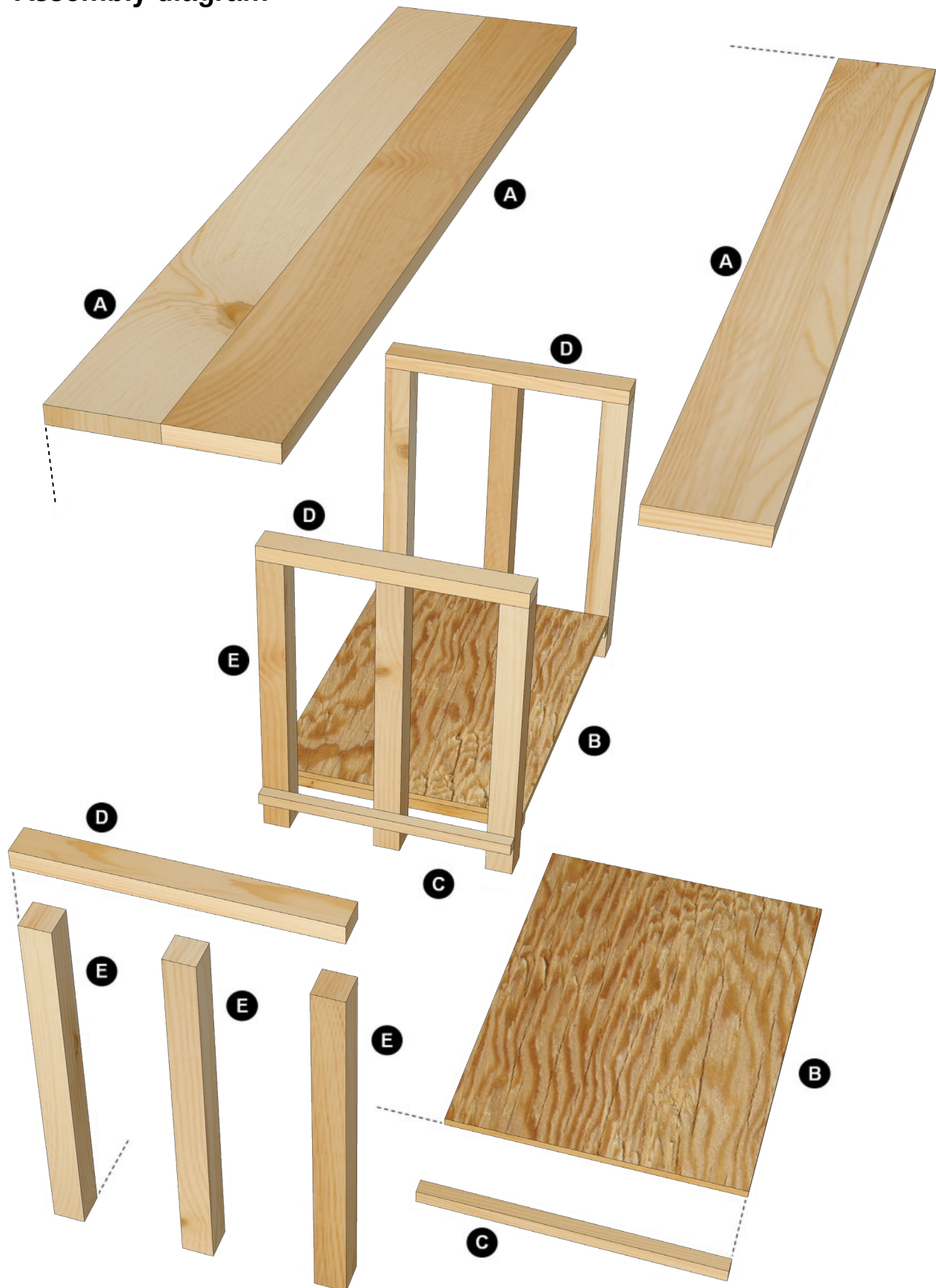


Side view of completed workbench



Safety gear is important when in the workshop or on a Wendy house construction site. James and Juliet make sure they are safe as they inspect Daddy's progress.

Assembly diagram



MAKE THE LEG ASSEMBLIES

- 1 Lay out three of the legs (E x 3) in the configuration of the leg assembly and mark the position of the bottom shelf support (C).

TIP: As shown in the photograph, use a **try square** to measure accurately from the base of the legs.



- 2 Fasten the bottom shelf support (C) to the bottom of the legs (E x 3) in the marked position using a **power drill** and two **cut screws** for each joint, as shown in the photograph. Repeat these two steps for all three leg assemblies.



- 3 Take one of the leg assemblies and fasten another bottom shelf support (C) to the opposite side using cut screws and a power drill, as shown in the photograph. This will be the leg assembly in the middle of the length of the bench, which has a bottom shelf support on both sides.



- 4 On the underside of one of the work surface supports (D), measure and mark off the position of the top of the middle leg (E) using a **steel ruler** and **carpenter's pencil**.

TIP: The outer legs of each assembly will be positioned at the ends of the work surface support so their position does not need to be marked off.



- 5** Position, clamp and fasten the outer legs (E x 2) to complete the first leg assembly. Repeat the whole process for the other two leg assemblies.



- 6** The three leg assemblies, as shown in the photograph, are now complete. Line them up and check that they are the same height, width and construction since they form the main structure of the workbench and need to be well built.



ASSEMBLE THE WORKBENCH

- 7** Choose the desired position of the workbench and place the three leg assemblies against the wall, as shown. The spacing between them must be equivalent to that of the length of the bottom shelves (B).

TIP: Ensure that the back legs are flush against the wall and compensate for an uneven floor with wedges under any of the legs (E), as needed.



- 8** Place each of the bottom shelves (B x 2) on the bottom shelf supports (C x 4) and fasten down with cut screws along all adjoining sides.

TIP: Accuracy and aesthetics are not important for constructing the workbench, but it's still good practice to use **pilot holes** and space the cut screws evenly as this strengthens the joint.

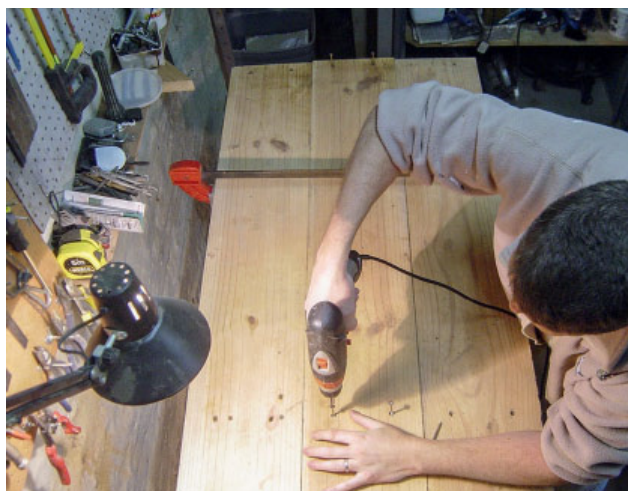


9 Starting at the back, successively position the work surface boards (A x 3) on the top of the work surface supports (D x 3), as shown in the photograph.

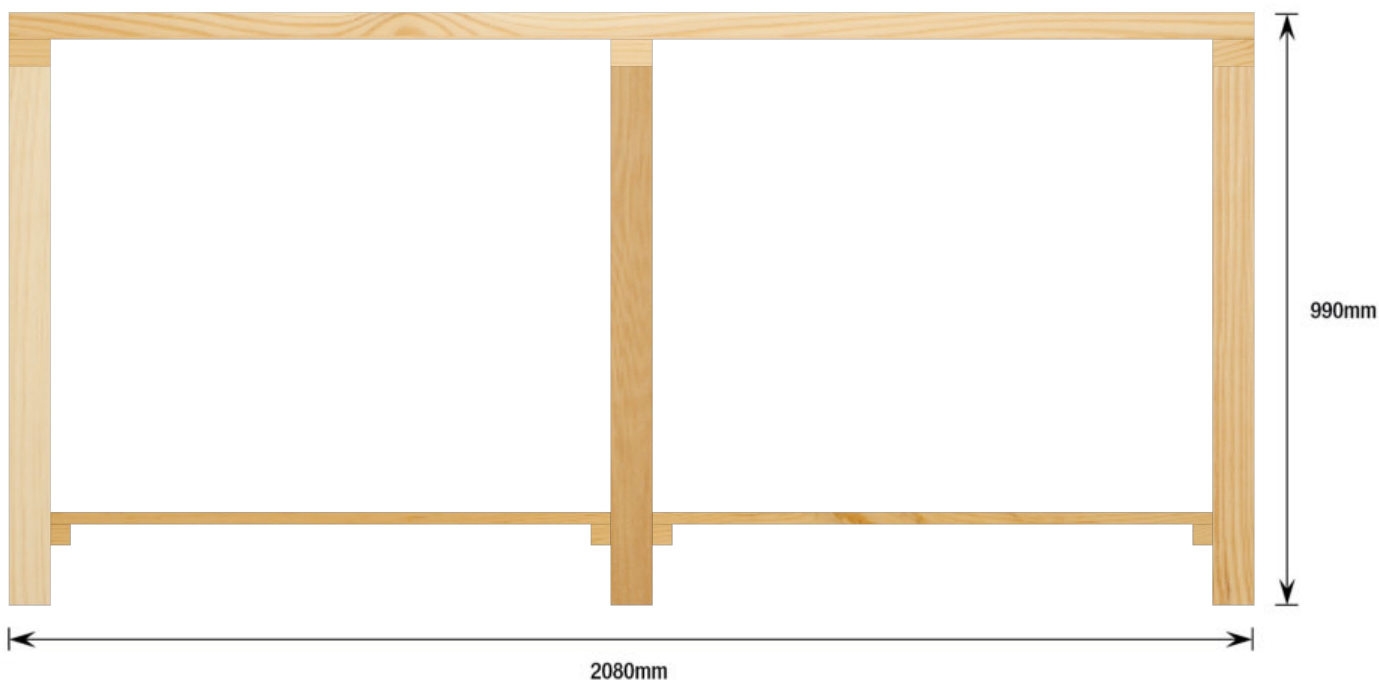
TIP: Ensure that major knots in the surface or corners of the wood are on the underside as they will weaken and erode the top surface after prolonged usage.



10 Move the assembly away from the wall and clamp the work surface boards (A x 3) to each other along the width of the assembled work surface, using **sash clamps**. This will ensure a tight fit and improve the integrity and strength of the work surface. In the clamped position, fasten the work surface boards (A x 3) with cut screws using a power drill to fasten along the top of the three leg assemblies, as shown in the photograph.



Front view of completed workbench



OPTIONAL: MOUNT A BENCH VICE

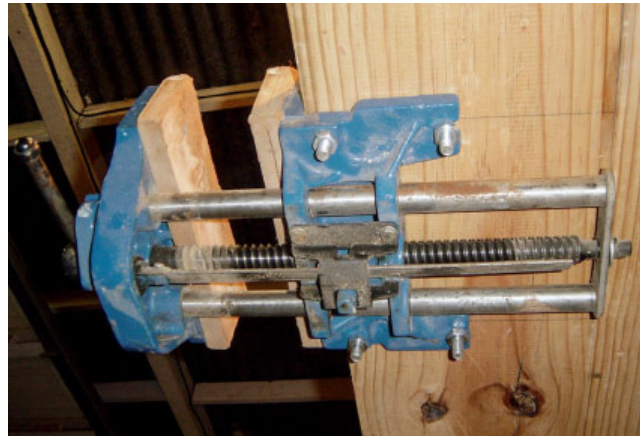
11 Drill the required holes in the workbench to accommodate the mounting bolts for the bench vice you wish to install. The position and size of the bolts will vary depending on the size and make of your bench vice. For this vice I chose to **countersink** the holes so that the head of the bolt does not protrude above the work surface.



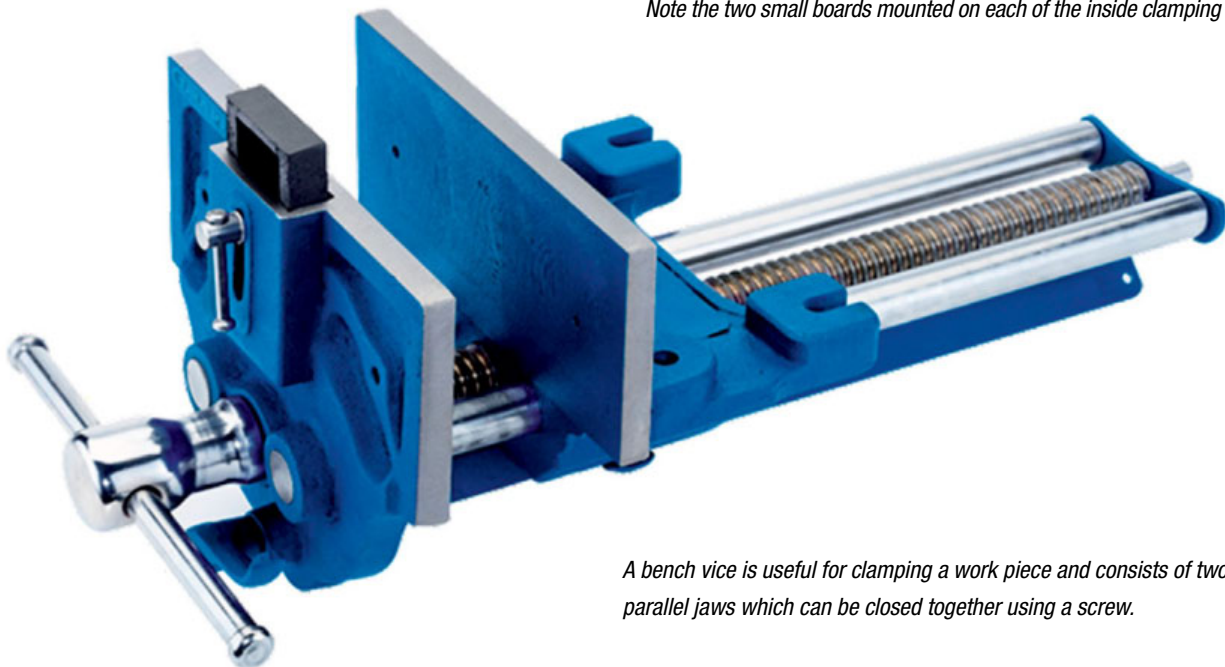
See pages 18–20 of the Tools and Techniques chapter for demonstrations for using various power tools with this workbench and vice.

TIP: Generally, the vice goes on the side of the workbench which corresponds to your strongest hand, which would have been the right-hand side for me. The reason for this is that you would use this hand to tighten the vice; however, I prefer to use my strongest hand to position the work piece in the vice, which means the vice must be mounted on the left-hand side. Your needs may vary and you can always move the vice later on if required.

12 The bench vice in the photograph required four bolts in the positions shown. Mount the bench vice using a **spanner** and **socket wrench** and ensure the **nuts and bolts** are tightened well to withstand strenuous clamping. If the vice is new, you will need to mount small boards on each of the inside clamping faces. Use small bolts in the holes provided and ensure that these bolts are countersunk.



The photograph above shows the installed bench vice from underneath. Note the two small boards mounted on each of the inside clamping faces.



A bench vice is useful for clamping a work piece and consists of two parallel jaws which can be closed together using a screw.

OPTIONAL: INSTALL A DRAWER

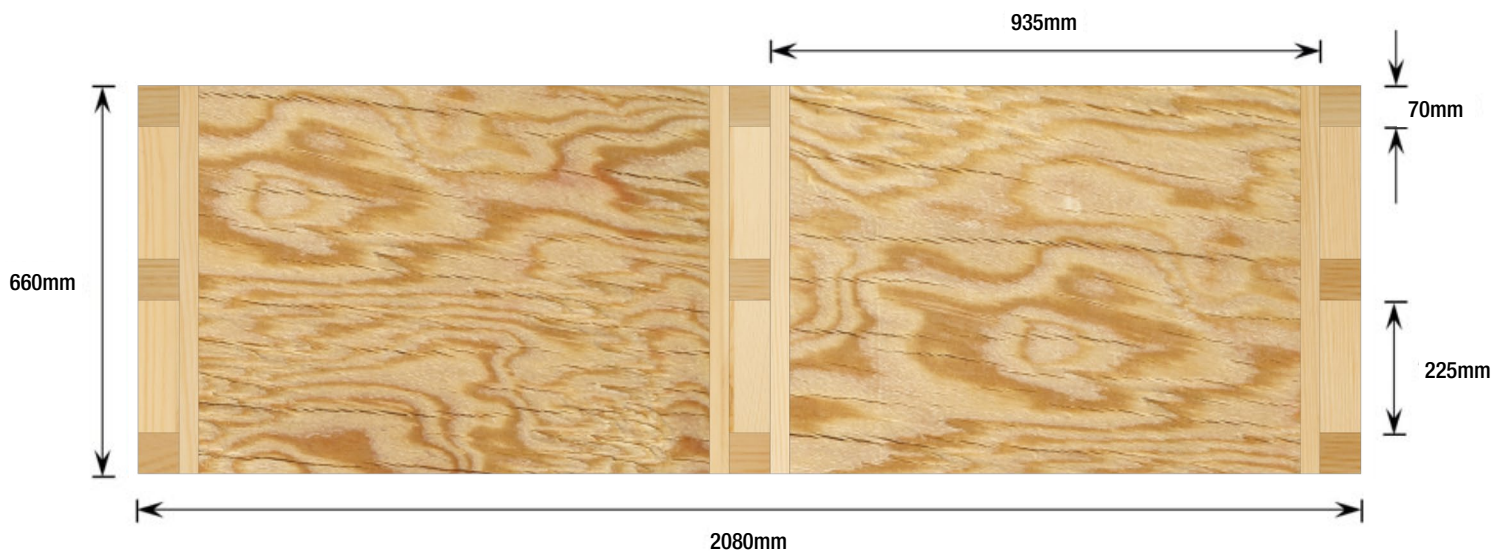
13 I also mounted a drawer underneath the work surface on the right-hand side of the workbench. This photograph is taken from underneath the work surface and shows the back of the drawer, as well as one of the wooden side brackets on which the drawer railings were mounted.



14 I fitted a socket spanner set inside the drawer for handy access when using the workbench. Although the set is good quality, the case in which it is packed does not keep the different components in place when it is moved around. Now that the case is fixed in place and conveniently located, I can quickly access any component I need.



Bottom view of workbench

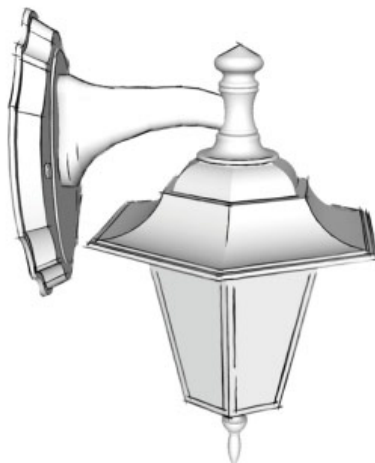




Wendy House



When our first set of twins had their second birthday we gave them a Wendy house that we designed and built for them in our garden. We had looked at other Wendy houses and came up with our own ideas of what we wanted, which developed into a large-scale family project. It took six months and was ready in time for their birthday party, which was themed around it, right down to the cake! Everyone got involved during the project, even the grandparents helped to paint and make the curtains. Although the children have had countless hours of fun using the Wendy house, the true gift for us turned out to be the time and effort in building it. Decorating the Wendy house was just as much fun and subsequent birthday parties have seen various improvements to the décor and fittings.



DESIGN AND CONSTRUCTION

This Wendy house creates a stylish and roomy space in your garden for everyone to enjoy. The large windows can be opened fully to bring in fresh air, the two skylights allow for plenty of natural light during the day and the raised base ensures the flooring remains free from damp. The high-pitched roof and wide floor dimensions create plenty of room that you can fill with toys and children's furniture. There are two skylights in the roof and the interior allows for future modifications, such as stairs and a landing area. The wooden

roof is waterproofed with bitumen and the exterior wall covering is tongue-and-groove stacked horizontally and cut out for the door and windows. The base is raised above the ground and is mounted on hardwood stakes with stairs leading up to the balcony in the front. The interior frame consists of joists joined together, against which the side walls and roof are mounted. We also installed an electrical plug point, lighting, window fixtures and a sliding bolt on the door. See also pages 8 and 9 for more information on the Wendy house.



'Welcome to my Wendy house Grandpa, look at the curtains Nana made!' Also note the small bookcase made in the earlier chapter (see pages 42–49).

Family fun factor



Project information

Overall dimensions	3.55m wide x 3.58m long x 3.10m high
Number of parts	About 450 (excluding fastenings)
Special equipment	10-pound hammer, circular saw, jigsaw, chain saw, level
Techniques	Decking, tongue-and-groove cladding, waterproofing, half-lap joint (see page 23), balcony railings, window and door hanging, external household electrics, window and door fixtures and fittings
Difficulty	Very hard
Duration	24 full days

WHAT I WOULD DO DIFFERENTLY NEXT TIME

- Use a bandsaw to cut the spikes on the ends of the hardwood stakes for the base (step 2).
- Fasten a large pipe clamp around the top of the hardwood stakes prior to driving them in, which will stop the wood from splitting (step 3).
- Use joist hangers to join the joists to each other, as these are

much stronger than simple butt joints (step 4).

- Lay gravel on the ground underneath the Wendy house prior to laying the boards on the base structure (step 5).
- Use long sash clamps to tighten the decking planks as they are mounted on the base (step 6).
- Use an exterior grade varnish for the balcony decking (step 16).

Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
A	Back wall				
A.1	Tongue and groove	72	13mm	64mm	2m
B	Side wall				
B.1	Tongue and groove	2	13mm	64mm	4m
B.2	Tongue and groove	8	13mm	64mm	2m
C	Front wall				
C.1	Tongue and groove	12	13mm	64mm	3m
C.2	Tongue and groove	33	13mm	64mm	2m
D	Base				
D.1	Joists	2	25mm	110mm	3580mm
D.2	Joists	1	25mm	110mm	3480mm
D.3	Joists	6	25mm	110mm	3420mm
D.4	Stakes	9	Radius = 75mm		2m
E	Deck				
E.1	Decking timber	31	25mm	114mm	3580mm
F	Steps				
F.1	Timber	3	25mm	135mm	702mm
F.2	Timber	2	25mm	112mm	600mm
G	Windows				
G.1	Windows timber	42	28mm	28mm	700mm
H	Balcony				
H.1	Hand rail	4	20mm	75mm	1362mm
H.2	Support rail	4	20mm	75mm	918mm
H.3	Pillars	4	75mm	75mm	726mm
H.4	Palings	40	38mm	38mm	614mm
I	Main structure				
I.1	Timber	10	38mm	76mm	2469mm
I.2	Timber	4	38mm	76mm	3502mm
I.3	Timber	7	38mm	76mm	1548mm
I.4	Timber	4	38mm	76mm	2132mm
I.5	Timber	4	38mm	76mm	720mm
J	Window supports				
J.1	Timber	10	38mm	38mm	1548mm
J.2	Timber	4	38mm	38mm	1324mm
J.3	Timber	4	38mm	38mm	655mm
J.4	Timber	4	38mm	38mm	764mm
J.5	Timber	2	38mm	38mm	916mm
J.6	Timber	1	38mm	38mm	600mm

continued on page 142

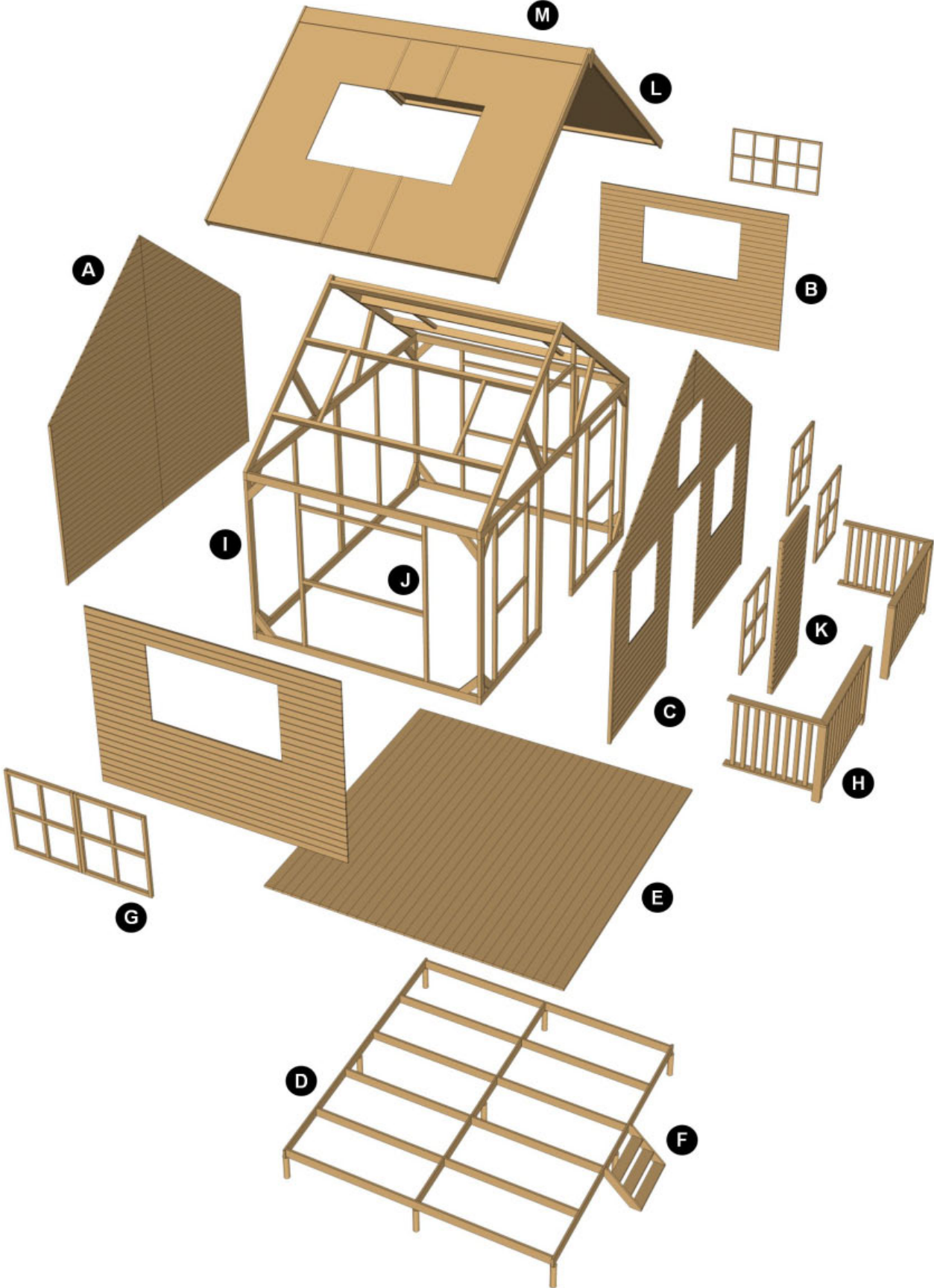
Cutting list and materials

	PART	QUANTITY	THICKNESS	WIDTH	LENGTH
K	Door				
K.1	Timber	3	38mm	75mm	733mm
K.2	Timber	2	38mm	75mm	874mm
K.3	Timber	2	38mm	75mm	1375mm
K.4	Tongue and groove	24	13mm	64mm	733mm
L	Roof				
L.1	Board	4	9mm	1200mm	2212mm
L.2	End supports	2	38mm	38mm	2804mm
L.3	End supports	4	38mm	38mm	2220mm
L.4	Fascia boards	4	20mm	75mm	2277mm
L.5	Half round	4	11mm	20mm	650mm
L.6	Half round	4	11mm	20mm	760mm
M	Valley flashing	1	164mm	164mm	2880mm
N	Barn door hinges	2			
O	Sliding bolt and catch	1			
P	Outdoor lights	2			
Q	Perspex glazing				
Q.1	Side windows	4	3mm	655mm	694mm
Q.2	Front windows	2	3mm	645mm	694mm
Q.3	Top window	1	3mm	589mm	630mm
R	Curtain rails				
R.1	Bathroom rail brackets	10			
R.2	Doweling	5	19mm (diameter)		1m
S	Window stays	7			
T	Skylights (polycarbonate roof sheeting)	2	10mm	802mm	1468mm
U	Inside fluorescent light (double bulb)	1			

Notes on the cutting and materials list

- All tongue-and-groove wall parts are given in 2, 3 and 4m lengths, which is the minimum lengths to reduce waste once they are cut to size.
- All other timber sizes are given accurately, although when making the project, measure and cut based on the illustrations provided.
- Valley flashing (M) is sheet metal that is bent at an angle and runs along the apex of the roof, creating a waterproof covering over the join of the boards. Usually it is used the other way round underneath roof tiles, in the gully between adjoining roof surfaces.
- The fixtures (barn door hinges – N, sliding bolt and catch – O, and outdoor lights – P) can be chosen according to the required look and feel of the Wendy house. All such parts chosen for this Wendy house are freely available in large hardware and lighting stores.
- The glazing for the seven windows is 3mm thick Perspex, which is the only safe option for a see-through covering in the window frames.
- The material used for the skylights is called polycarbonate roof sheeting (see photo in step 22, page 151) and is also used for greenhouses, carports and conservatories. For safety reasons, glass should never be used for windows, skylights or anywhere else on a Wendy house.
- The bathroom rail brackets used for holding the curtain rails can be seen on page 154. Dowel thickness is determined by the size of the rail brackets that you purchase, but the standard size is 19mm.

Assembly diagram



PREPARE THE AREA AND INSTALL THE MOUNTING STAKES

1 Choose a section of the garden where you would like to build the Wendy house and clear it of all major plants. It should be an area that receives enough sunlight during the day so it is not damp and dark, but not too much direct sun the whole day.

TIP: You will also need sufficient space around this area to work during the project and you must also consider any large trees that may obstruct the opening space of windows (G) or the use of ladders to get access to the top of the roof (L).



2 Cut spikes on the ends of the hardwood stakes (D.4 x 9). I mounted each stake on a trestle, as shown in the photograph, and used a chainsaw to cut shavings from the end until it was sufficiently sharpened.

TIP: The sharper the spikes, the easier it will be to drive them into the ground and ensure a firm base for the Wendy house.



A sturdy base is vital and the mounting stakes must be driven deeply as the completed Wendy house will be a very heavy structure.

3 Drive in the four corner stakes (D.4 x 4) as demonstrated by my son James, although you will need to use a slightly larger hammer than the one he is using. The 10-pound double-face sledge hammer that I used is visible in the photo under step 1. It is important to be accurate with this step as the outer joists (D.1) of the base (D) will rest on the top of these stakes (D.4), so they must be in the correct position and all the tops must be in the same horizontal plane. The best way of achieving a level plane is to drive the stakes (D.4) until 0,7m is protruding, then level down with a chainsaw until all four corners are at equal height.

TIP: Use one of the joists and a spirit level to verify and adjust the plane of the tops of the outer stakes (D.4 x 4) as required. When mounting the base you will also need thin wedges to further adjust the height of the four corners.



BUILD THE BASE

4 Position the ends of the four outer joists (D.1 x 2, D.3 x 2) on the tops of the stakes and use a **power drill** with long **cut screws** to affix with **butt joints**, but do not fasten into the stakes yet. Use scrap wood lengths to hold the 90 degrees in the four corners, as shown in the photograph; this will prevent these from moving out of position. Mount the four inner joists (D.3 x 4) running front to back at even spacing and fasten with butt joints, using a power drill to drive in long cut screws.



5 With the base frame in place, mark the position of the mid-points in the four outer joists (D.1 x 2, D.3 x 2), move the base (D) out of the way and drive in the stakes at these positions. Do the same for the centre stake and join the transverse support joist (D.2) by means of **half-lap joints** to the previously installed joists (D.3 x 4), running front to back.

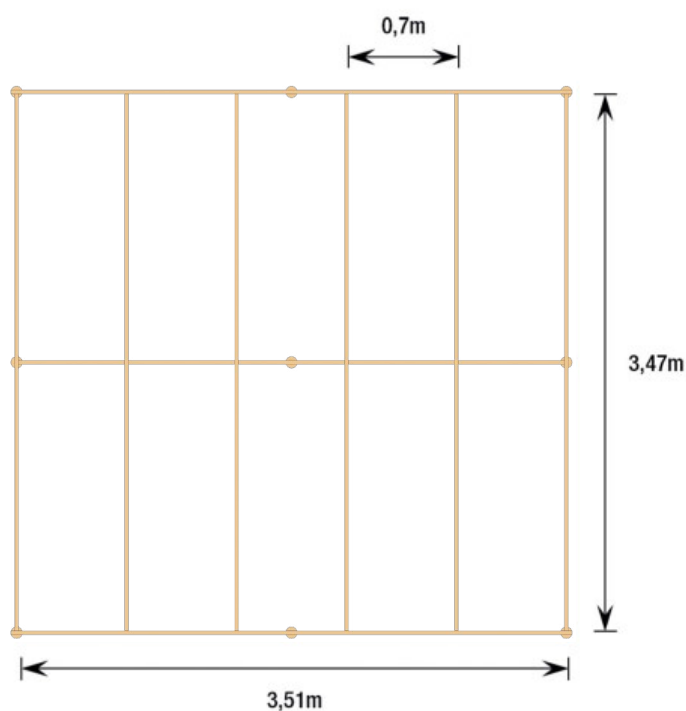


6 Stack the decking planks (E.1) towards the back of the completed base (D) in preparation for mounting them. Start at the front – use large **quick grip clamps**, a power drill and large cut screws to clamp and screw down the first one with a lip overlapping the forward edge (this will be used at the end to position the steps leading up the balcony). Consecutively clamp down and screw in each decking plank until the base (D) is fully covered with decking planks (E.1 x 31).

TIP: Ensure the screws are **countersunk** at least 1,5cm below the surface, which will allow for levelling of the deck (E) later on.



Top view of base (without decking installed)



7 Once the decking (E) is finished, use an **electric planer** to level the surface and then finish it off with a **belt sander**. If the decking screws are not sufficiently countersunk they will damage the planer and sander. As shown in the photograph, my son and daughter helped me by checking and tightening all the large cut screws.

TIP: Also mark the required straight edges at the right and left sides of the deck (E) and use a **circular saw** to finish these off accurately.



MAKE AND ASSEMBLE THE INTERNAL FRAME

8 Make the front and back frames (1.3 x 4, 1.2 x 4), as shown in the photograph, using butt joints and long cut screws fastened with a power drill. Once again maintain the 90 degrees using scrap pieces across the corners, as shown in the frame resting against the wall.



9 The design includes 45-degree braces, as shown in the frame resting on the ground (see photograph, step 8) and once these are fastened in place, the scrap wood can be removed. Position the frames on the deck, one at the back and one at the required position in the front, leaving sufficient space for the balcony, as per the design. Add vertical supports (1.3 x 2) at the midpoint in each frame.



After completing the base, I realised that such a deck in a shady part of the garden could have other uses and we experimented with one option, as shown in the photograph on the left. Luckily I did not put up the hammock as well, otherwise it might have been permanent, and the Wendy house would never have been finished.

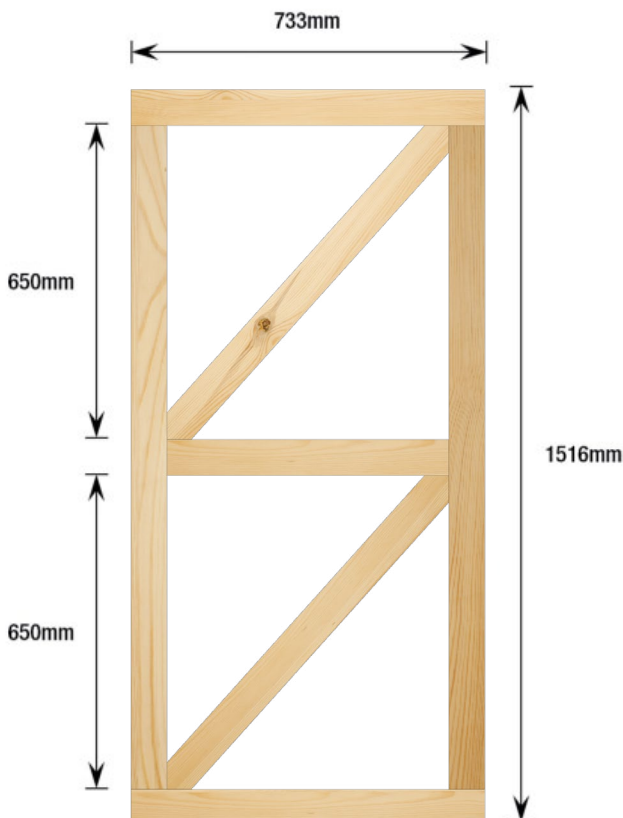
10 Attach the four rafters (1.3 x 4) to form the upside down V-shapes on the front and back frames according to the design, ensuring that the midpoint struts (1.5 x 4) between the rafter (1.3) and the top of each wall frame (1.2) are correctly positioned. Erect the full front and back frames and hold in place with quick grip clamps and spare lengths of wood, as seen resting between the frames and on the front frame on the right-hand side of the photograph. The width of the front and back frames allows for the thickness of the cladding on the sides (B), while the back frame should be positioned so that the protruding ledge of the deck (E) matches the thickness of the cladding.



11 Add the front door posts (1.3 x 2) and cut out the base piece between these at the bottom of the front frame. Remove the temporary vertical support. Add the corresponding roof supports between the front and back frames, again using simple butt joints and long cut screws. Link the front apex and the back apex by means of two joists (1.1 x 2) mounted in a V-shape – this is called the ridge beam. The two structural supports between these (1.1 x 2) and the eaves of the roof are called purlins. Add the vertical window supports (J.1 x 8) all round, as well as the vertical supports (J.1 x 2) in the back frame, to complete the main structure (I).



Door structure



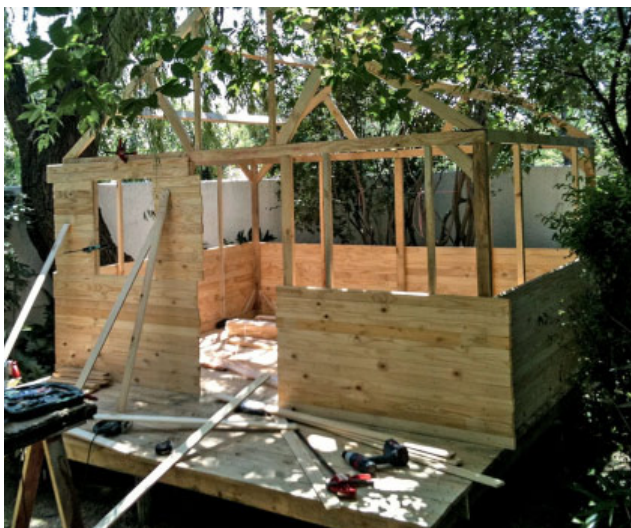
I reached this stage during the rainy season and had to cover the structure with a waterproof tarpaulin every day. Luckily James was helpful and quick up the ladder as Granny kept it steady.



INSTALL THE WALL CLADDING

12 Use the tongue-and-groove timber (A.1, B.1, B.2, C.1 and C.2) to build the walls by working from the bottom up and around the window areas, as shown in the left of the photograph. Use short cut screws to mount the cladding to the internal frame and make sure each successive tongue-and-groove length is well seated into position by tapping along its length with a **rubber mallet**.

TIP: Make sure the front cladding protrudes past the outer sides and also into the window and door spaces, as shown in the photograph, as this will be trimmed square later on with a **jigsaw**.



13 Complete the wall cladding up to a height that is just below the top horizontal member of the frames, as shown in the bottom left of the photograph. Lift the roof panels (L.1 x 4) up through the inside of the Wendy house and position them on top of the roof, making sure they do not stick out over the front and back. This is done now because it is easier to position them when you have access through the upside down 'V' of the front and back roof supports (this portion is called the gable). You will only mount them once all the cladding is complete, but this will require minor repositioning.



14 Use a jigsaw to cut off the edges of the tongue-and-groove timber along the edges of the door posts, window frames and all corners. The photograph shows that this step has been completed for the right front window, as well as both sides of the door frame. The edges of the left window and both front wall outer corners have not yet been straight-edged and still show the uneven ends of the mounted tongue-and-groove timbers. As the roof boards (L.1 x 4) have been positioned away from the edge of the sloping front and back roof supports (L.4 x 4), complete the cladding to pitch height, as shown at the top right-hand side of the back wall.



INSTALL THE ROOF

15 Use a jigsaw to cut off the tongue-and-groove panels along the edges of the front and back sloping roof supports (L.4 x 4) and then properly mount the roof boards (L.1) with sufficient overlap in the front. Mount the side supports (J.4 x 4) on each of the skylights, as shown in the skylight on the right of the photograph. Add the top and bottom window rails (J.2, J.3, J.5, J.6) all round, as shown in the window above the door in the photograph. Paint the outside of the walls (A, B and C) with wood primer since these will now be exposed to the weather.

TIP: The skylight and window rails are done after the wall cladding is installed because the full width of a whole number of the tongue-and-groove timbers will determine the height of the base and the top of the windows.



16 The roof panels should be cut and positioned to create the skylights according to the measurements required. As shown in the photograph, ensure there is a lip around the edges of the skylight to house the 10mm polycarbonate roof sheeting. Also shown are the half-round ridges (L.5, L.6), which are mounted over the joints of the roof boards (L.1) to ensure a watertight seal once the bitumen is added.



17 Install end supports (L.2, L.3) underneath the eaves on all sides of the roof (L) using quick grip clamps, a power drill and cut screws. The photograph shows the left-hand side eave where the end support (L.2 x 1) is clamped in position and butt joints to the back of the end support (L.3 x 1) already mounted over the front gable.



18 Mount the bargeboard (L.4) as shown being held in place with **G-clamps** on the right of the photograph. Add a decorative finial to finish off the roof (L).



PAINTING, BALCONY, STEPS AND SKYLIGHTS

19 Prime the inside of the Wendy house and paint all surfaces with an exterior paint in the colour of choice. For our Wendy house we used a sky blue paint for accents, such as the balcony (H) and bargeboard (L.4), with plain white for the rest of the walls (A, B, C) and window frames. At this point of the project it was very close to the birthday party deadline so we enlisted the grandparents to help with the painting while I continued with the woodwork. Use dust sheets, as shown in the photograph, to protect the flooring when painting.

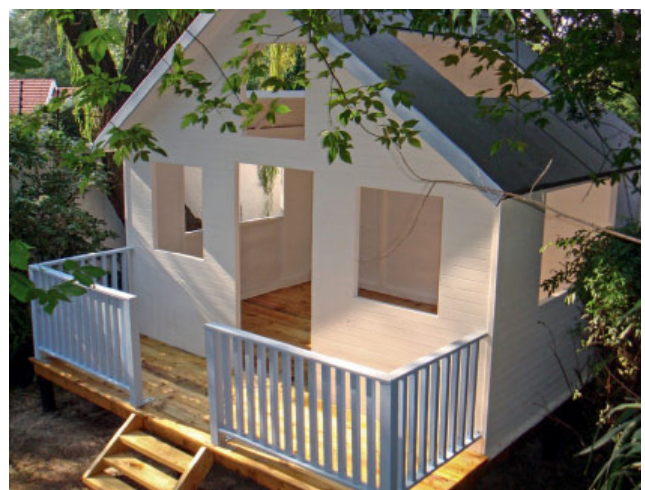


20 Install the balcony railing frame (H.1, H.2, H.3) on both sides and then use a custom-made spacer at the top and bottom to position and affix the palings (H.4). Work from the centre outwards, as shown, so that any inaccuracies are furthest from the entrance.

TIP: Calculate the size of the spacer as follows: measure the space in the balcony frame, subtract the number of palings you wish to install, then divide the remaining space by the same number of palings plus 1.



21 Build a simple step construction (F) and mount it underneath the lip of the front decking plank (E x 1) in line with the door frame. Ensure that the base of the front of the steps rests on two bricks that have been partially sunk into the ground to prevent further settling when in use. Complete the painting, waterproof the roof (L.1), varnish the steps (F), the balcony decking and the inside flooring (E).

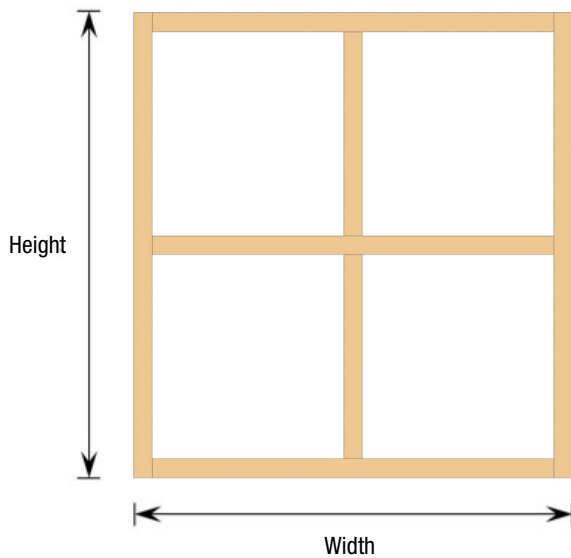


22 Install the 10mm polycarbonate roof sheeting (T) to complete the skylights, ensuring the seal is sufficiently waterproofed.

TIP: To achieve a perfect seal, layer the inside top surface of the lip of the skylight with trowelable bitumen, then install the polycarbonate sheeting and ensure the edges seat onto the bitumen all around. Add another layer of the bitumen around the edges and seal with flashing tape, as shown in the photograph.

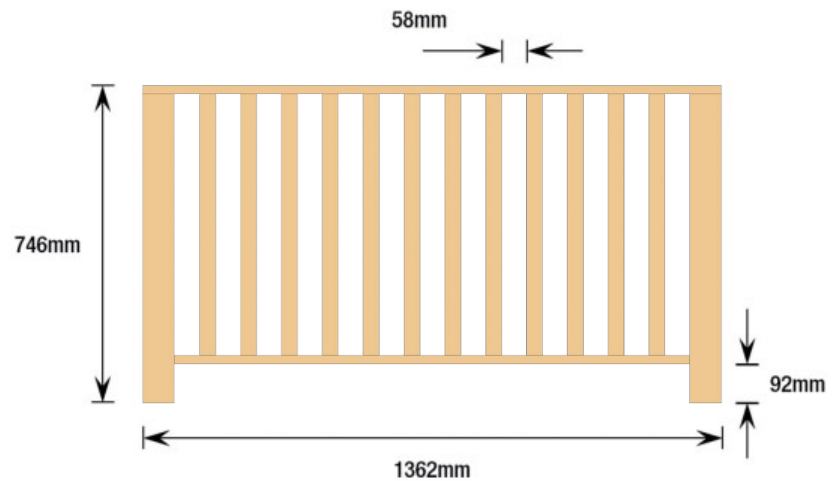


Window design

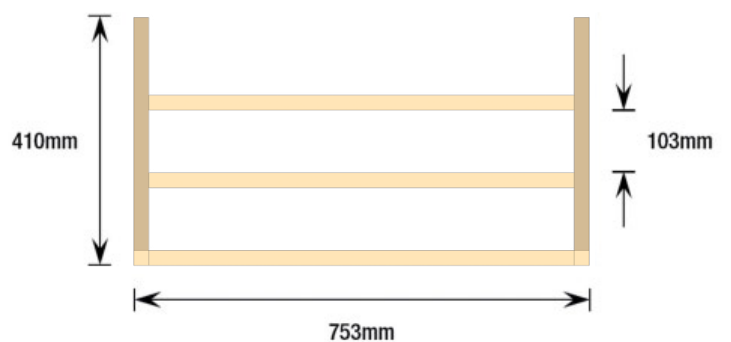


Window	Width	Height
Front lower	645mm	694mm
Front upper	589mm	630mm
Side	654mm	694mm

Front view of balcony



Front view of steps



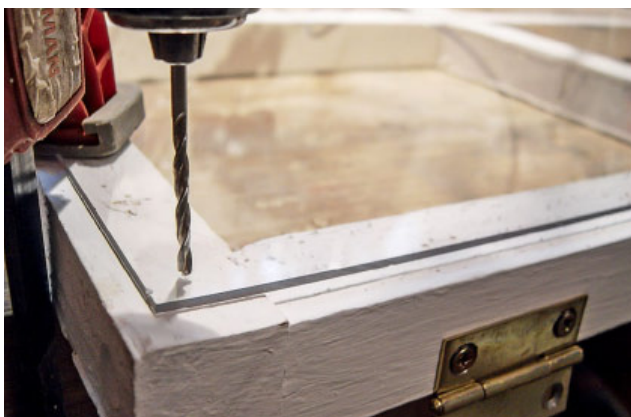
MAKE THE WINDOWS AND DOOR, AND RESTORE THE GARDEN

23 Construct seven windows (G) for the five window frames using the design and measurements shown in the illustrations. For each, assemble the outer frame first, using butt joints at the corners with long **wood screws**. Next assemble and fasten the internal frame which consists of one long, vertical bar and two smaller horizontal crosspieces on either side. Ensure that the wood screws holding the window frame together are countersunk at least 1 cm to ensure that sanding and planing can be done to correct any ill-fitting sides. Prime and paint the windows before installation.



24 Install a 2mm-thick Perspex sheet (Q.1, Q.2, Q.3) on the inside surface of each window (G) by drilling **pilot holes** with a power drill and using cut screws, as shown. Hang the windows (G) and check for clearance all around between the window and the frame. Adjust and repaint as needed.

TIP: As shown in the photograph, also make sure there is about 1 cm clearance all around between the edge of the Perspex (Q.1, Q.2, Q.3) and the window (G).



25 Ensure that there is at least a 3mm gap all the way around between the window frame and the window (G). Install the windows to swing outwards using two simple hinges for each window. Check that the window is not hindered by trees outside the Wendy house.

TIP: When fastening the hinges to the window frame, start with just the top two screws of each hinge so that you can rotate their position slightly if required. Once the window (G) opens and closes as required, fasten with both bottom screws on each hinge.



26 Build the door structure with the required timber (K.1, K.2, K.3). The design of this door can also be adjusted to a barn door style where the top and bottom halves open independently. Ensure that the cut screws are countersunk at least 1 cm so that adjustments can be made to ensure the correct fit. The design of the door is called a 'ledged and braced door', which features battens and diagonal braces onto which boarding (K.4) is fixed. The two diagonal braces must be positioned so that the upper ends coincide with the same side of the door as the hinges.



27 Use the same tongue-and-groove timber as the Wendy house walls and build up the front of the door (K.4). Tap each successive board into place with a rubber mallet and allow for some overhang on each side, which will be trimmed off using a jigsaw to align the edges with the sides of the door frame.



The photograph above shows the tongue-and-groove timber being fixed to the door structure shown on page 147. Note the overlap on both sides, which is then trimmed off using a jigsaw.

The completed door is primed, painted and ready to be hung. Note that the door should be hung before it is painted as fitting the hinges may require some adjustments to the sides of the door.

28 Prime and paint the door in a colour of your choice. As with the bargeboards and balcony rail, we used a light blue feature colour for effect.

TIP: Hanging the door (K) will require some assistance unless you have done it before. Rest the base of the door (K) on two wedges inside the door frame and adjust their position until the gap around the top and sides is equal. Mark the positions of the hinges, install them against the door frame, then open them by 90 degrees, position the door (K) with the wedges underneath then fasten the inside edge of the door.



29 Mark off an area in front of the Wendy house to install paving, add flower boxes and restore the grass if required. This was a fun project for the whole family to get involved in, with jobs for all ages. Neat paving and other decorative touches will complement the front of the Wendy house and make it not only a fun space for young children to enjoy, but also an attractive feature in the garden.

TIP: If you have installed paving along the front, you could extend it into a path leading from the steps of the Wendy house to elsewhere in the garden.



LIGHTING AND FINISHINGS

30 Have an electrician install a plug point and electrical connections in the Wendy house if interior or exterior lighting is desired. Select and install two outside lights, one above each of the front windows, as well as a fluorescent or other type of interior light.

TIP: The exterior lights were placed above the innermost corner of the front windows and roughly half way up to the roof.



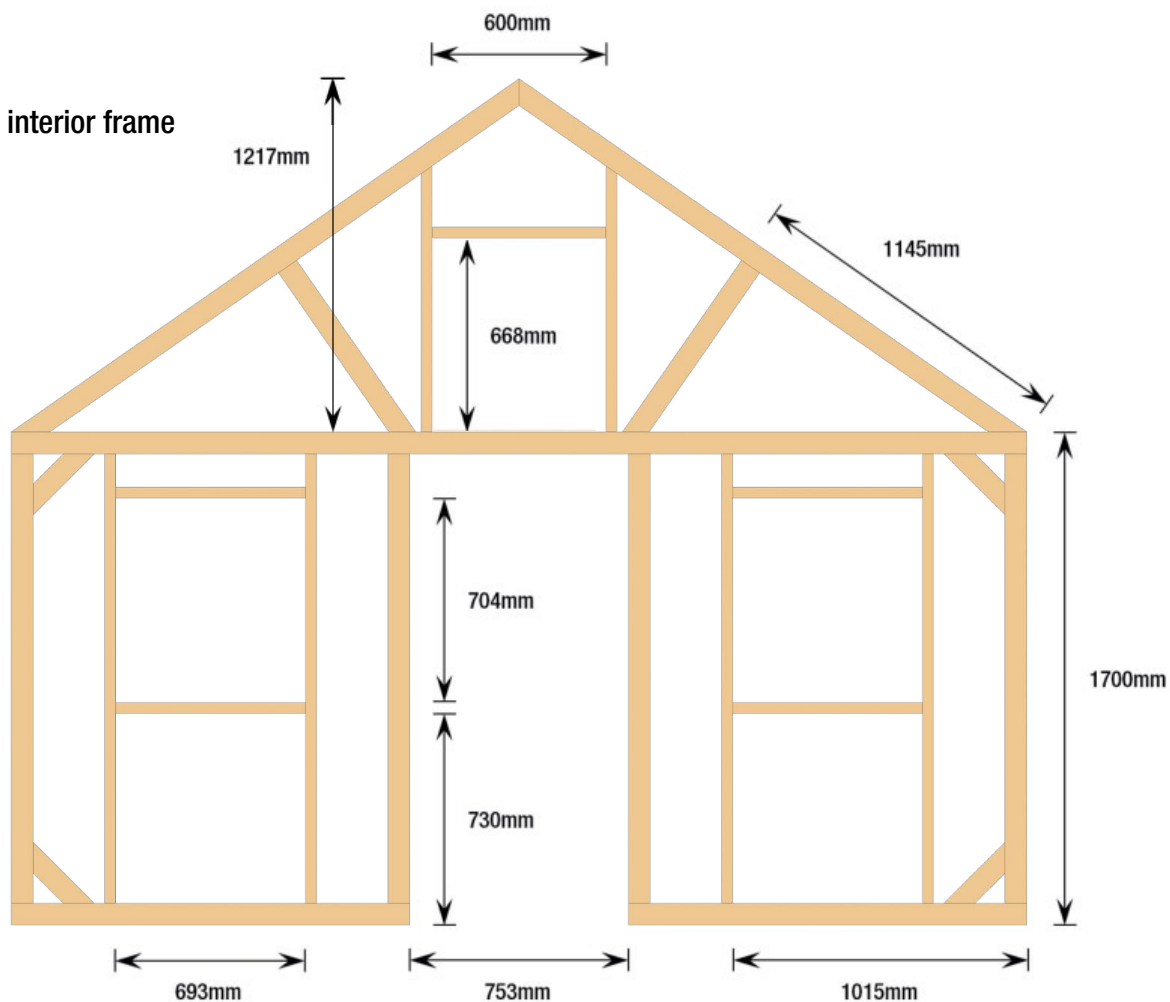
31 Using a power drill and cut screws, install curtain rails (R) using simple bathroom rail brackets (R.1) and dowelling (R.2). The curtain rail (R.2) should be positioned in line with the top rail of the window frame. To hang the curtains, simply remove the rail bracket on one side and thread the loops onto the curtain rail. Install window stays (S) on all the windows (G) so that they can be opened and held safely in position. While also a decorative feature, stays (S) ensure that windows (G) are not left loose as it is easy for children's fingers to get caught if they blow closed in the wind.



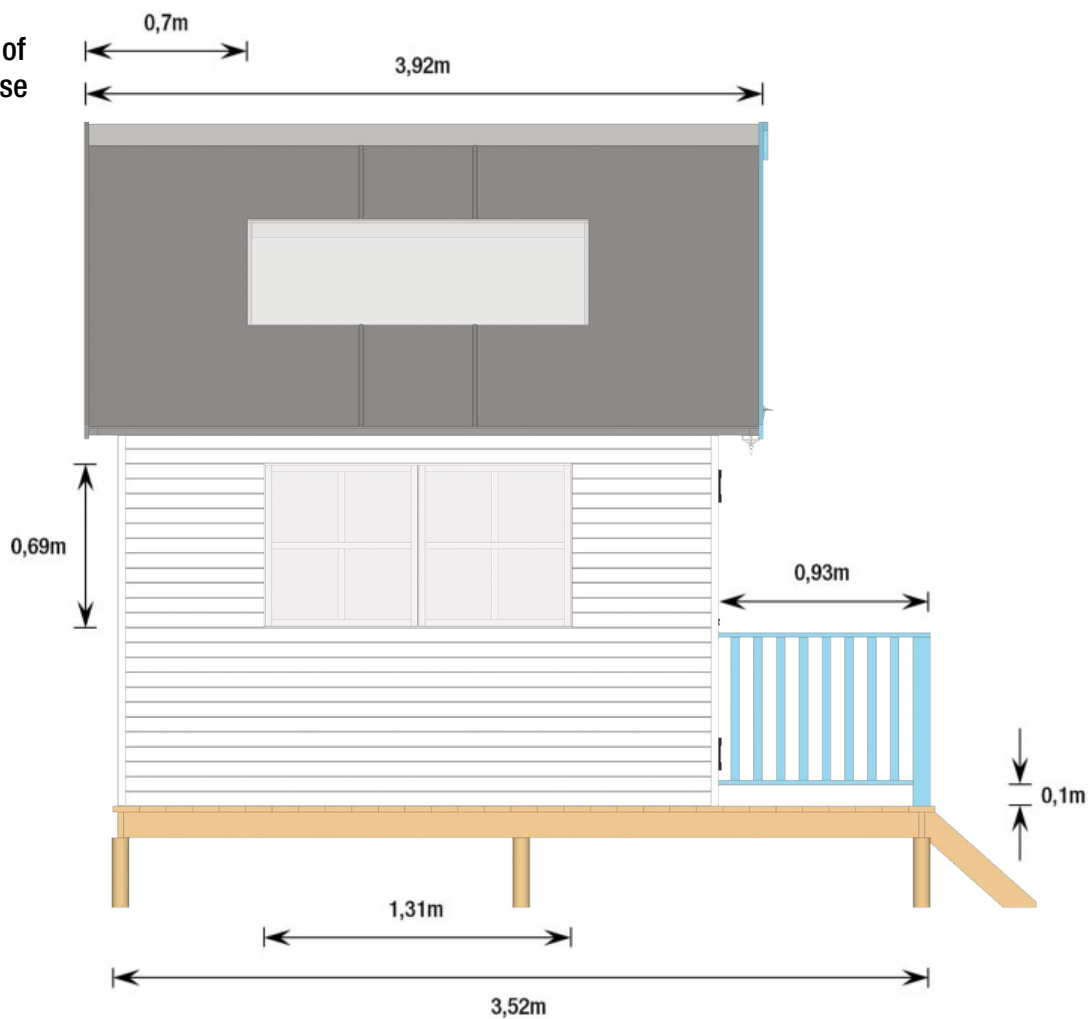
32 Install hooks inside the Wendy house for hanging space and use simple furniture with low surfaces. You can also hang pictures on the walls to suit the interior and décor, as required.



Front wall interior frame



Exterior left side view of completed Wendy house



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SAFETY NOTICE

Woodworking is an enjoyable hobby, but always exercise extreme caution as many tools in the workshop are very dangerous. Always read instruction manuals, use the safety guards provided, wear protective gear and clothing, and keep young children away from power tools, sharp points, blades, dangerous fluids and heavy objects. The instructions in this book are not exhaustive and any omissions for clarity should not compromise your safety or that of anyone else when building any of the projects.

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EXTRA CONTENT

Booster Step (half-lap joins)



3D Model



Animation video

Booster Step (butt joins)



3D Model



Animation video

Toy Box



3D Model



Animation video



High speed construction video

Bookcase (tall)



3D Model



Animation video

Bookcase (low)



3D Model



Animation video

Nursery Shelf



3D Model



Animation video

School Desk



3D Model



Animation video

Toy Shelf



3D Model



Animation video

Child's Bed



3D Model



Animation video

Bunk Beds



3D Model



Animation video



Assembly: High speed construction video



Bunk end: High speed construction video



Ladder: High speed construction video

Window Seat



3D model



Animation video

Garden Bench



3D model

Gym Bench (long)



3D model



Animation video

Gym Bench (short)



3D model



Animation video

Work Bench



3D model



Animation video

Wendy House



3D model



High speed construction video