

Rules, tapes and squares

This worksheet is about the tools
you use to measure and mark pieces of timber.

What you will learn

When you have finished this worksheet, you should be able to:

- Identify and use marking tools
- Identify and use measuring tools



Things you need before you start

Materials

You will need some pieces of timber to work with.

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Tools or equipment

A ruler, a measuring tape, a try or combination square.

A pencil, pen or a marking knife.

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Introduction

You need to be able to measure and mark timber accurately so that the finished pieces are the correct shape and size and fit properly.

Good cutting and joining of timber is no use if the measuring and marking are in the wrong place !

Careful marking and cutting can also make good use of the timber and save waste.

There is an old saying of carpenters ;

“measure twice — and cut once”. It is good advice.

This worksheet tells you how to use simple tools for measuring and marking.

First, let's look at measuring tools.

What is a measuring tool?

A measuring tool is used to find out

- how long, how short or how wide something is, or
- what angle two pieces of timber meet at.

Length

Simple tools to measure length are rulers and tape measures.

They are usually divided in metres, centimetres(cm) and millimetres(mm)

Some places still use the old system of feet and inches.

For long measurements, the easiest tools to use are:

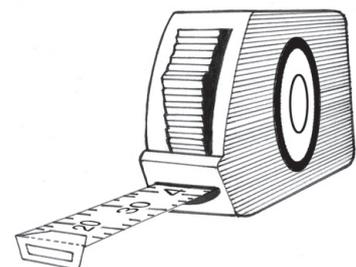
A measuring tape

This is a small tool that can stretch out and spring back to its first position.

It is easy to carry about and it is flexible, so it can bend around things.

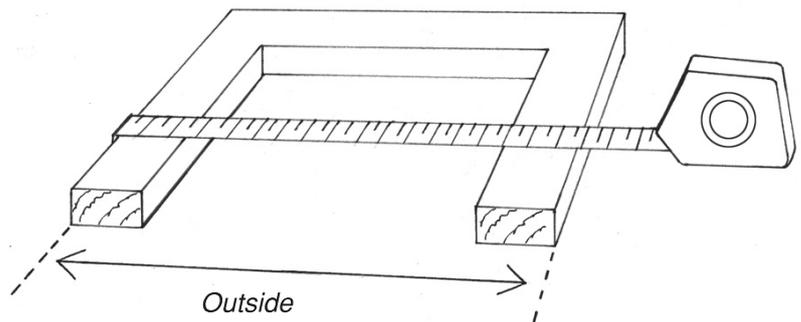
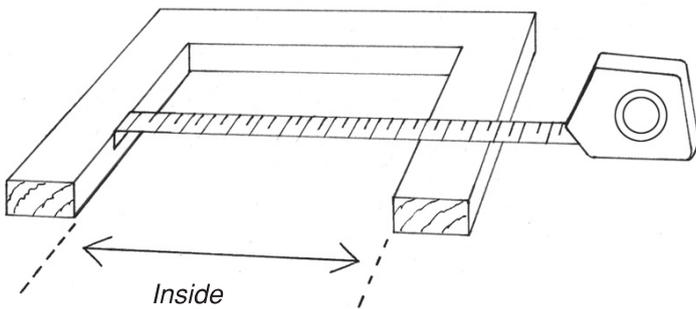
It can be locked into position, which is helpful when taking measurements.

Useful lengths for construction work are 3 metre(m) tapes and 5m tapes.



Most measuring tapes have a tip on the end that can move.

This allows you to make accurate inside and outside measurements.

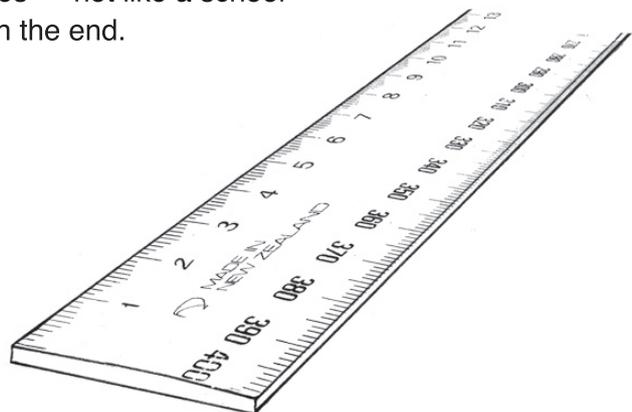


A ruler

This is a long and thin piece of timber or metal. It is solid (doesn't bend) so it is good to use when measuring in straight lines. In some places it is known as a 'rule'.

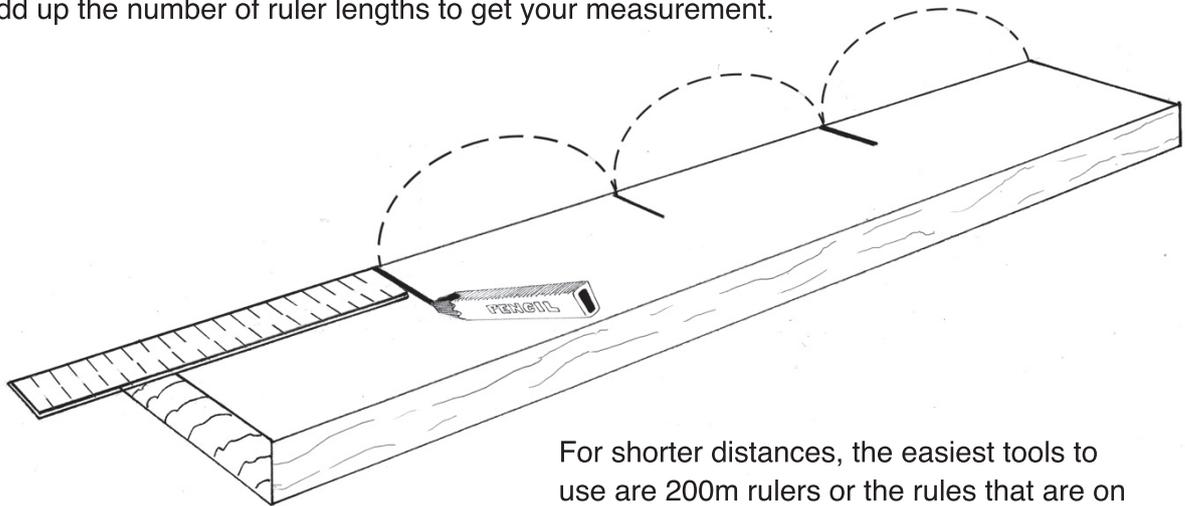
For construction work a useful length is 500mm to 1000mm (1 metre)

The markings go right to the end of these rules — not like a school or drawing ruler where there is an extra bit on the end.



To measure a distance longer than the ruler, you need to:

- measure and mark on the timber at the length of the rule
- slide the end of the rule along to your mark, and mark again
- keep doing this until you get to the distance you need
- add up the number of ruler lengths to get your measurement.



For shorter distances, the easiest tools to use are 200m rulers or the rules that are on the sides of squares.

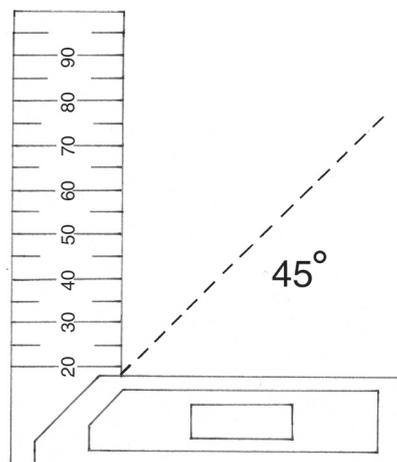
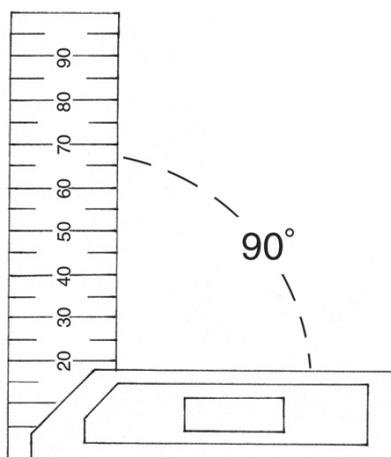
Angles

Another type of measurement you have to make is to measure the angle at which timber is joined together. These angles are measured in degrees($^{\circ}$).

Simple tools for checking and marking angles are called “squares”.

The most common angle used in construction work with timber is the 90 degree($^{\circ}$). This angle is also known as the ‘right-angle’ or ‘square’.

You may also find the 45 $^{\circ}$ angle used for some joints.

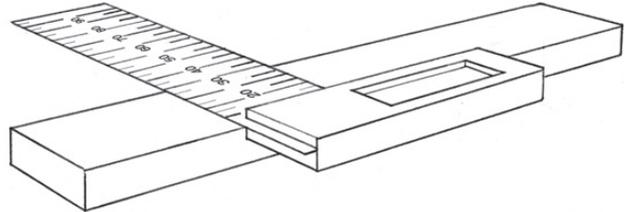


Try Square

This tool is in the shape of the letter L (which is at a 90° angle). It has a steel blade with measurements on it and a wooden or metal handle.

It is used to

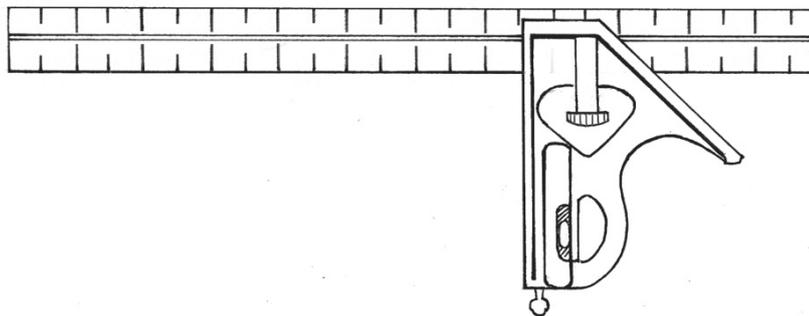
- check that something is “square” — to make sure that a joint is at an angle of 90° (or in the shape of an L).
- mark timber for cutting “square” across at 90°



To use the try square, hold the handle tight against the side of the timber. The blade will be at 90° across the timber.

Combination square

This measuring tool can do many jobs because the handle can be moved up and down the blade, and even taken off.



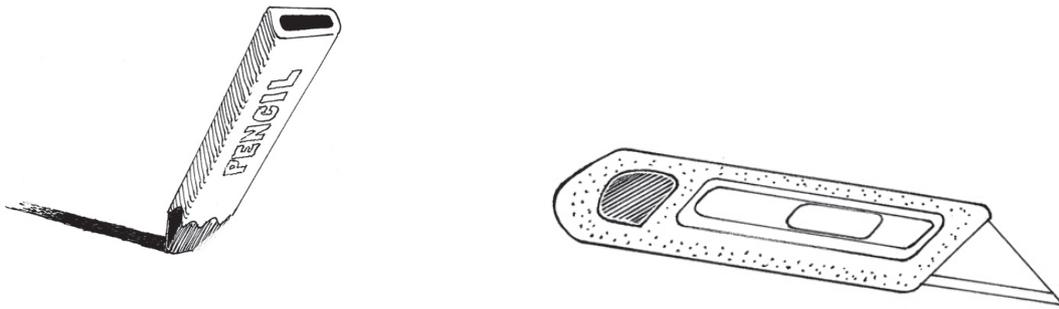
The shapes in the handle allow you to measure 90° angles **and** 45° angles

Now, let's look at marking tools.

Marking

A marking tool is anything that you can use to mark wood with a thin line that you can see easily.

For example, a pencil or a sharp knife are good tools.

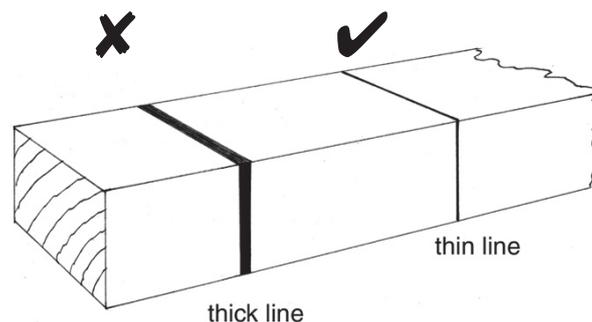


Keep the pencil sharp.

The marks need to be clear — and **thin**.

If you make a **thick** line it is very difficult to be accurate.

How will you know where to cut ?



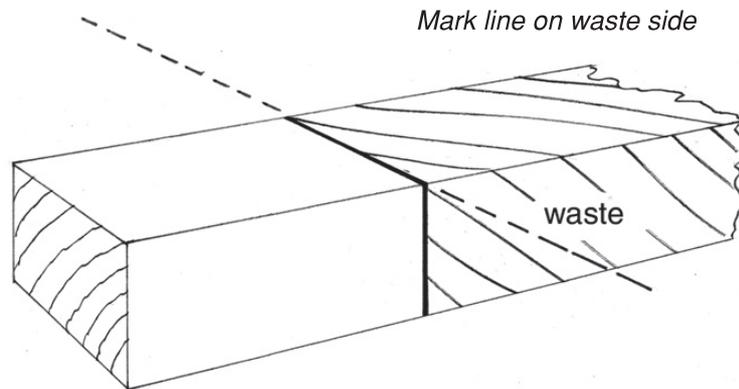
You must mark exactly where you want a piece of timber to be cut or drilled.

Mark accurately to your measurement.

Then measure again to check your mark is in the right place — it is so easy to get it wrong !

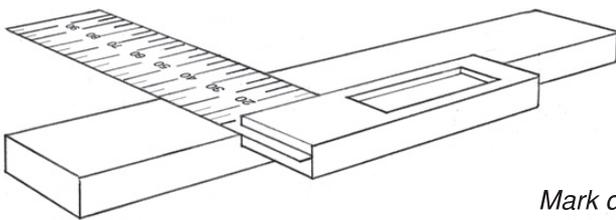
When you mark for cutting:

- Draw your mark just on the 'waste' side of your measurement
- When you cut along the line, it will leave the size you want
- Make lines or scratches on the scrap or waste side of your marks – That way you will be sure which is the piece you want to use.

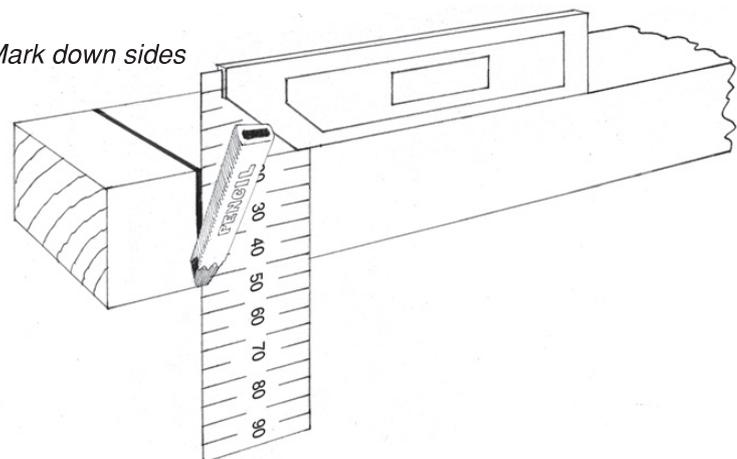


When you mark a piece of timber for sawing to length, it is good to mark across the top using a square, and then to mark down both sides of the timber with the square as well. This will help you with sawing the timber accurately later.

Mark across with the square



Mark down sides



Activity

- Measure the length and width of the room you are in. What measure will you use ?
- Measure and mark a piece of timber for sawing square to a length of 800mm.
- Mark a piece of timber to be sawn at a 45 angle and 750mm on its longest edge.
- Measure the width of a doorway (or window frame).
 - Then measure and mark a piece of timber to fit exactly inside the top of the frame.

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Square, level and plumb

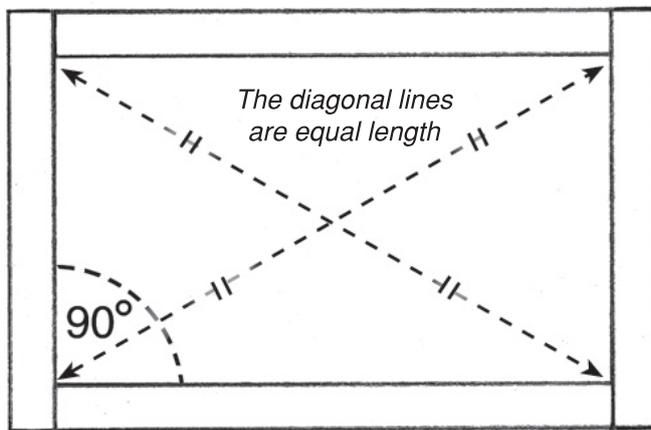
These are all important ideas when you make timber frames or buildings.

They are basic rules about the shape and construction of buildings.

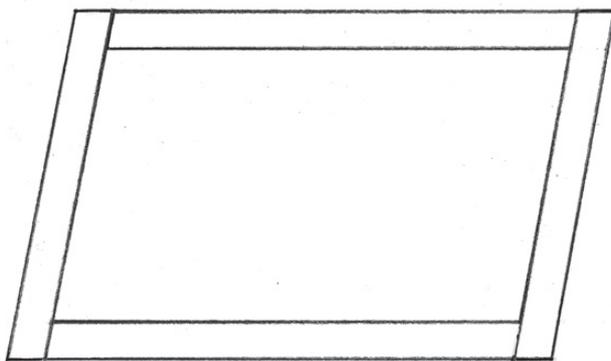
Square

Means joining pieces of timber together at exactly 90° degrees (a 'right-angle' or 'square').

A frame should be this shape



Not this shape

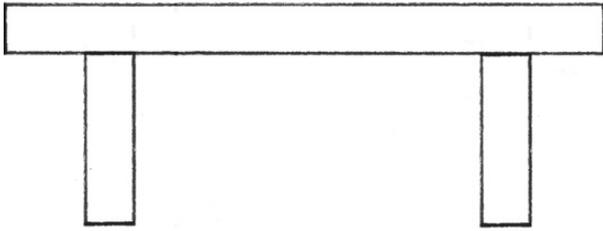


Checks for square

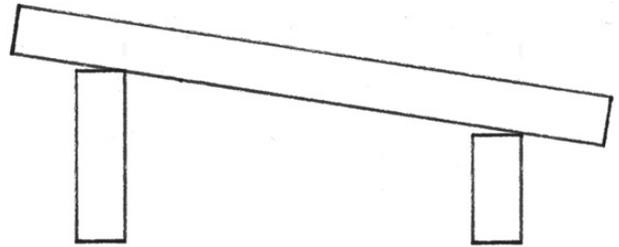
- use a try square or set square tool to measure that all angles are at 90°
- measure the diagonal distances across the frame — from corner across to corner. They should be exactly the same length if the frame is 'square'.

Level

This means that a surface is at the same height at both ends and at both sides.

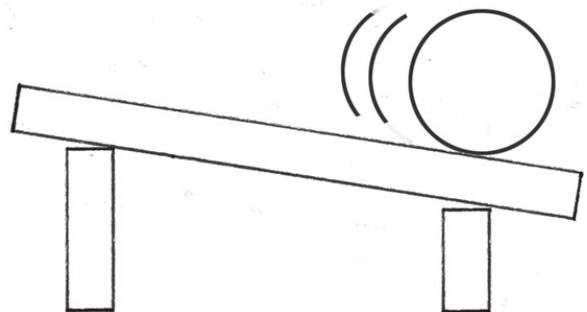
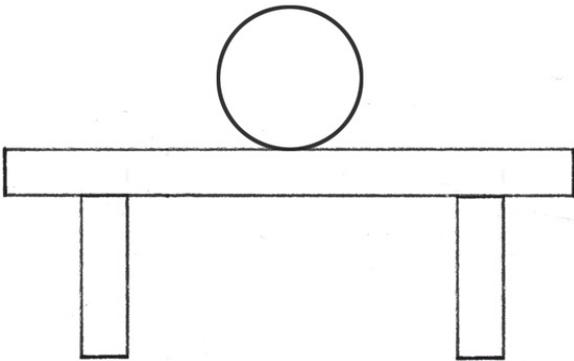


This



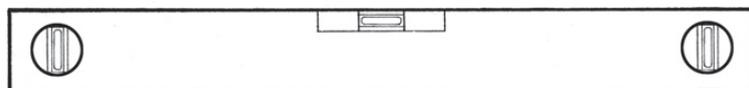
Not this

When a surface is level, a ball will stay still on the surface — not roll in any direction.



Check for level

A “spirit level” uses an air bubble inside a glass tube to show when a surface is level.

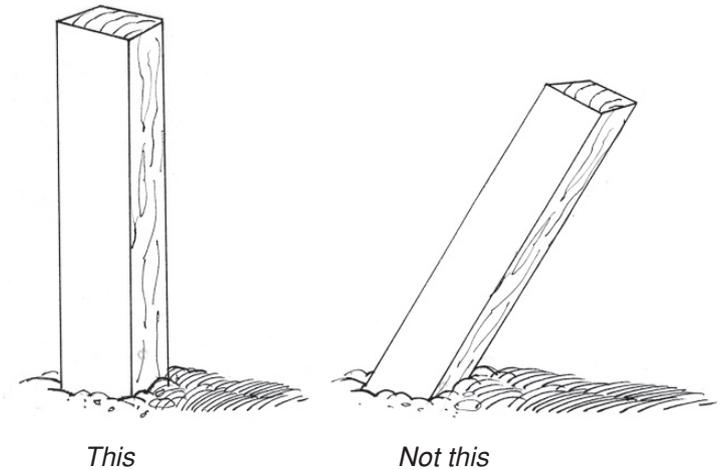


To use a spirit level, put it on the top surface of the timber. When the air bubble is in the middle of the tube, the surface is level.

Plumb

“Plumb” means that a piece of timber is exactly upright in all directions

It does not lean at all.



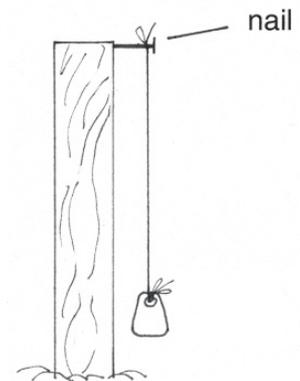
Try this

Tie a weight to a piece of string and hang it from a point — it will hang ‘plumb’, or exactly vertical in all directions, once it stops swinging.

You have made a simple “plumb-bob” or “plumb-line” that you can use to check the plumb of an upright timber.

Hang the plumb-bob from the top corner of the timber and see how the line of the timber matches the string.

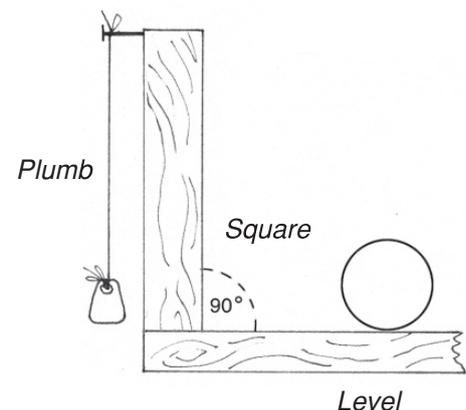
If the timber does not match the line, move the timber until the timber follows the plumb-line exactly.



Square, level and plumb

If you think about these — they all fit together

An upright timber that is “**plumb**” — will be at 90° degrees (or “**square**”) — to a timber that is exactly ‘**level**’.



Safety tips

Never use a tape or ruler to hit timber or nails. If you do, you might damage the ruler and it will no longer be accurate.