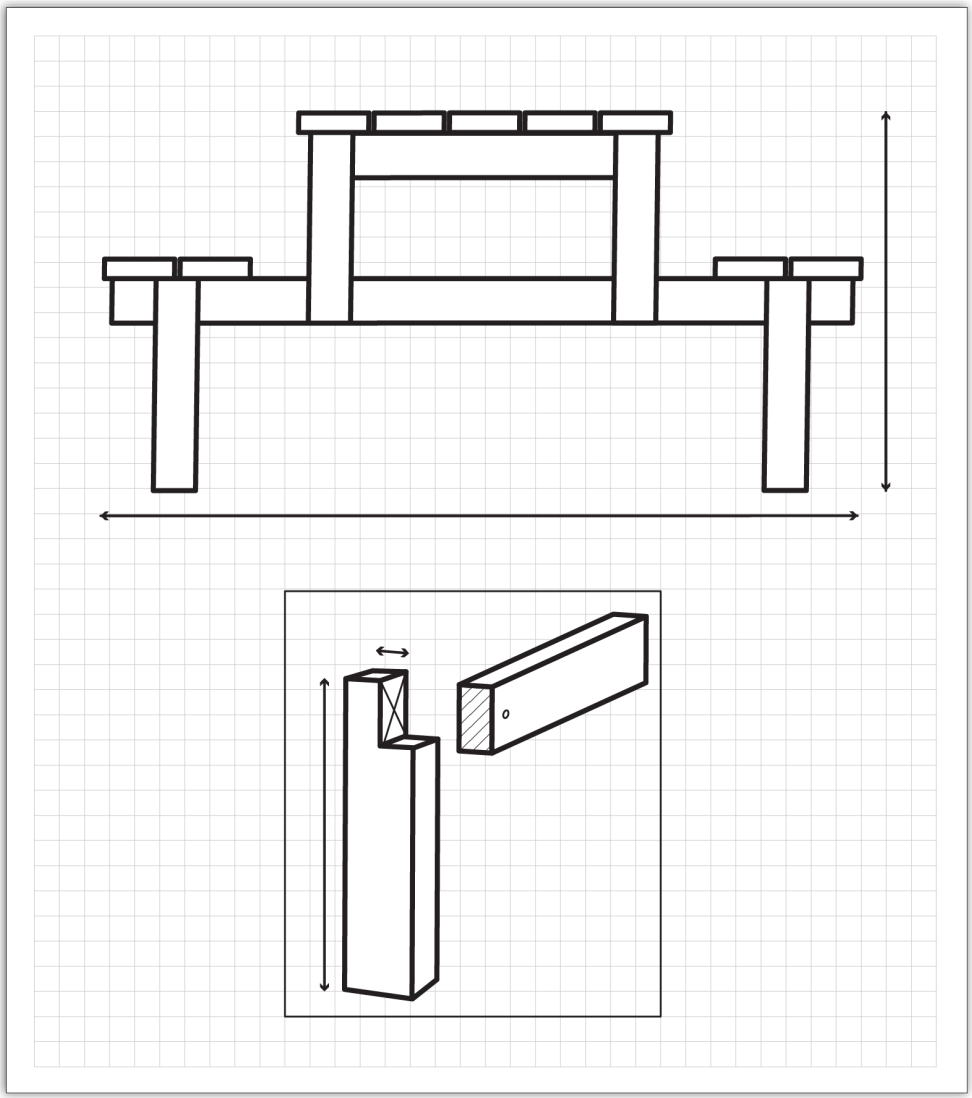
BCATS
BUILDING, CONSTRUCTION AND ALLIED TRADES SKILLS

Sketches and drawings

Learning resource



This resource provides guidance for the following BCATS skill standard:

Level 2 – 40556
Create sketches and drawings for a BCATS project

BCITO
He Hunga Hanga Mātou
building people

Contents

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Introduction

Sketching and drawing are essential skills in construction. Bringing the idea from your head into a completed project takes careful planning. Sketching your ideas will help you visualise and minimise mistakes when you build something in the real world.

While digital tools are widely used, hand sketching is still valuable for quick ideas, problem-solving, and on-site tweaks.

This guide is all about how to develop sketches and drawings for your BCATS projects. You'll learn:

- different ways to sketch and draw your ideas
- symbols and notation used in drawings.

To store your sketches and drawings, keep them in a clean, dry folder or portfolio. This is to protect them from damage like moisture, tearing, or fading.

Label each drawing clearly with your name, date, and project title so they're easy to find and reference later.

Back up digital copies by scanning or photographing your work and saving them securely online or on a USB drive.

Sketching tips

Be precise and clear
Sketches need to be accurate with the right sizes and proportions.

Clearly communicate your ideas
Good quality sketches make it easy for everyone to understand what you want to build.

Practice makes perfect
The more you sketch, the better you get. Use your pencil to draw lines, shapes, and details. Even rough sketches can be useful on site.

There are a few things to think about before you get started on a drawing.

- ☑ Are you sure about what you are planning to make?

- ☑ Who is going to use the drawing?

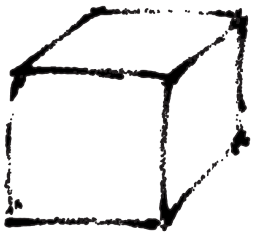
- ☑ Is your pencil sharp?

Sketches and formal drawings

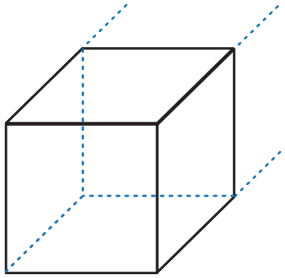
Usually, freehand sketches are prepared first, and then developed into formal 'working' drawings once the design details have been decided.

Sketches and formal drawings are a simple way to show what you're building and how it'll be made. They give clear, visual information about your project. These drawings can show:

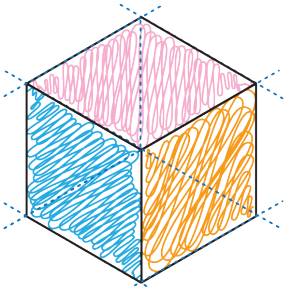
- the shape, size, and layout of the project
- information about how to complete the project
- materials and finishes.



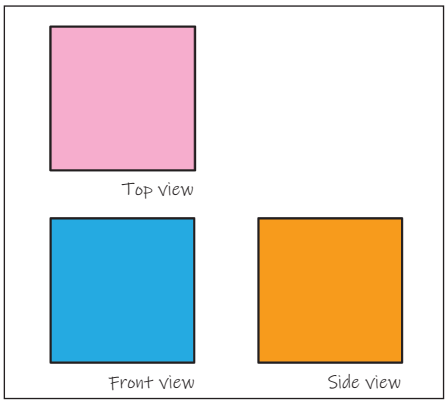
Sketch



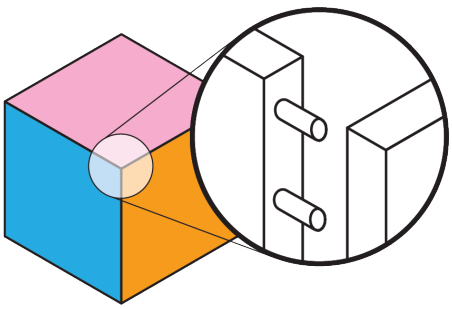
Oblique drawing



Isometric drawing



Orthographic drawings



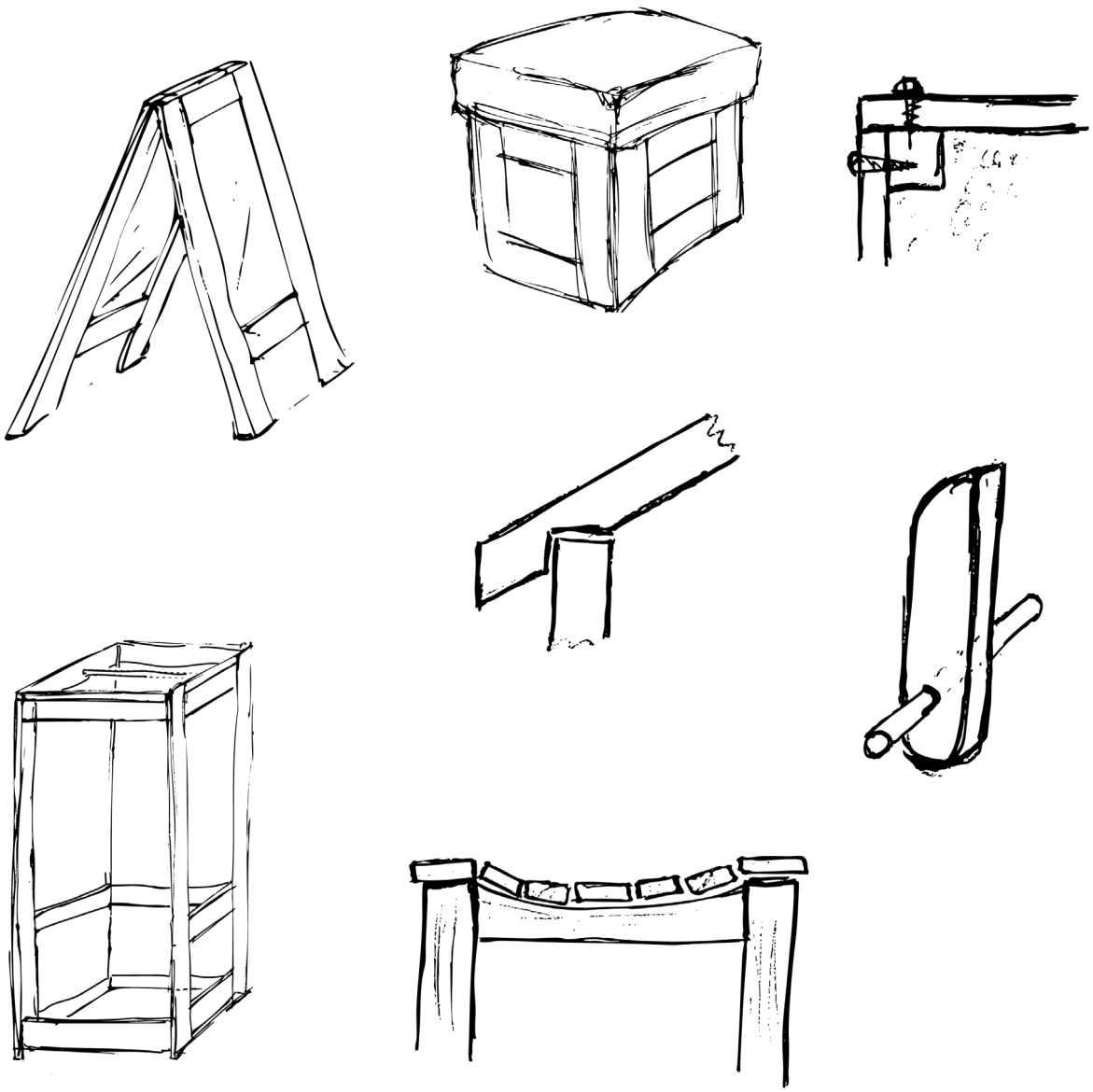
Detail drawing

Sketching

Explore your ideas

The first step in planning any construction project is to do a quick sketch. It's a fast and easy way to show your ideas and compare them. You can try out different options to see what they might look like or figure out how you might build a complicated joint. Sketches don't have to be amazing, but they should:

- clearly describe the idea or component
- be roughly in proportion
- be easy to understand.



Perspective drawings

Using depth in your sketches is a great way to show what your finished project will look like in three dimensions (3D). Perspective drawings show depth in a natural way by having lines recede into the distance using vanishing points.

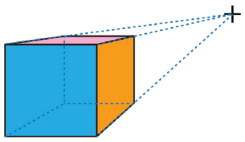
Vanishing points represent places on the horizon where parallel lines appear to meet. This creates a sense of depth.

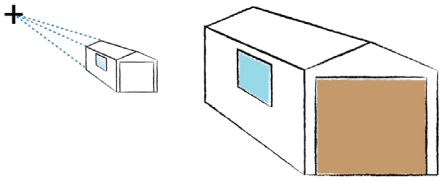
There are three main types of perspective drawing: one-point, two-point, and three-point perspective.

One-point perspective

Depth lines meet at one vanishing point.
The front is drawn flat, and the rest stretches back.

It's good for showing one side of an object.

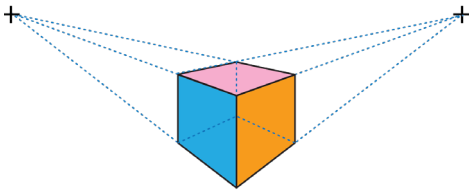


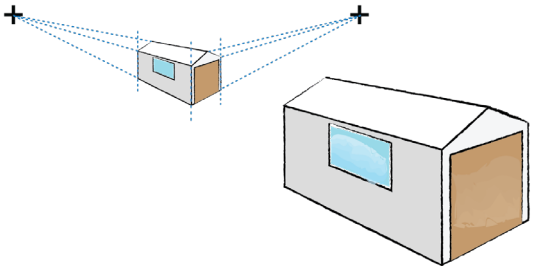


Two-point perspective

Depth lines meet at two vanishing points.
Upright lines stay straight, and the sides angle back.

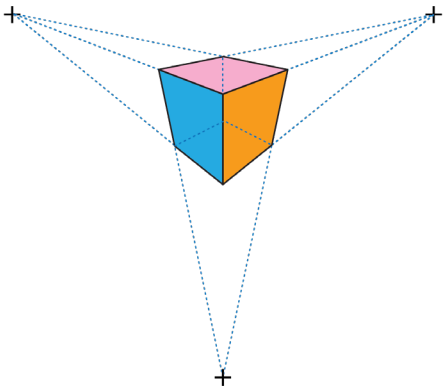
This is the most common type of drawing used in construction.

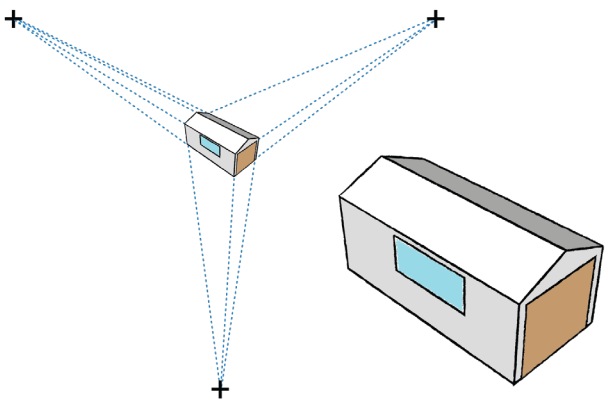




Three-point perspective

Depth lines meet at three vanishing points.
It looks the most realistic, but it distorts all sides of the object.





Formal drawings

Refine your sketches

Once you and your teacher are happy with your freehand sketches, you'll move on to making a set of formal 'working' drawings. These drawings can be done by hand but are now often made on a computer using Computer Aided Design (CAD) software like AutoCAD or SketchUp.

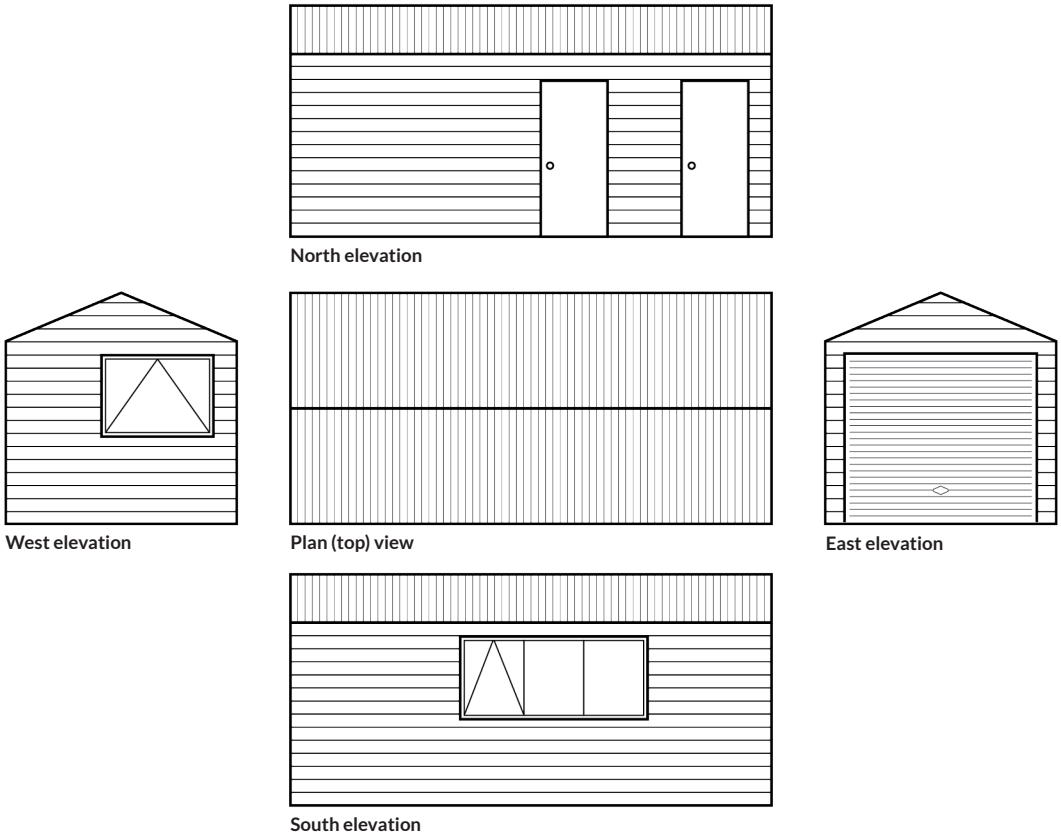
There are a few different types of working drawings. Each one shows a different view and is used for a different purpose. On the next pages, you'll see examples of these drawing types.

Orthographic projections

Orthographic projections are one of the most common drawings used in construction. Think of these like unfolding a box and laying each side out flat to show the project from each side. Because every side is shown flat, it's easy to see details and measurements for your project.

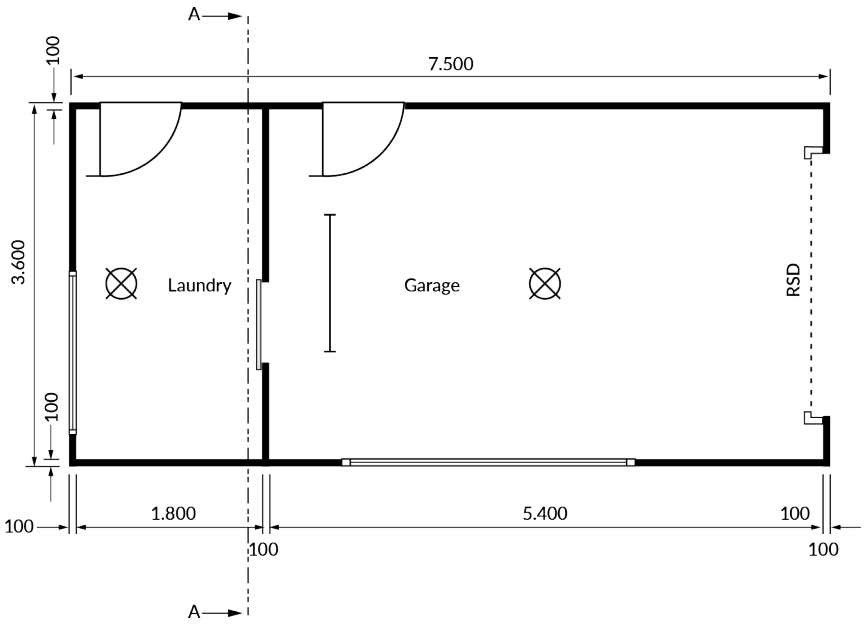
The view from above is called a **plan**, and the side views are called **elevations**.

Here's a simple example of an orthographic projection for a garage.



Floor plans

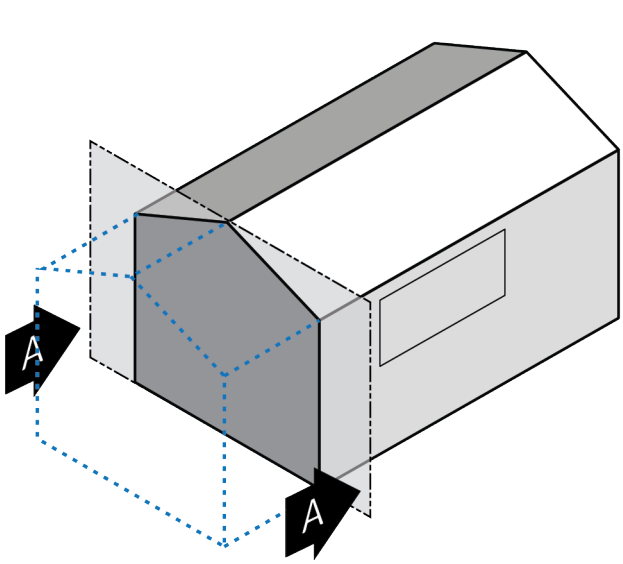
A floor plan shows the layout of an area from above. This makes it easy to see where everything goes. This view is part of an orthographic projection.

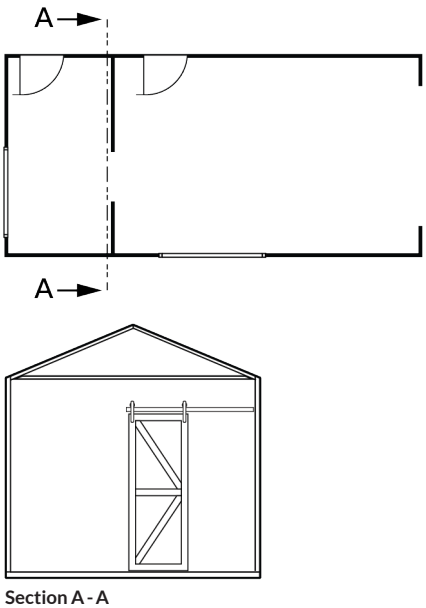


Cross-sections

Sectional views, or cross-sections, are like slices through part of a structure. They help you see hidden parts that don't show up in plan or elevation drawings.

You'll often see them marked with letters like A – A on a dashed line. These drawings are great for showing small details or how things fit together inside your project.





Section A - A

3D drawings

Drawing things as flat 'true' objects can be useful but it's much easier to visualise something when you see it in 3D.

Oblique and isometric drawings are useful because they show three sides of an object. At first, they might look like perspective drawings, but there's a key difference. These drawings don't use vanishing points. Instead, the lines on the sides stay parallel. That means the shape doesn't get distorted.

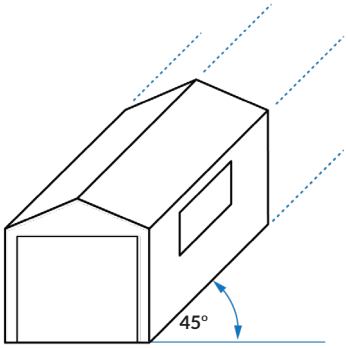
Oblique drawing

This is a simple way of showing 3D objects.

- The front face of the object is drawn true to scale and shape.
- The depth is represented by lines receding at an angle (commonly 45°), but not to scale.
- It's often used for quick sketches and technical illustrations.

Key features

- Easy to draw.
- Distortion in depth can occur.



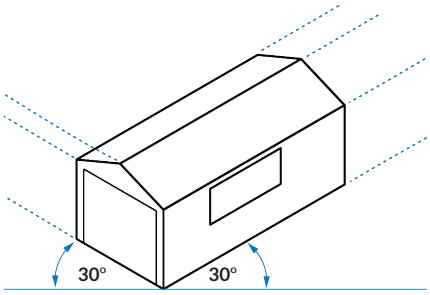
Isometric drawing

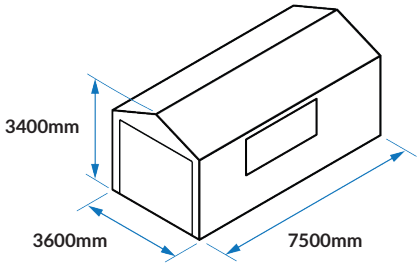
This is a more complicated method.

- No face is shown in true shape, but dimensions are to scale.
- The depth is represented by lines receding at an angle (commonly 30°) off the horizontal.
- Commonly used in joinery, architecture, and engineering.

Key features

- Gives a more accurate sense of 3D.
- No distortion in scale.



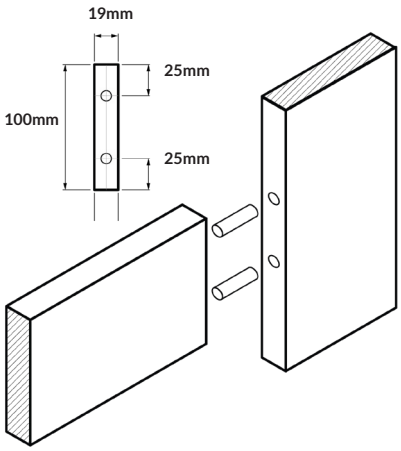


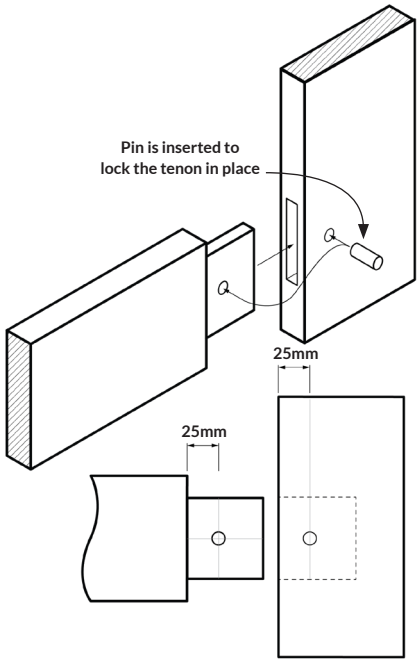
Detail drawings

Sometimes you might need to show small, tricky parts of a project in more detail. These are called detail drawings.

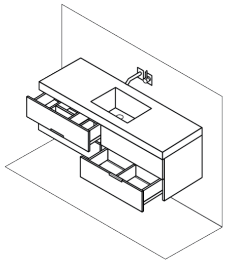
Creating detail drawings can help you understand how to make complex joints before you get on the tools. By doing most of the trouble shooting on paper you will save time in the workshop.

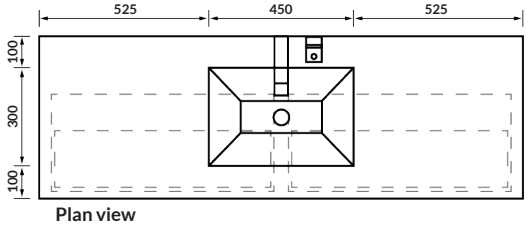
The examples below show details for joints.

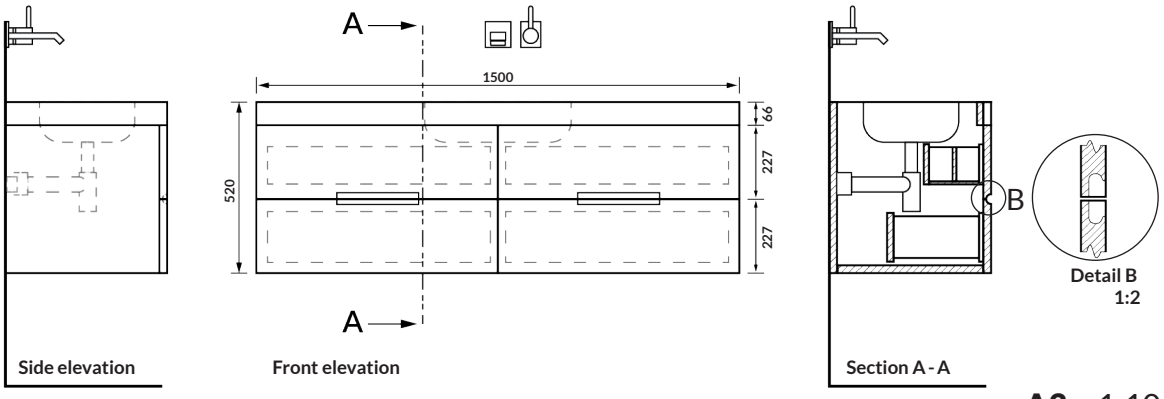




In project plans you will often see a range of drawings. In the example below you can see orthographic projections, a cross-section, and a detail drawing.







A3 - 1:10

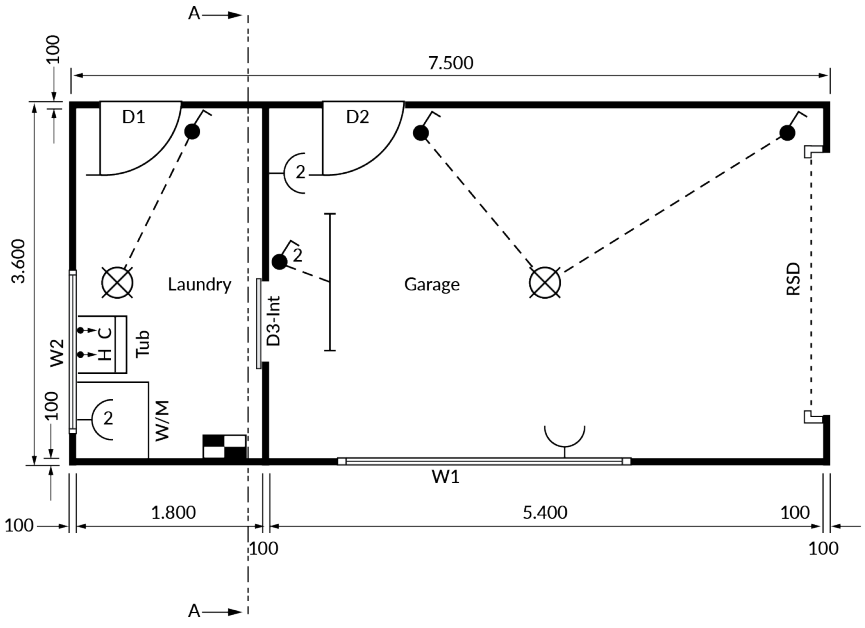
Client name:	Date:	BATHROOM VANITY UNIT	WOODCRAFT JOINERY
Address:			

Drawing conventions

Keeping things clear

Drawing conventions are the standardised way designers and architects share information in working drawings. They use lines, symbols, and abbreviations to keep things clear and simple.

The example below might look tricky at first, but it's actually a simple floor plan for a garage.



Line types

The table below shows some common lines and why they are used. Your teacher might show more examples.

What the line represents	Description	Line style
Visible objects and edges	Thick continuous line	
Hidden objects and edges	Thin dashed line	
Dimensions	Thin continuous line, sometimes with arrow-heads	
Cross-section	Alternating long-short-short dashed lines, labelled with capital letters	A A

Abbreviations

Working drawings of buildings will have many doors, windows, fixtures, and appliances. These are often labelled using shortened words or letters.

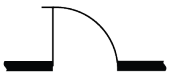
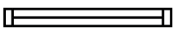
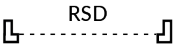
The table below shows some common abbreviations and what they mean. Your teacher might show more examples.

Abbreviation	Meaning	Abbreviation	Meaning
D1	Door, also numbered	W/M	Washing machine
W1	Window, also numbered	RSD	Roller shutter door
H/C	Hot and cold taps	NTS	Not to scale

Symbols

Plans will also have symbols that show different materials or parts of a structure.

The table below shows some common symbols and what they mean. Your teacher might show more examples.

Symbol	Meaning	Symbol	Meaning
	Door		Electrical outlet
	Window		Light switch
	Roller shutter door		Ceiling light
	Switchboard		Fluorescent light

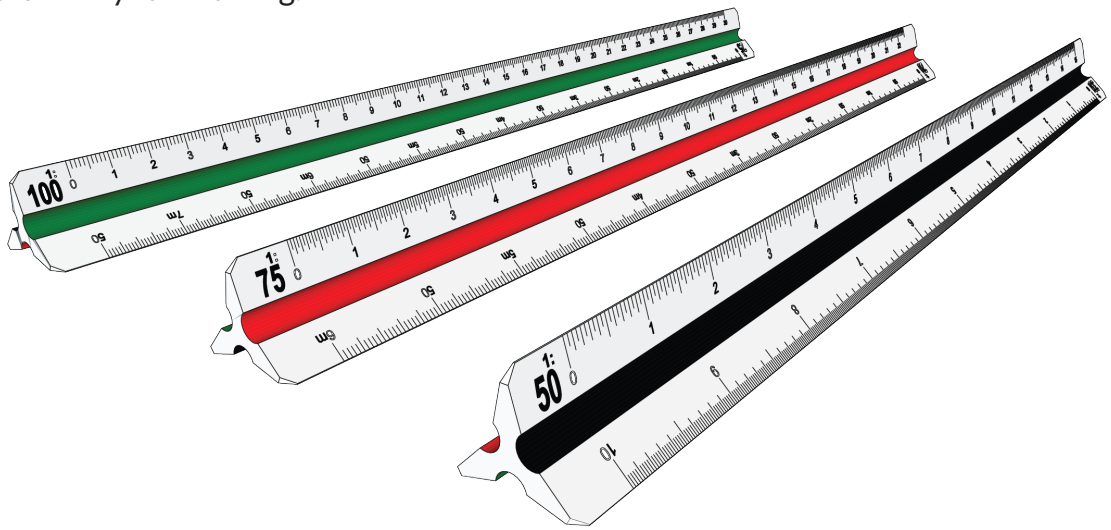
Scale

When making a set of formal drawings, it is usually impossible to draw objects full size, so you'll need to draw a smaller version to fit on your paper. This is called scaling.

Scaling means changing the size of everything by the same amount, so all parts stay in the right proportion to each other. For example, a 1:2 scale means everything is half the size than it is in real life. A 1:50 scale means it's 50 times smaller.

If you are working on a computer, you will be able to draw at actual size but will need to print a scaled version.

When you make a formal drawing of your project by hand, you will have to decide on the best scale to use. Use a scale rule to be accurate and be sure to write the scale on your drawing.



House plans are usually drawn at a scale of 1:100, or 1:50 for smaller builds.

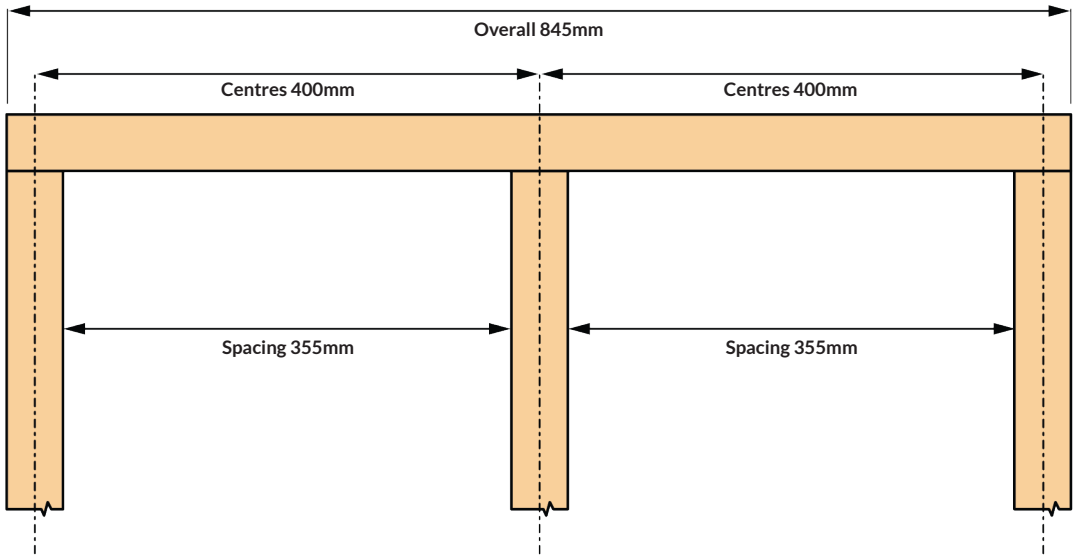
BCATS projects are smaller and will generally only need to be at 1:5 or up to 1:10

Measurements

You need to use accurate measurements on your working drawings.
In construction, we measure things using millimetres.

There are three common types of measurements you'll see on drawings.

- Overall measurements – From one end of something to the other end.
- Centre measurements – From the centre of one piece to the centre of another. For example, between the centres of two wall studs.
- Spacing measurements – The clear gap between two pieces.



There are a few things to think about before you get started on a project.

- ☑ What will you build it out of?

- ☑ What will you use this for?

- ☑ Do you need any specialised materials or hardware?

Project examples

This section shows examples of sketches and working drawings for four BCATS projects. This will help you see what good planning looks like. Each project includes:

- a sketch
- orthographic drawings
- an isometric drawing
- detail drawings.

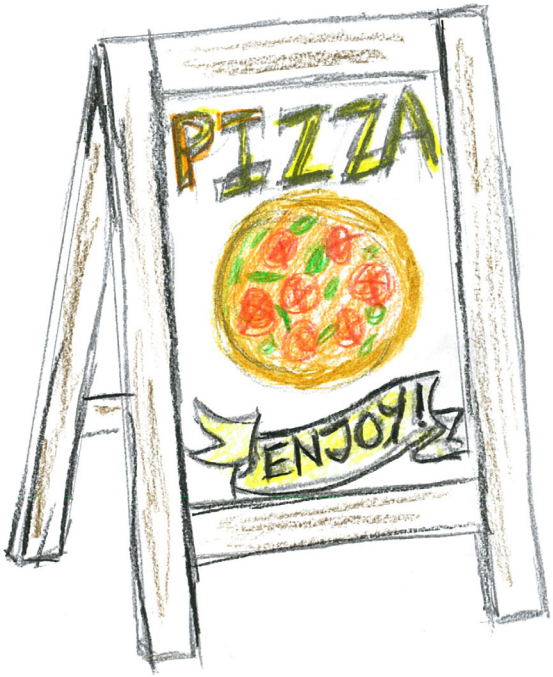
You can also plan a different project from the ones shown in this resource. Your teacher will help you choose something that's right for your skill level.

Project one

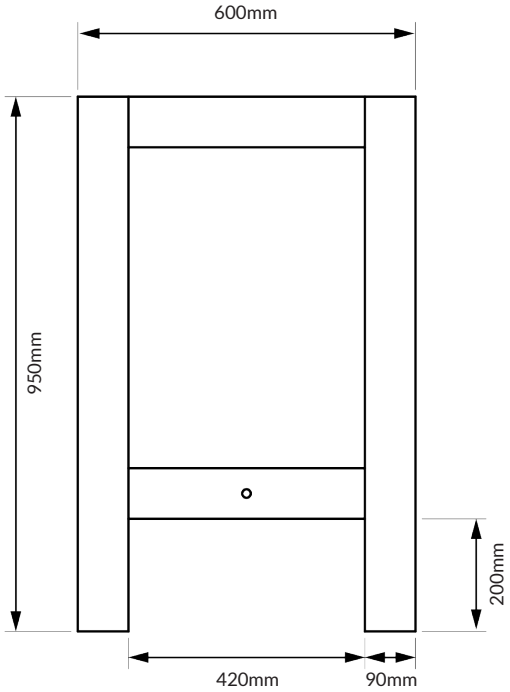
Sandwich board

This sandwich board is designed as a blackboard menu for a local pizza business.
This sign will be used outdoors so needs to be made from weather resistant materials.

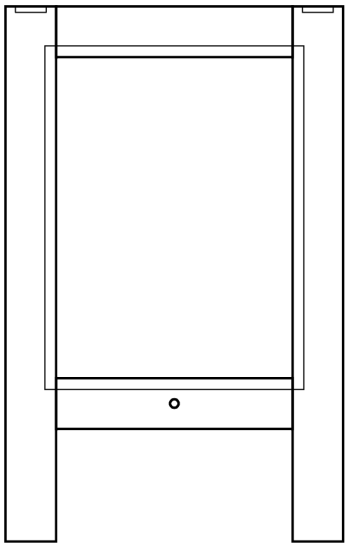
Sketch



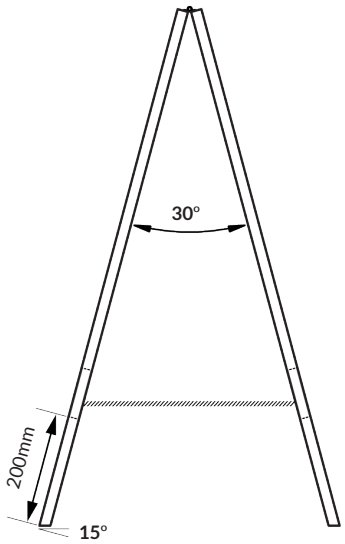
Orthographic drawings



Front elevation

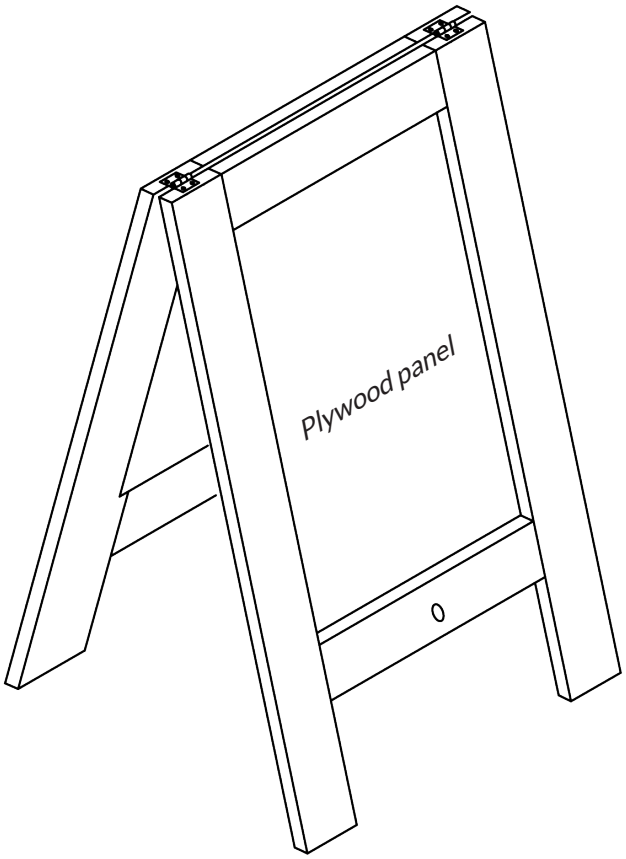


Back elevation

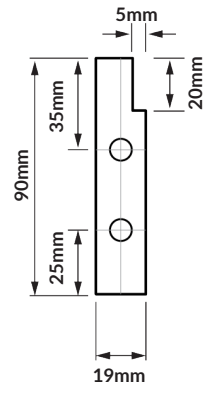


Side elevation

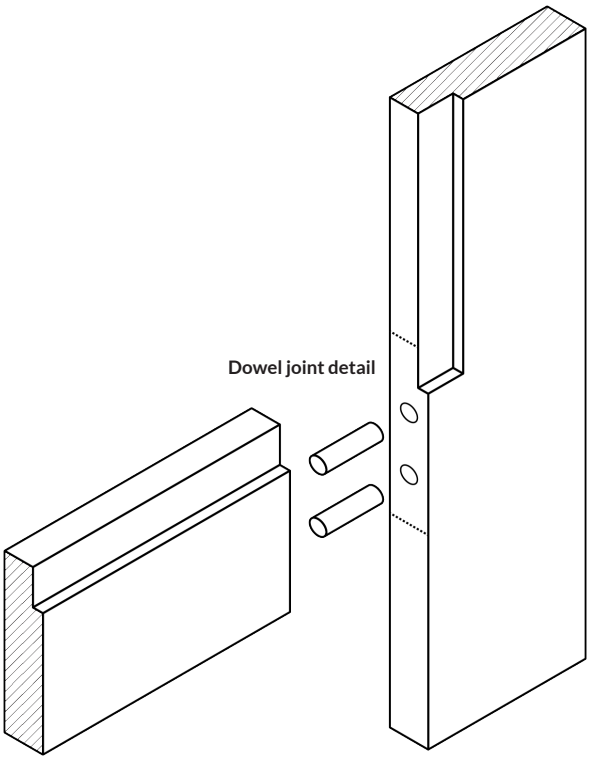
Isometric drawing



Detail drawings

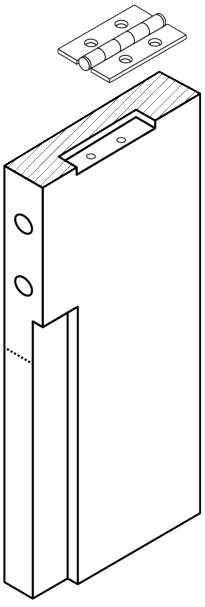


Rebate detail



Dowel joint detail

Hinge detail

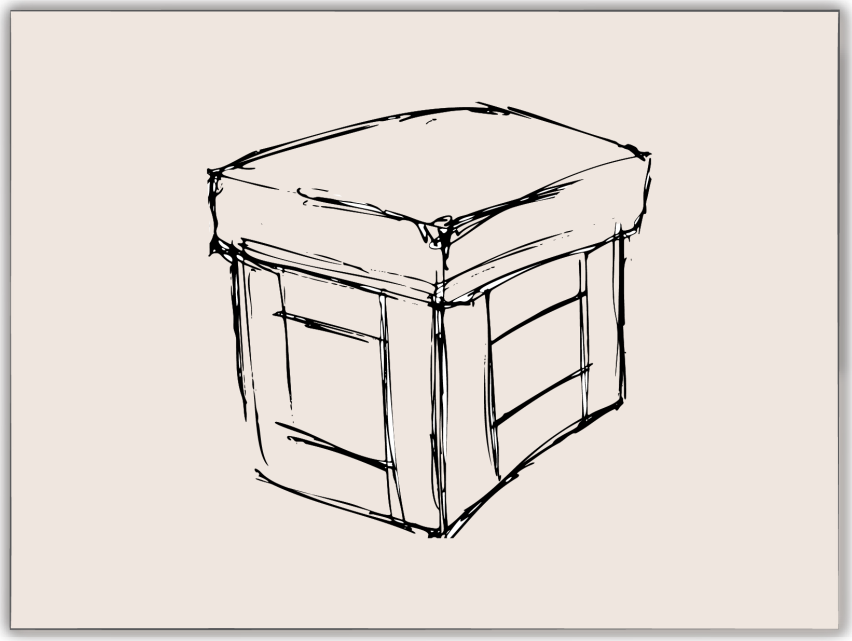


Project two

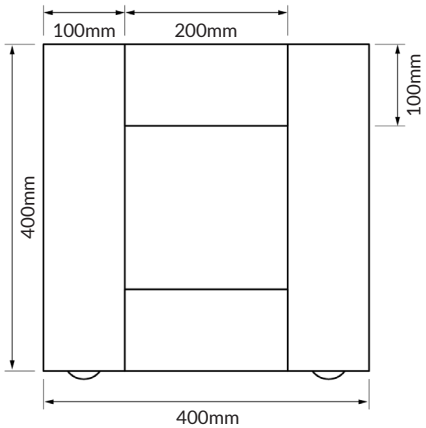
Footrest storage box

This storage box is designed for use in a home lounge. It needs to be big enough to hold a folded up blanket. It has a padded lid that lifts off and hidden castor wheels.

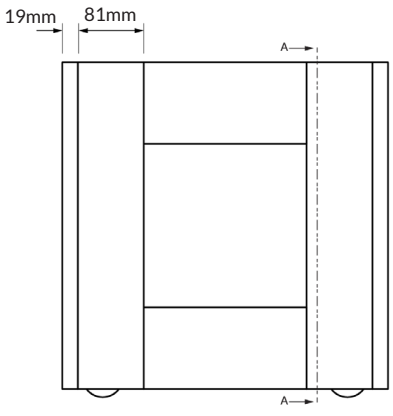
Sketch



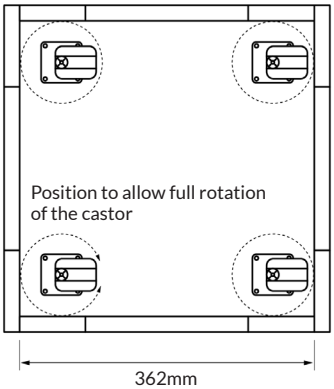
Orthographic drawings



Front elevation

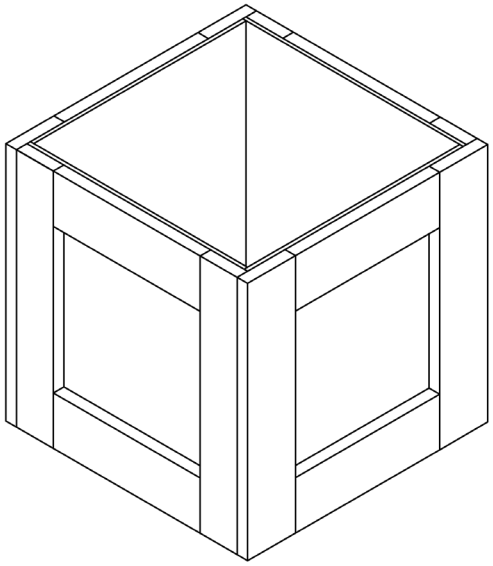


Side elevation

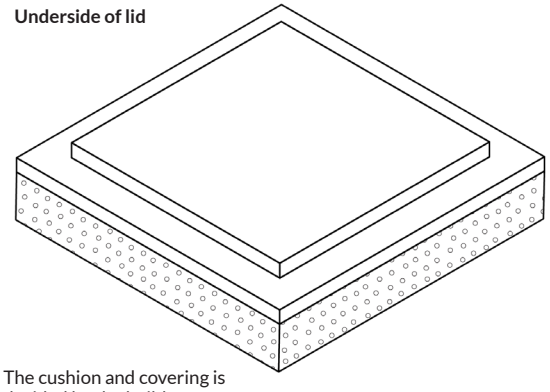


Bottom elevation

Isometric drawing

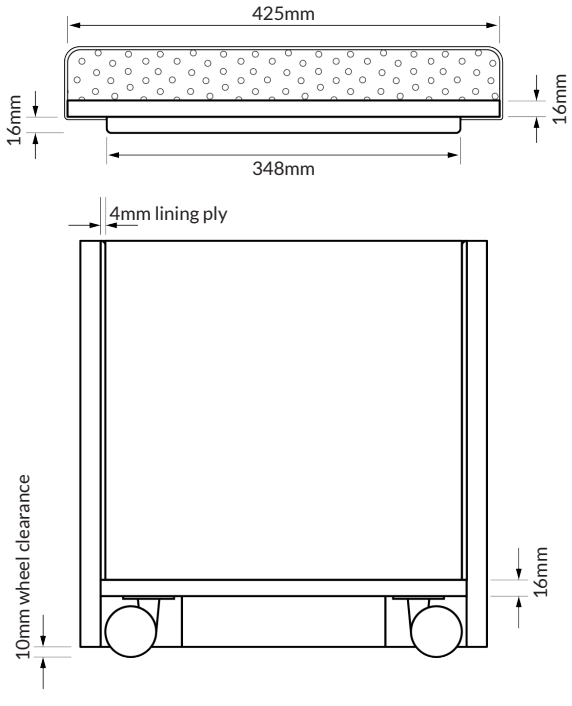


Underside of lid

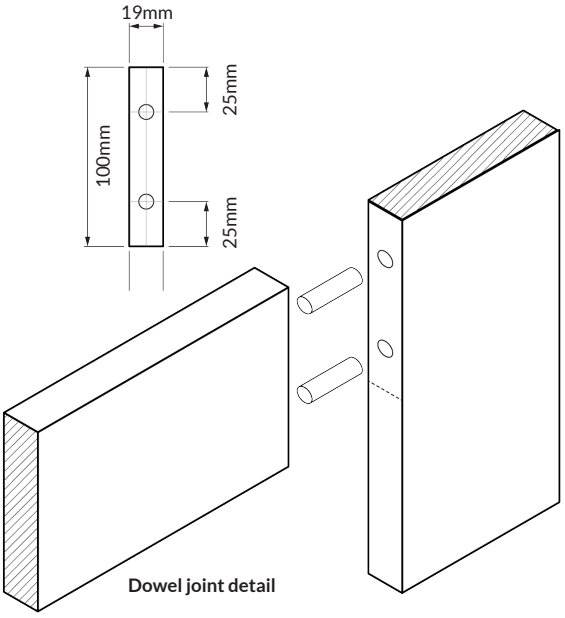


The cushion and covering is decided by the builder.

Detail drawings



Section A – A



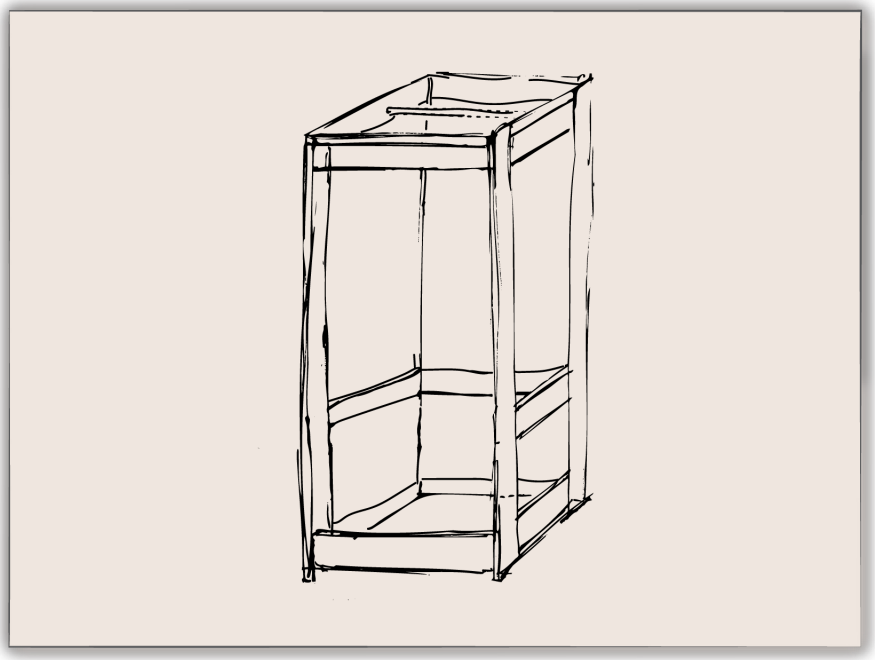
Dowel joint detail

Project three

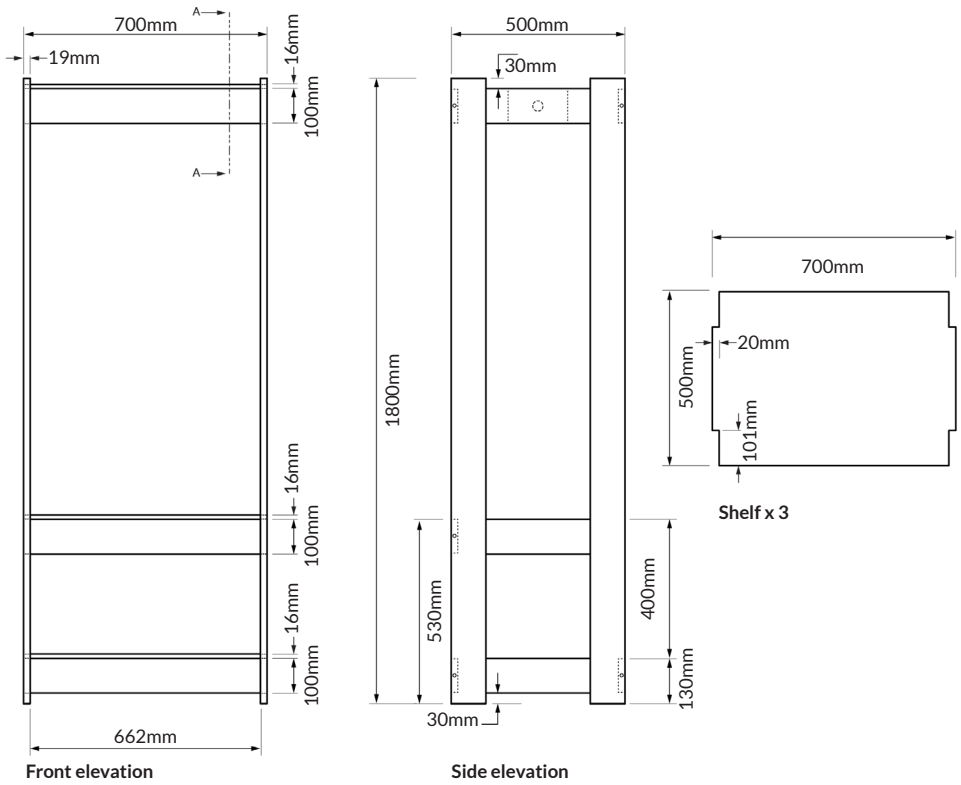
Wardrobe

This wardrobe is designed to be installed in a small alcove. The size is determined by the space it will fit into. If you make a project like this, you will need to change the dimensions to suit your needs.

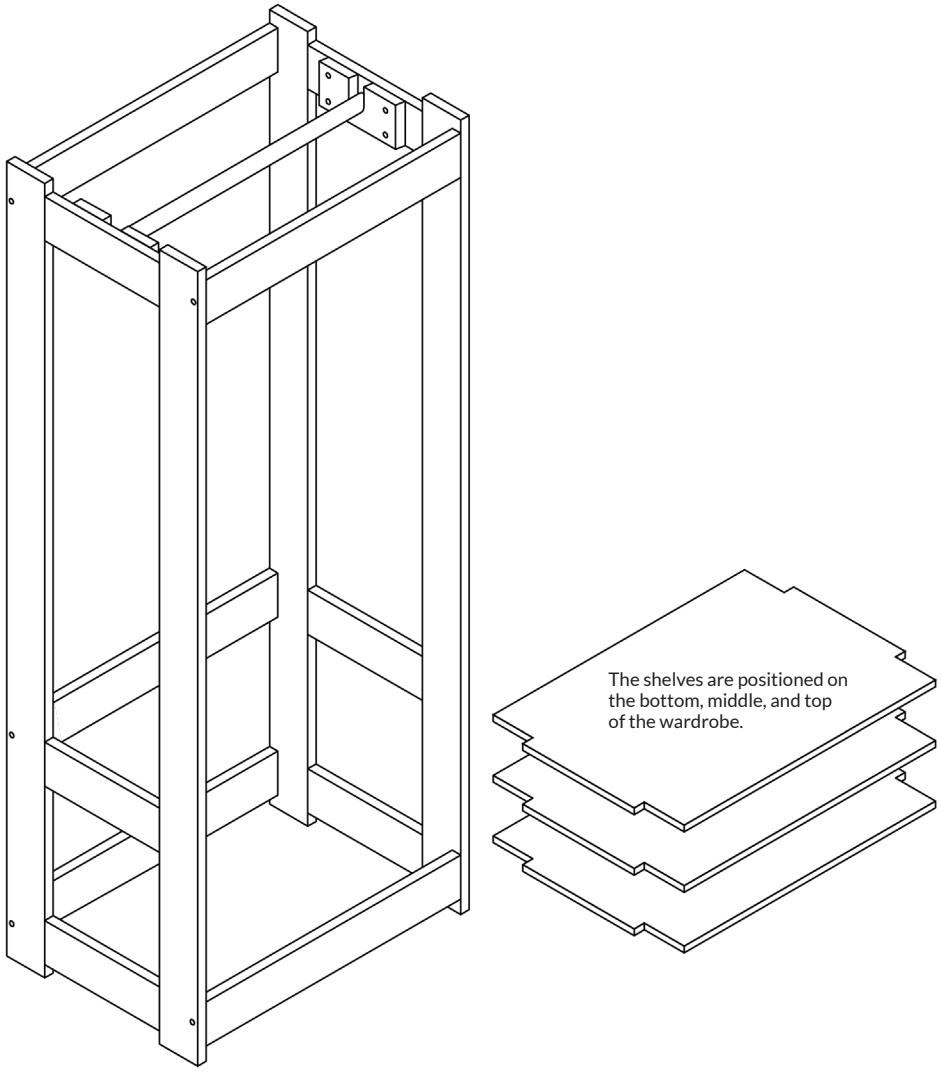
Sketch



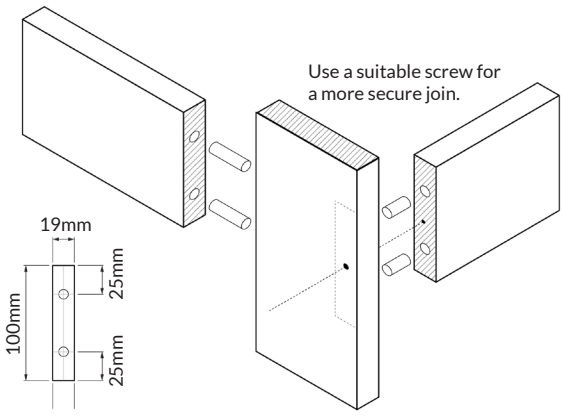
Orthographic drawings



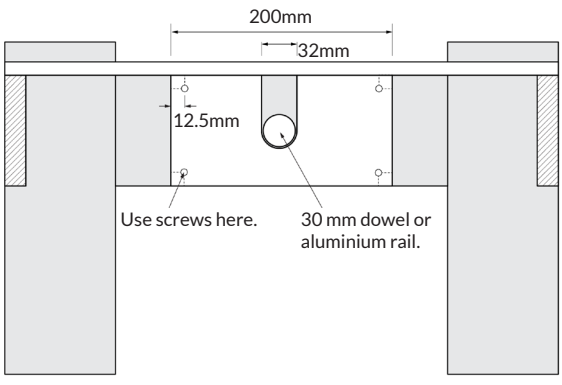
Isometric drawing



Detail drawings



Dowel joint detail



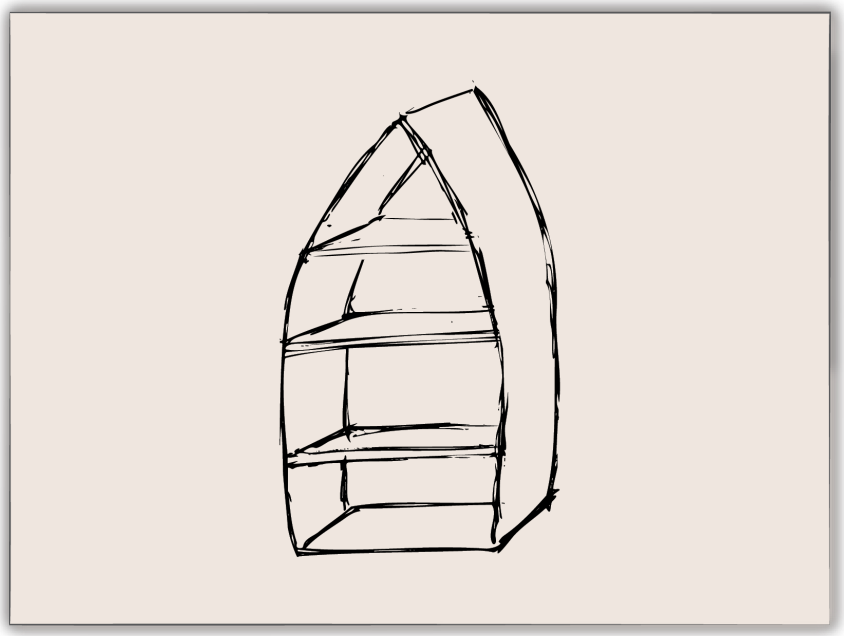
Section A – A

Project four

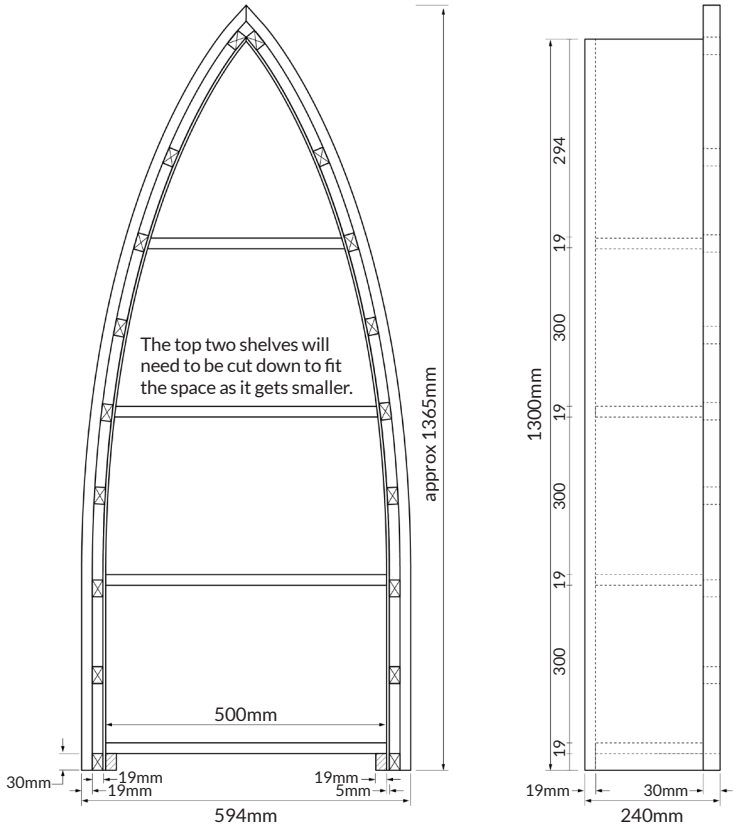
Boat bookcase

This example shows a basic build that could be customised or decorated to suit your style. For example, you could adjust the space between shelves or add boat themed details.

Sketch



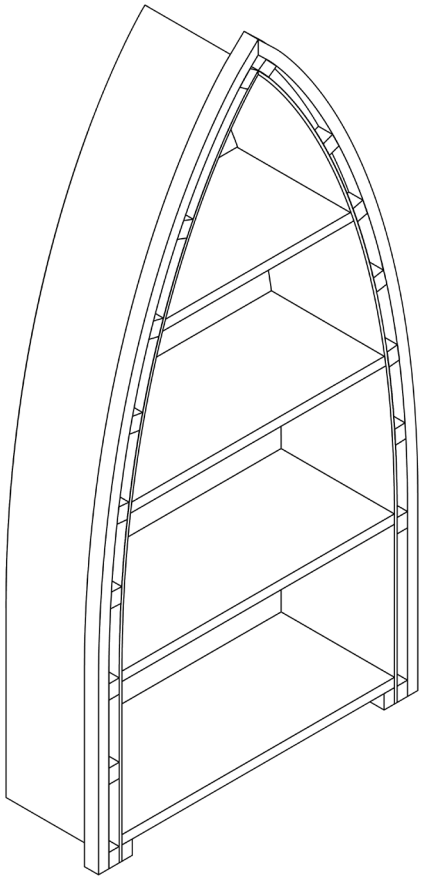
Orthographic drawings



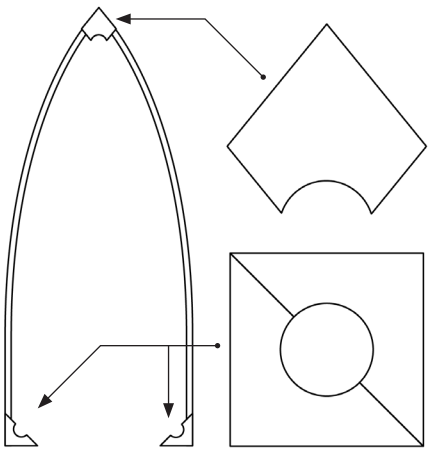
Front elevation

Side elevation

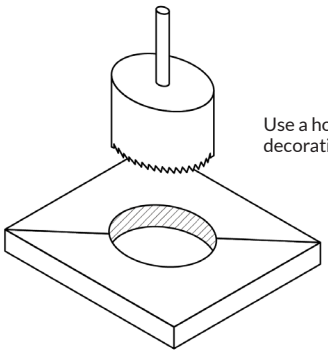
Isometric drawing



Detail drawings



Decoration options



Use a holesaw to make decorative corner fixtures.

BCITO
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building people