



BCATS

BUILDING, CONSTRUCTION
AND ALLIED TRADES SKILLS

Tools

Learning resource



**This resource provides guidance
for the following BCATS skill standards:**

Level 1 - 40542

Use hand tools for a BCATS project or related tasks

Level 1 - 40543

Use basic power tools for a BCATS project or related tasks

Level 2 - 40553

Use power tools for a BCATS project

Level 3 - 40571

Manage the use of tools, equipment, and machinery for a BCATS project

BCITO
He Hunga Hanga Mātou
building people

Contents

> Introduction	4
> Safety with tools	7
> Types of tools	13
Measuring, marking, and setting out tools	14
Cutting and shaping tools	17
Drilling tools	23
Driving tools	24
Pliers	29
Clamps	30
Finishing tools	32
Painting tools	34
Vacuum cleaners	35

Building and Construction Industry Training Organisation (BCITO)

Level 5, 234 Wakefield Street
PO Box 2615
Wellington 6140

0800 422 486

www.bcito.org.nz

© 2025 BCITO

All rights reserved.

No part of this work may be reproduced, adapted, modified, copied, or transmitted in any form or by any means, including by way of example only, written, graphic, electronic, mechanical, reprographic, photocopying, recording, taping, or information retrieval systems, without the written permission of the publisher.

Introduction

Working with tools is both enjoyable and rewarding as you turn raw materials into something useful and lasting.

There are a lot of different tools available and this resource would be huge if we included every one of them. We have included the tools you would most often use while working on your Building, Construction, and Allied Trades Skills (BCATS) projects.

You'll learn:

- what different tools there are, and what they are used for
- how to look after the tools you use
- which PPE you should use with different tools.

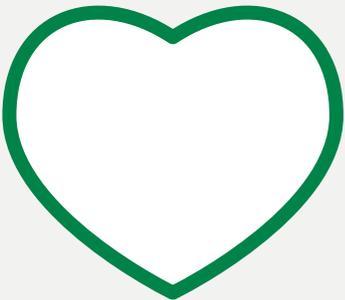


Depending on your school's policy, you might not be able to use some of the portable power tools included in this resource, such as a circular saw. If this is the case, it is a good idea to take the opportunity to learn about it and carefully watch how your teacher/tutor uses it.

Basic tool use



- Always choose the right tool for the job.



- Look after the tools, equipment, and machinery you use and remember to keep them clean.



- Always wear suitable PPE when using tools and make sure other safety controls are in place.

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

Do you know which tools you will use during your project?



Have you checked the tools are safe and ready to be used?



Have you been trained to use all the tools you need to work with?



Safety with tools

Apart from using personal protective equipment (PPE), you can keep safe by selecting and using tools properly.

- Keep them well maintained and check them before use.
- Do not use any damaged tools (and report any damage you see).
- Never run your fingers across a blade to check how sharp it is.

You must receive training in the use and maintenance of tools before you handle them.

You have a responsibility to ask your teacher for guidance if you're not sure of how to use a tool properly.

Setting up

It is useful to prepare all the tools you'll need before you start working on a task. Store them tidily to one side of the job.

Before using tools

- Choose the right tool for the job.
- Choose and wear appropriate PPE for the tool you will be using.
- Make sure tools with blades are sharp.
- Secure the project you will be working on so it doesn't move.
- Avoid carrying too many tools at once.

While using tools

- Use the tools only as you have been instructed.
- Carry sharp tools close to the body and pointed downwards.
- Pass tools handle-first to another person (without holding the sharp edge).

After using tools

- Roll up power cables and remove any batteries and put them on to charge.
- Clean off any dust or dirt.
- Occasionally rub metal components down with light machine oil to prevent rust.
- Put tools away on a rack or in their storage case as soon as you've finished using them to reduce clutter.

Hazards and controls

Every tool has its own hazard, and every hazard can be controlled or have the risk minimised. Below are some common examples.

Hazard	Potential harm	Control(s)
Dropping a tool	A foot injury if the tool is dropped onto someone's foot	Wear suitable footwear
Sharp blades	A cut finger or hand if the tool slips	Use the tools as trained Keep body parts out of the path of the blade
Loud noise	Permanent hearing damage	Wear suitable ear protection
Blade breaking while using the tool	Eye damage from flying splinters	Wear safety glasses
Materials not secured down before work starts	Injury from material dropping or slipping	Clamp or secure materials before starting work

Safety stickers

You will often see stickers on tools to warn people about hazards. The stickers are usually coloured to show different meanings.

	Meaning	Examples
YELLOW	Risk of danger	
BLUE	PPE guidance	

Guards

Power tools will often have a guard or an in-built safety measure. Guards are essential for protecting you against contact with moving parts, flying debris, kickback, and noise.

- Never remove guards during use.
- Regularly inspect for damage, secure attachment, and smooth action.
- Clean and oil moving parts to keep spring-loaded guards working properly.



Eye protection

Flying debris, sawdust, and chips can cause severe eye injuries or permanent blindness. Safety glasses and safety goggles are available in clear and a range of colours. All New Zealand certified safety eyewear is tested and approved for medium impact protection.

Recommended PPE

Safety glasses - are lightweight and ideal for general use.

Goggles - provide better side protection and seal around the eyes which is better for dust-heavy environments.

Face shields - can be used in addition to safety glasses for maximum protection when operating high-risk tools like routers or table saws.



Ear protection

Power tools are very noisy and can cause permanent hearing loss over time.

Recommended PPE

Earplugs - hugely reduce noise when worn properly. They are relatively cheap and effective for short work sessions.

Earmuffs - offer more comfort and better noise reduction for prolonged use.



Dust masks and respirators

Inhaling fine wood dust can lead to respiratory issues, allergies, or even chronic lung disease.

Recommended PPE

Dust masks (N95) - are good for basic protection against large particles during sanding or cutting.

Respirators (half-mask with filters) - P100 filters are needed for finer particles or fumes from finishes and chemicals.



Sawdust

Using tools, especially power tools, in the workshop will always produce some sawdust. It might seem harmless, but it can create health and safety risks if not handled properly. Here's what you need to know about sawdust.

1. Respiratory dangers

Fine dust particles can irritate the nose, throat, and lungs. Long-term inhalation can lead to serious lung infections.

Certain hardwood dusts, like beech or oak, are classified as carcinogenic, increasing the risk of nasal and sinus cancers.

2. Allergic reactions

Treated timber and some wood varieties, like cedar or teak, contain chemicals that can cause:

- > skin rashes
- > eye irritation
- > breathing issues.

3. Fire hazard

Sawdust is highly flammable. Dust that builds up near heat sources or sparks can cause fires or explosions in workplaces.

4. Environmental and cleanliness issues

Dust can settle on tools and clog them up. On the floor it creates slippery surfaces, increasing the risk of accidents.

How to stay safe

Wear PPE: Dust mask or respirator, safety goggles.

Use dust collection systems: Attach dust bags, or vacuum extractors to tools.

Ventilation: Keep your workspace well-ventilated.

Regular cleaning: Sweep or vacuum often.

Avoid compressed air: Blowing dust spreads it into the air.

Power sources

The portable power tools we cover in this resource are powered by rechargeable batteries or plugging into a standard 240 volt mains power outlet.



Leads and extension cords

When using plug-in tools outdoors or in damp conditions, always use an appropriate electrical safety device, such as a residual current device (RCD) or an isolating transformer.

Extension cords are available in light or heavy duty.

- Light-duty cords are useful for small drills and lights. Using a light-duty lead with a larger tool will result in a loss of power and overheating of the lead which could cause a short circuit or fire.
- Heavy-duty cords are used for larger tools that need a greater flow of electricity. Also use a heavy-duty lead when a long extension cord is needed.

Special care should be taken to prevent damage to an extension cord. Exposed wiring is extremely dangerous.

- Never carry tools around by their lead.
- Always uncoil extension cords to prevent heat build-up.
- If you need to join cords together, tie them in a simple loose knot to stop them pulling apart. Make sure that the joint is supported off the ground.

Make sure the cord is plugged into the socket properly and positioned so it will not get wet, be tripped over, or in the path of a blade.

Cordless tools

Most traditional power tools, such as drills, saws, and sanders, are available in cordless models. These are more convenient to use but they can only be operated for a limited time before the batteries must be recharged.

- Heavy-duty work requires more frequent recharging than light-duty work.
- As soon as you detect a loss in power, remove the battery for recharging.
- Do not overwork the cordless tool.

Follow manufacturer's instructions for correct care and charging, so you get the longest possible life out of a battery. A good rule to follow is to charge the battery after use. This keeps the tool ready for anybody to use without having to wait. Having a fully charged spare battery is useful where power tools are used often.

Types of tools

Tools are generally grouped according to their purpose, such as cutting, measuring, or fastening. You can also find tools organised by trade, for example painting, roofing, or plumbing.

The construction industry includes many different trades, each with its own specialist tools. If your project requires any of these, your teacher will introduce them to you.



Measuring, marking, and setting out tools

Steel ruler

Used for accurate drawing, measuring, and marking out materials. Also useful when used with a utility knife to cut straight lines.

Comes in lots of different sizes, including 150mm, 300mm, 600mm and 1m.

Tips for use

- Use with a sharp pencil for accuracy.

Care and maintenance

- Protect edges and ends from damage.

Folding ruler

Used to measure straight lines and angles.

It folds down which makes it easy to carry around.

Comes in 1m or 2m lengths with centimetre (cm) and millimetre (mm) markings.

Tips for use

- It stays rigid while measuring.

Care and maintenance

- Easily broken, so be careful not to drop it or knock it against things.

Tape measure

Flexible strip of steel divided into mm, cm, and metres.

Tips for use

- When measuring, hold the tape tight and support it to prevent sagging.
- Rewind it after use.

Care and maintenance

- Keep the tape dry and free from grit that can scratch the enamel surface. This can make it hard to read and rewind.
- Avoid retracting the tape hard onto the stop end.

Laser measure

Electronic device that sends out a laser beam to accurately measure distance.

Comes in a variety of range limits, from 12m to 100m.

Tips for use

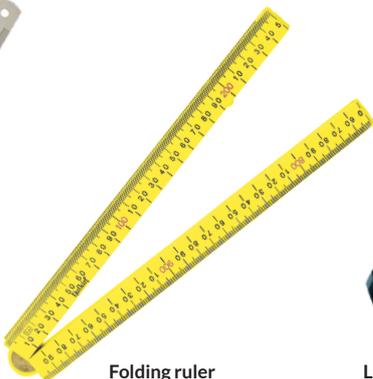
- Mirrors and shiny metals can cause the laser beam to reflect at odd angles.
- Best used outside.

Care and maintenance

- Check for accuracy before using and reset if necessary. To do this, take a reading over a known distance (e.g. between two existing walls).



Steel ruler



Folding ruler



Laser measure



Tape measure

Try square

Used to mark 90-degree angles and test if edges and corners are square.

Tips for use

- Comes in different sizes, but the blade is always fixed at 90 degrees to the stock.

Care and maintenance

- Make sure edges are not knocked or damaged.
 - Regularly check that the square is still square.
-

Sliding bevel

For marking acute angles and testing bevel cuts and mitres.

Also used to transfer angles, such as setting up a compound saw.

Tips for use

- Blade is held in position on the stock by a thumbscrew and wingnut.
- Can be adjusted to any angle.

Care and maintenance

- Lightly oil the thread at the thumbscrew to keep moving parts operating.
 - Reset the blade after use.
-

Combination square

Used to mark 45-degree and 90-degree angles.

Helpful as a gauge in awkward places and to measure the depths of rebates.

Tips for use

- Stock can be adjusted and fixed by a thumb screw in any position along the blade.

Care and maintenance

- Lightly oil the thread screw so the stock moves easily on the blade.
-

Marking gauge

Used to mark timber for joints.

Comes with a variety of pins and blades to score or cut.

Tips for use

- Fence can be adjusted and fixed with a thumb screw in any position along the beam.
- Use the cutting blade for marking across grain or on delicate veneer.

Care and maintenance

- Keep the spurs and blades sharp.
- Release tension on the thumb screw when not in use.



Try square

Sliding bevel

Combination square

Marking gauges

String line

Used to set out straight lines for foundations and wall frames.

Has a nylon line wound on a timber or plastic dowel.

Common lengths are 50m and 100m.

Tips for use

- Must be pulled tight so it lines up accurately.

Care and maintenance

- Keep the string free of knots.
- Rewind the line when not in use.
- Regular use can cause the first section of the line to wear. Cut it off if necessary.

Chalk line

Used to mark out straight lines over long distances like walls.

Has a nylon line wound up in a casing filled with powdered chalk.

Commonly come in 30m lengths but sometimes longer.

Tips for use

- Must be pulled tight to keep the line straight then snapped against a surface to transfer the chalk to the material.

Care and maintenance

- Keep the string free of knots.
- Rewind the line when not in use.
- Will need occasional refills of chalk.

Spirit level

Used to check surfaces are level (when horizontal) or plumb (when vertical).

Made of aluminium, wood, or high density plastic and come in a range of lengths.

Tips for use

- Level is shown when the bubble is between the lines in the centre of the liquid vial.
- Some levels have a digital display that is very accurate.

Care and maintenance

- Avoid dropping or knocking it.
- Check for accuracy before use.



String line



Chalk line



Spirit level

Cutting and shaping tools

Utility knife

For cutting tasks on lightweight materials.

Has a retractable blade that is easy to replace.

Tips for use

- Blade is held in position on the stock by a screw or spring catch.
- The length of blade can be adjusted for different tasks.

Care and maintenance

- Retract the blade after using it.
- The blade can be snapped off when blunt.
- Blades will need replacing.

Chisel

There are many different chisels, each for a different purpose, such as shaping and trimming timber or fine, delicate cutting.

They come in widths from 6 – 50mm. Bevelled-edge and (square-edged) firmer chisels are the most common. Others include:

- registered firmer
- butt
- paring
- mortise
- carving.

A set of standard-sized bevel-edge chisels is suitable for most construction work.

Tips for use

- Secure the workpiece down.
- Position both hands behind the blade.
- It is important that only a wood mallet is used on traditional wooden-handled chisels.
- Modern chisels with plastic handles can cope with being struck many times with a steel hammer.

Care and maintenance

- Do not use too much force when driving with a hammer or using as a lever. The blade could bend or break.
- Store in a rack, roll-up pouch, or carrying case.



IMPORTANT

Knives and chisels can cause serious injuries if you don't use them correctly. Only use them for their designed purpose in your project.



Utility knife



Bevel edge chisel set



Firmer chisel



Mortise chisel

Handsaws

Used for general cutting of timber or sometimes other materials. They come in a range of sizes and styles to suit different jobs.

Saw blades will be measured by length but also by the number of teeth on the blade. The teeth are counted per inch of blade (TPI).

The three main groups are:

- general purpose crosscut and panel saws
- back saws, such as tenon or dovetail saws
- curve cutting saws, such as coping saws.

General purpose handsaw

An all round saw for cutting timber.

Blade length (mm): Around 500 – 600

Teeth per inch: 7 – 10



Panel saw

A fine tooth saw for fine cutting timber or thin sheet materials like plywood.

Blade length (mm): Around 300 – 500

Teeth per inch: 11 – 16



Tenon saw

Has a thin and fine toothed blade with a brass or steel ridge on the top edge to strengthen and stiffen the blade.

Blade length (mm): Around 300 – 400

Teeth per inch: 12 – 15



Coping saw

Has a fine blade held in tension by an adjustable steel frame. Two adjustable screws rotate the blade position to allow it to cut curves.

Blade length (mm): Around 160

Teeth per inch: 15 – 17



Hacksaw

Has a detachable blade held in a heavy-duty metal frame. The blade is held tight to stop it twisting or bending. Used to cut metal or plastic.

Blade length (mm): Around 200 – 300

Teeth per inch: 20 – 30



Tips for use

- Grip the handle with a pistol grip (index finger pointing forwards on the handle) to steady and control the saw.
- Stand over the blade so that both sides of the blade can be seen at the same time.
- Start sawing on the waste side of the line.

Care and maintenance

- Lightly oil the blade to protect from rust.
- When not in use, protect the teeth with a blade guard or place the saw in a rack or a saw bag.
- Change the blades of coping saws or hacksaws if they are blunt.

Circular saw

A powered saw with a round blade designed to make straight cuts through timber, or other materials. It is commonly used for cutting boards and sheet materials quickly and accurately.

A range of different saw blades can be used for different materials.

It features controls to adjust the depth and angle of the cut.

Tips for use

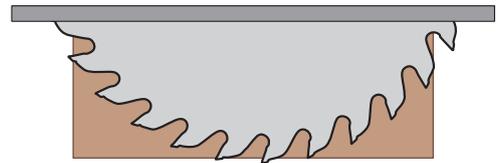
- Secure the workpiece before cutting.
- Make sure the guard is working properly.
- Always wear eye and ear protection.
- Keep hands out of the path of the blade.

Care and maintenance

- Clean off the sawdust that builds up around the tool.
- Lightly oil the blade or mechanism
- Blades will need sharpening or replacing when they get blunt.



To make a smoother cut, set the depth so that only the bottom edge of the blade is exposed on the other side of the material.



Biscuit joiner

Also called a plate joiner, this tool is used when joining two pieces of timber edge-to-edge. It cuts a rounded slot into each piece, where a small oval-shaped wooden “biscuit” is inserted. It is typically used for tabletops and frames.

The tool has a small circular blade that cuts the slot and adjustable guides to set the position and depth of the cut.

The three biscuit sizes available are #0, #10 and #20.

Tips for use

- Wait for the blade to get up to speed before making the plunge cut.
- Use the largest biscuit size that will fit into your piece of work.

Care and maintenance

- Clean the tool regularly to prevent clogging.
- Blades will need sharpening or replacing when they get blunt.



Biscuit joiner



Circular saw

Jigsaw

A powered saw designed for cutting curves and intricate shapes in wood, metal, plastic, and other materials.

It features a narrow, straight blade that moves up and down. Some models have an adjustable base plate to rotate the blade up to 45° to make bevel cuts.

Tips for use

- Always wear eye and ear protection.
- Keep hands away from the blade path.
- Secure material firmly before cutting.
- Wait for the blade to stop before lifting it.

Care and maintenance

- Clean off the sawdust that builds up around the tool.
- Blades will need replacing when they get blunt.

Rasps and files

Used on materials such as wood and metal to get precise finishes and refine rough surfaces or sharp edges. Files can also be used to sharpen the edges of cutting tools, such as knives and chisels.

Rasps and files come in a range of surfaces and profiles, from a very coarse rasp to a fine grade file.

Tips for use

- Rasps should only be used on wood.
- Use even strokes in one direction.
- Apply light pressure to let the teeth do the work and avoid damaging the workpiece.
- Work along the grain of timber.

Care and maintenance

- Clean the tool regularly to prevent clogging.



Jigsaw



Rasps

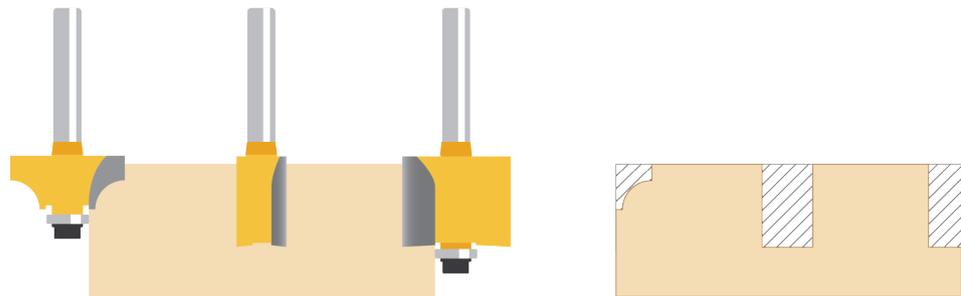
Files

Router

A high-speed rotary tool designed to cut grooves, shape edges, and create decorative profiles in wood. It's used for cabinetry, furniture making, and detailed joinery.

Sliding rails allow the blade to be pushed down to a set depth. A spring pushes the blade back up.

Router bits are the cutting tools attached to the router. They come in a range of shapes for different purposes.



Tips for use

- Secure material firmly before cutting.
- Always wear eye and ear protection.
- Check the direction of travel (indicated on most routers).
- Keep hands away from the blade path.
- Start and stop the router away from the material.
- For deep cuts, increase depth gradually.

Care and maintenance

- Clean off the sawdust that builds up on the base and around the tool.
- Blades will need replacing when they get blunt.



Router

Palm router

Planes

Used to smooth, straighten and reduce the width of timber. Planes have a sharp blade that can extend to set the depth of the cut.

Choosing the right plane for the job is important.

- **Jack planes** - have a longer body and are used to plane longer lengths of timber and create a straight, flat surface.
- **Smoothing planes** - are mainly for smoothing and finishing work. They can also be used for cleaning up end grain, chamfering, and rounding edges. Because of their short length, they should not be used to plane long lengths of timber.
- **Rebate planes** - also known as an open-side plane, are used to cut rebates such as shoulders or steps.
- **Spokeshaves** - are used to smooth surfaces on curves. They are like a plane but because the sole is so short, it follows the curve of the material.
- **Power planers** - can do most jobs that a hand plane can do, but faster and with a lot less effort. They have multiple blades mounted on a spindle. The front shoe of the planer can be adjusted up and down to change the depth of the cut.

Tips for use

- Set the blade depth correctly.
- Make many small passes to make deeper cuts instead of trying to cut out in one pass.
- Retract the blade from the cutting position when not in use.

Care and maintenance

- Do not knock or drop them.
- Always store a plane on its side to protect the cutting edge of the blade.
- Blades will need sharpening or replacing when they get blunt.



Jack plane



Smoothing plane



Rebate plane



Spokeshave



Power planer

Drilling tools

These tools are used for making holes in wood, metal, or concrete for screws, nails, and hardware.

Drills

There are a range of drills for different levels of work. A hand crank drill is still used but has been mostly replaced by general purpose cordless drills. For jobs that need more power, like drilling into concrete, a heavy duty hammer drill is used.

Tips for use

- Different drill bits are available for timber, metal, and masonry. Using the wrong bit for the material will cause the bit to quickly go blunt.

Care and maintenance

- Use the correct drill cutting speed to suit the drill bit and material being drilled.
- Remove the bit from the drill after finishing the job.

Drill bits are the cutting tools attached to drills. They come in various shapes and materials for different applications.

Twist drill bit

Most common type.

- Used for wood, metal, and plastic.



Brad point bit

Designed for wood.

- Has a sharp point for accurate positioning.



Masonry bit

For concrete, brick, and stone.



Spade bit

For large holes in wood.



Forstner bit

Creates clean, flat-bottom holes in wood.



Step bit

For drilling holes of different sizes in thin metal or plastic.



Hand-crank drill



Electric drill



Hammer drill



Right angle drill

Driving tools

Hammers

These are some of the most common and essential hand tools, used for driving nails, shaping materials, and in dismantling tasks.

They typically consist of a hardened steel head, designed for striking, mounted on a handle. They come in a range of sizes for different jobs.

Claw hammer

Most common type for carpentry.

- Round flat face used for driving nails.
- Claw end for pulling them out.



Warrington hammer

Also called a joiner's hammer, this is used most often for fine bench work.

- Round face used for finishing nails.
- Chisel-like edge used for starting small nails and pins.



Ball-peen hammer

Also called an engineer's hammer, this is commonly used in metalwork.

- Flat face for striking punches and general hammering.
- Ball (rounded) peen for shaping metal, such as rounding off edges of rivets.



Sledgehammer

Heavy-duty hammer used for driving in posts and for demolition.

- Flat striking face for maximum impact.
- Long handle for powerful strikes.



Tips for use

- > Always wear safety glasses when striking.
- > Check the hammer head is secure before using it.
- > Use the right hammer for the job to avoid damage or injury.

Care and maintenance

- > Clean the hammer face by rubbing it on a piece of fine sandpaper.
- > Never strike the face of one hammer against another.

Mallet

A type of hammer with a large, typically softer head compared to steel hammers. It's designed to deliver controlled blows without damaging the workpiece. Mallets are commonly used in fine woodworking, carpentry, leatherwork, and other crafts.

The three main groups are:

Wood: Traditional choice for woodworking.

- Driving chisels without damaging their handles.
- Assembling joints (e.g., mortise and tenon).

Rubber: For assembling furniture or striking delicate surfaces.

- Tapping pieces together without leaving marks.

Plastic or nylon: Used in metalwork or for non-marring strikes.

- Adjusting parts without scratching surfaces.

Tips for use

- Inspect the head and handle for cracks before use.
- Choose the right mallet for the material (wood, rubber, plastic).

Care and maintenance

- Avoid striking hardened steel tools with plastic mallets as they can chip.



Screwdrivers

Used for driving in or taking out screws.

They are available in different lengths with a range of tips for different types of screws. Powered screwdrivers are used for driving longer screws and for heavy duty work.

It is important to choose the right screwdriver to suit the screw head size.

The main types are:

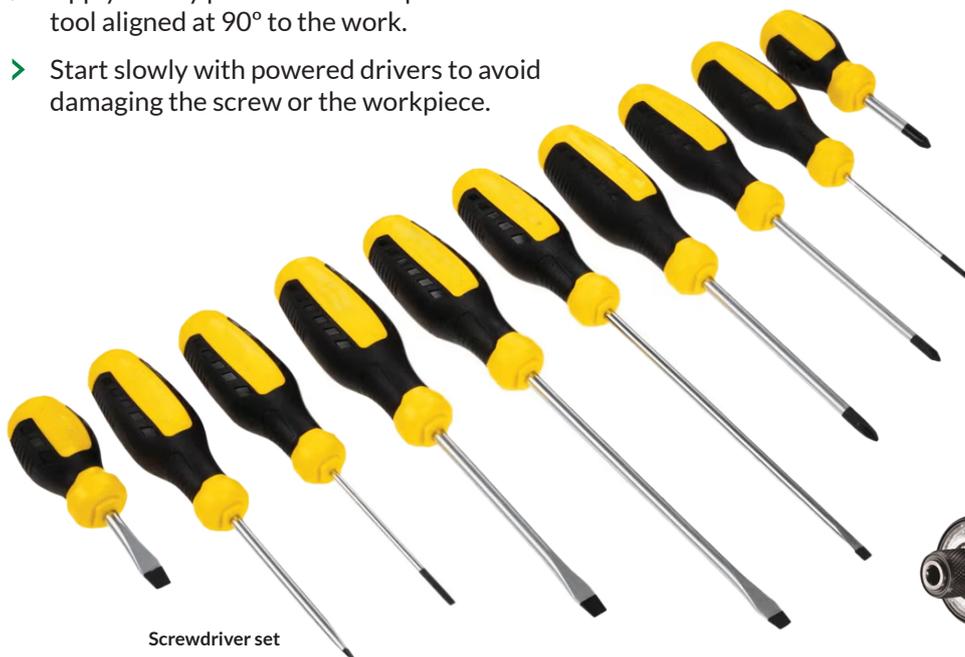


Tips for use

- Match the screwdriver tip to the screw head to avoid stripping.
- Use the correct size for better torque and safety.
- Apply steady pressure and keep the tool aligned at 90° to the work.
- Start slowly with powered drivers to avoid damaging the screw or the workpiece.

Care and maintenance

- Do not use screwdrivers as levers, as they could bend.
- Throw away drivers and bits with stripped tips.



Screwdriver set



Electric screwdriver



Impact driver

Nail punch

A nail punch (also called a nail set) is a small hand tool used to drive nail heads below the surface of wood without damaging the surrounding area.

They come with different tip sizes. Choose the best tip for the size of nail you are working with.

Note: Only punch jolt head nails.



Tips for use

- Wear eye protection when striking.
- Grip the punch firmly, or it could fly off when struck.
- Tap the punch with a hammer until the nail is slightly below the surface.

Care and maintenance

- Inspect the nail punch for damage and file any rough edges in the head.

Wrenches

Used to grip and turn nuts, bolts, and other fasteners.

They provide leverage to apply torque for tightening or loosening.

Wrenches are typically made from strong forged steel and come in a range of sizes.

Spanner

Made from strong forged steel and comes in a range of sizes.



Adjustable spanner

- Movable jaw for different sizes.
- Versatile but less precise.



Socket wrench

Uses a ratchet handle with interchangeable snap-on sockets.



Allen key

L-shaped tool for hex head screws.

- Common in furniture assembly.



Tips for use

- Always match the wrench size to the fastener, to avoid stripping.
- Pull, don't push, to reduce injury risk.

Care and maintenance

- Occasionally clean with machine oil to keep free of rust.

Nail gun

This power tool is designed to drive nails into wood, masonry, or other materials quickly and efficiently.

Nail guns can be powered by compressed air through a hose (pneumatic), or cordless models which use batteries and gas to create the driving force.

A battery-powered nail gun has a quick startup time but doesn't have as much driving power as a pneumatic nail gun. It is also heavier than other options, so is best used for smaller jobs.

There are a few different types of nail gun:

- **Framing nailers** - are great for large projects, such as building decks, sheds, and houses.
- **Finish nailers** - are lighter than framing nailers and work well for assembling cabinetry and installing flooring and trims. Uses smaller nails for a clean finish.
- **Brad nailers** - are ideal for delicate work like furniture or small trim.

Nail guns use strips or coils of collated nails. Collated nails come in a range of sizes for different jobs. (90mm framing nails down to 32mm brad nails.)

Tips for use

- Use the right type of nails for the job.
- Wear safety glasses when using a nailer.
- Keep hands away from the firing area.
- Never point a nailer at yourself or others.
- Make sure you have a clear line of sight before firing.

Care and maintenance

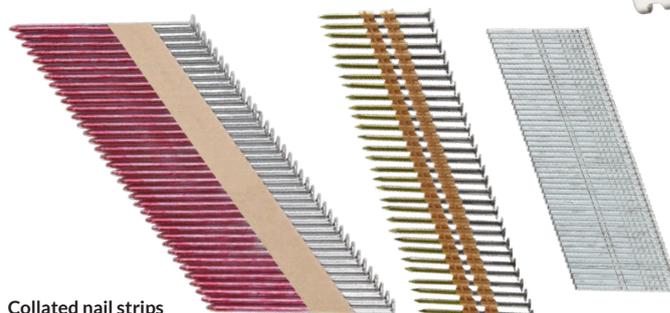
- Disconnect from the power source before making adjustments or clearing jams.
- Remove nails from the cartridge when not in use.



Framing nailer



Brad nailer



Collated nail strips

Pliers

Pliers are hand tools designed to grip, hold, bend, twist, or cut materials. They come in a range of styles for different purposes.

Pliers

Have a serrated jaw to provide grip and leverage, and fine cutting edges to cut most types of wire. They are used for:

- holding small parts while gluing or drilling
- adjusting hardware
- cutting wire.

Pincers

Have rounded jaws that are perpendicular to the handles. This design allows them to:

- grip objects close to a surface
- pull nails or staples without damaging the material
- cut wires flush with the surface.

Side cutters

Have angled cutting edges that allow them to snip wires flush to a surface. They are designed with:

- diagonal cutting edges for close, clean cuts
- wide handles to give strong cutting force with minimal effort
- compact size to fit into tight spaces.

Tips for use

- Use the right type of pliers for the job.
- Wear safety glasses when cutting wire.

Care and maintenance

- Do not use pliers as a hammer or wrench.
- Keep jaws clean for better grip.



Clamps

Clamps are used to hold pieces of timber together while they are being worked on, glued, or fixed.

Tips for use

- If soft pads are not fitted, prevent damage to the work by placing scrap timber between the jaws and the material.
- To stop the material from twisting, avoid over-tightening the clamps.

Care and maintenance

- Keep screw threads clean for a smooth action.
- Clean off any dry glue after finishing a job.

Sash clamp

A long, heavy-duty clamp designed to hold large workpieces together while glue dries or joints are assembled.

Used for:

- cabinet making
- door and window frames
- edge-to-edge jointing (e.g. tabletops).

G clamp

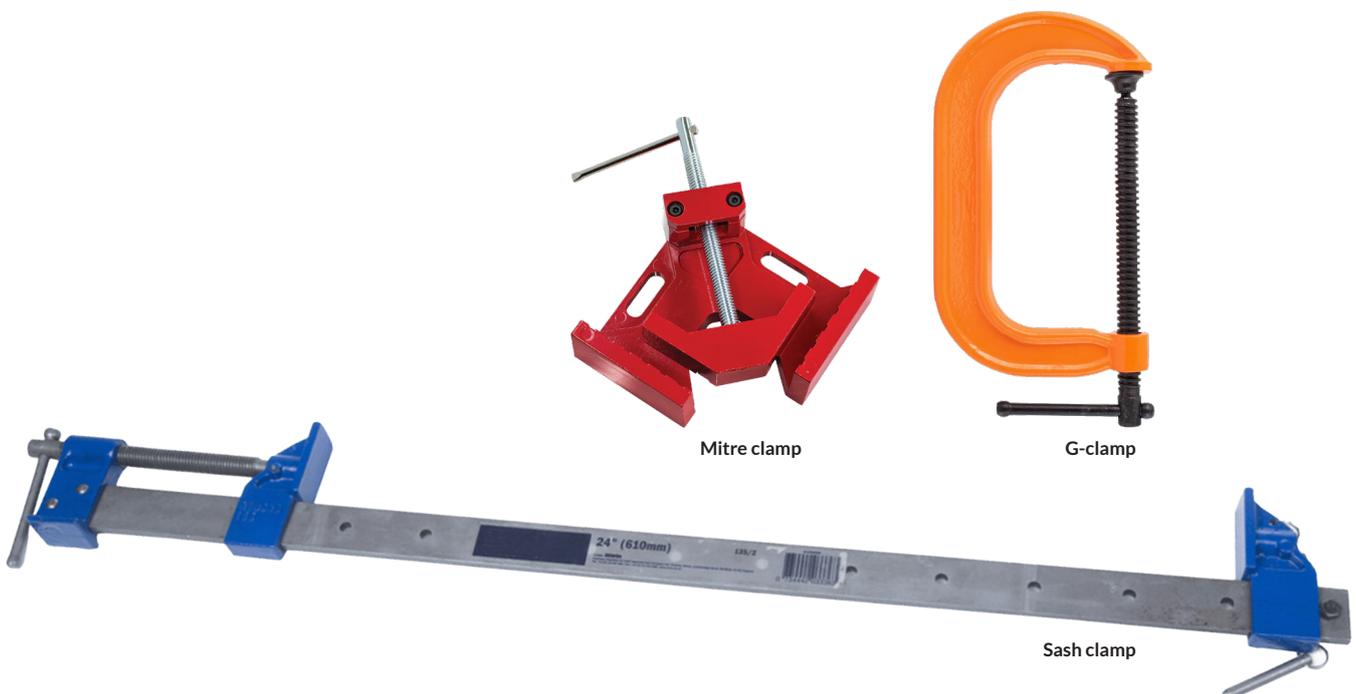
A heavy-duty clamp shaped like the letter “G” (or “C”). It uses a threaded screw mechanism to apply strong pressure to hold materials securely in place. Because it is a fixed size, it has a limited reach.

Used for holding pieces together during drilling, cutting, or gluing.

Mitre clamp

This tool grips two angled pieces (typically cut at 45°) and holds them together securely so you can glue, nail, or screw them. This should give you a perfect corner joint.

They are used for picture frames, cabinet doors.



F clamp

Also called a bar clamp, this is a versatile clamping tool shaped like the letter “F”. It is commonly used in woodwork, metalwork, and general assembly tasks.

It is designed with:

- a long steel bar for reach and strength
- a fixed jaw at one end and a sliding jaw that moves along the bar for easy adjustment
- a screw mechanism on the sliding jaw for tightening.

Quick clamp

Also called a quick-release clamp, this is a bar-style clamp with a trigger mechanism that lets you tighten or release it quickly using one hand. This makes it ideal for situations where you are working by yourself.

It is designed with:

- a long steel bar for reach and strength
- a trigger handle to move the sliding jaw along the bar
- a quick-release button to loosen the clamp.

Spring clamp

A small, portable clamp that uses a spring-loaded mechanism to apply pressure. It works much like a large clothes-peg, making it easy to open and close with one hand.

Used for:

- holding small pieces while glue dries
- securing materials temporarily during assembly.



F-clamp



Quick clamp



Spring clamp

Finishing tools

Finishing tools are used to smooth surfaces, remove imperfections, and prepare materials for painting, staining, or sealing. They help achieve the final aesthetic and functional quality of a project.

Scraper

Usually a flat piece of steel with a cutting edge. It is used to remove marks and defects on planed surfaces.

Scrapers can also be shaped for use on curved surfaces.

Tips for use

- Hold it in both hands with your thumbs behind the blade.
- Lean the scraper forwards until it starts to cut. Push it along the grain, bending it slightly so it forms a curved cutting edge without the corners digging in.

Care and maintenance

- When you're not using the scraper, put it down on a piece of timber with the cutting edge hanging over the edge.
- Sharp scrapers produce fine shavings, while blunt or dull scrapers just produce dust. If your scraper is blunt, ask your teacher to help you sharpen it.

Sanding block

Blocks of cork, rubber or a similar soft material. Sandpaper is wrapped around the block to begin work.

Sanding with a block gives a flatter, more even finish than holding the paper in your hand. Without the block, your fingers produce uneven pressure, which results in dips and hollows in the surface of the material.

Tips for use

- Cut a piece of sandpaper to the same length as the block and twice its width.
- Wrap the paper tightly around the block and start sanding along the grain.

Care and maintenance

- Throw the block away if the sanding surface is damaged.

Sandpaper comes in different grades or grit levels which is shown with numbers. A low number is very coarse and a high number is finer.

Sandpaper grit

Coarse - Less than 60

Medium - 80 - 120

Fine - 150 - 180

Very fine - More than 200



Sanding block



Sanding sponge



Scrapers

Electric sanders

These powered tools do most jobs that hand sanding can do but in a fraction of the time and with a lot less effort.

There are a few different types of electric sander:

- **Orbital sanders** - move the base plate in small circular motions. Great for light finishing and smooth surfaces.
- **Random orbital sanders** - combine circular and orbital motion for a swirl-free finish. Ideal for most general sanding work and fine finishing.
- **Detail sanders** - are similar to orbital sanders but have a small, pointed pad for tight corners and intricate work.
- **Belt sanders** - use a continuous sanding belt. They are best for heavy material removal and levelling large surfaces like floors. You need to take care with belt sanders because they can quickly remove more than you want.

Tips for use

- Move the sander with the timber grain.
- Replace the sandpaper as it wears out.
- For fine sanding, step up through grit levels before going straight to the finest paper.

Care and maintenance

- Empty the dust bag after you finish working.
- Use a dust vacuum attachment if available.
- Clean off the saw dust that builds up around the tool.



Random orbital sander



Detail sander



Belt sander



Orbital sander



IMPORTANT

Always wear a dust mask and/or work in a well-ventilated area when sanding to protect yourself from the dust.

Painting tools

Brushes

No matter which coating you use, it will need to be applied with some kind of brush. Brushes come in a huge range of sizes and styles for different purposes.

There are three main groups:

Bristle brushes - are the standard kind of paint brush used for most work.

Paint pads - also called speed brushes, are useful for large flat surfaces and getting into tight corners.

Rollers - are used for painting large areas like walls, ceilings, and roofs. They can be attached to a pole for better reach.

Tips for use

- Match the brush size with your job.
- Use long, smooth strokes for consistent coverage.
- Load your brush evenly to avoid drips.

Care and maintenance

- Clean thoroughly after use.
- Don't leave your brush in water for long periods.

Heat gun

This is a handheld tool that blows hot air to soften paint, varnish, adhesives, or caulking, which you then scrape off.

Make sure your material is suitable for heat stripping. Avoid plastics that can melt or release toxic fumes.

Tips for use

- Keep the nozzle moving and about 60mm away from the material to avoid scorching it.
- Heat and scrape your work in sections so it doesn't cool and harden again.

Care and maintenance

- Let the tool cool down before putting it away.



Vacuum cleaners

Workshop vacuums (often called "shop vacs") are heavy-duty vacuum cleaners designed to handle sawdust, wood shavings, and rubbish in workshops and construction sites. They are different from household vacuums because they can manage larger particles, liquids, and fine dust.

Workshop vacuums have these features:

- **High suction power** - for picking up sawdust, chips, and heavier debris.
- **Durable construction** - from tough plastic or metal to withstand rough work.
- **Wet/dry capability** - so they can vacuum both liquids and dry debris.
- **Tool integration** - to connect directly with saws, sanders, and routers for direct dust collection.
- **HEPA filter systems** - are critical in woodworking to prevent inhalation hazards.

Tips for use

- Use the right nozzle for the job (wide for floors, narrow for corners).
- Avoid sharp bends in the hose and keep it as straight as possible.

Care and maintenance

- Empty the container in a suitable bin after you finish cleaning up.
- The filters will need to be replaced when they become clogged.

HEPA filters

HEPA stands for High-Efficiency Particulate Air.

This is a specialised filter designed to trap tiny airborne particles that standard filters can miss. This includes fine sawdust, allergens, mould spores, and some bacteria.



