Subject

Basic Technology

Topic

Woodwork Hand Tool

Class

JSS1

Performance Objectives

At the end of this lesson you should be able to:

- Define woodwork hand tools
- List measuring tools and gauges
- List marking- out tools and setting-out tools
- List driving tools and boring tools
- Describe wood work holding and supporting devices
- List cutting and pairing tools.

WHAT IS WOODWORK HAND TOOLS?

Woodwork hand tools are portable tools used in wood operations for measuring, machining and fabricating wood to a desired finished product.

MEASURING TOOLS AND GAUGES

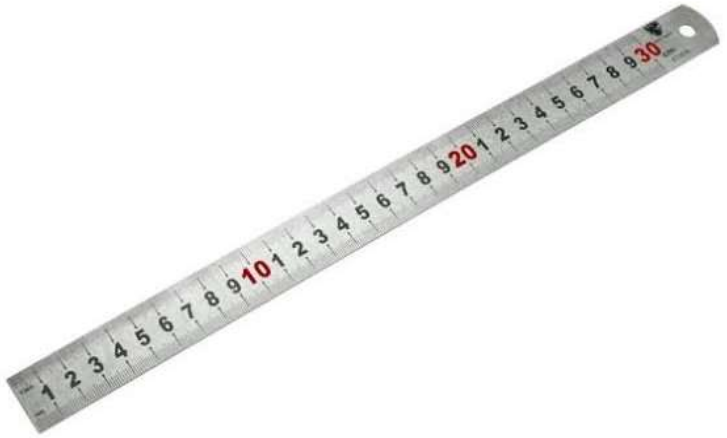
Accurate measurement in wood work practice is very important. However, knowledge of how to make good use of the measuring tools and gauges is imperative.

There are many factors to consider when gathering measuring tools in order to layout work accurately.

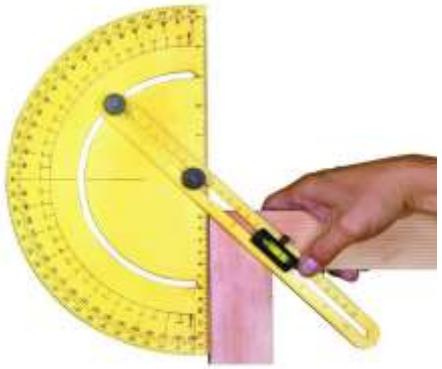
- The first factor is to choose the correct measuring tool for the job.
- The second factor is to use the measuring tools correctly.
- It is also very important to know how to read the graduations on different measuring tools.

The following tools are classified as measuring tools and gauges:

a. **Metric rule:** This tool is used for taking straight line measurement. It is made of steel. The engineer's measuring tape can also be used for this purpose.



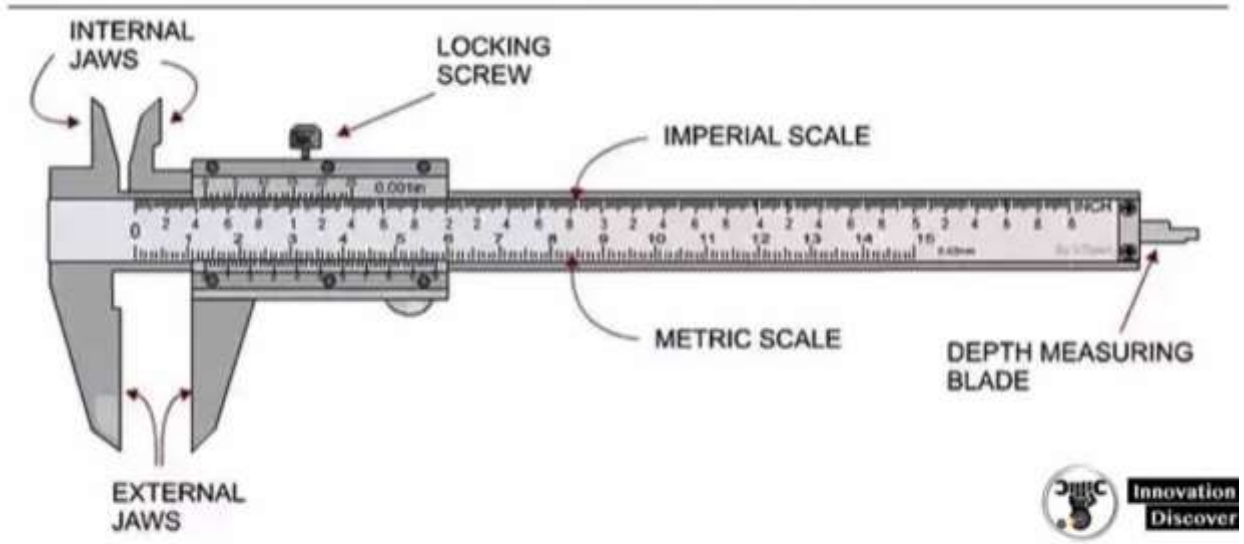
b. **Protractor:** The protractor is a metallic semi-circular instrument, used for measuring angles in degrees.



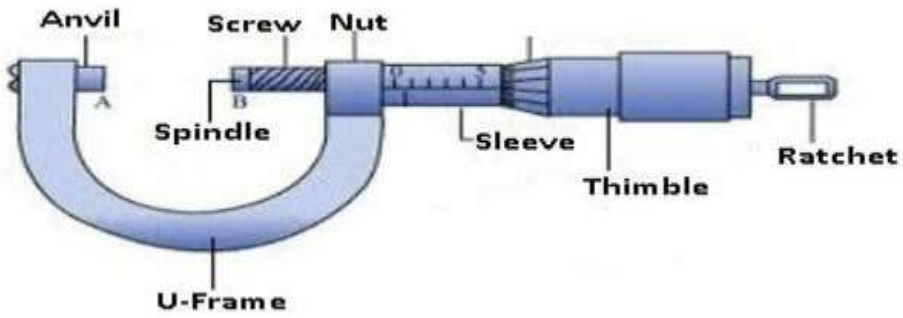
c. **Calipers:** The calipers are used for measuring diameters. The inside caliper for the inside diameter and the outside caliper for the outside diameter of holes.

d. **Vernier Calipers:** It is used for measuring internal and external diameters of holes.

It has both main and veneer scales.



e. **Micrometer Screw Gauge:** It is used for taking accurate measurement of relatively small thickness. It has a spindle and thimble.



f. **Depth gauge:** This tool is used to measure the depth of holes, recesses and slots of deep objects.

MAKING-OUT TOOLS AND SETTING-OUT TOOLS

Marking-out tools are used to indicate points or positions, for drawing curves, arcs and all forms of lines on wood, while setting-out tools are used to set surfaces and edges at angles.

Examples include the following:

- **Carpenter's Square:** This is an L- shaped steel blade used for constructing frames for windows and doors by carpenters.

- **Try-square:** The try-square is used for testing the squareness of a surface at 90 degree.

- **Sliding bevel:** It is used to check angles in wood work piece and for marking inclined lines.

- **Miter square:** It looks like the sliding bevel. The only difference is that this tool is used for marking both horizontal and vertical lines and it is used to test objects at angle 45 degree only.

- **Compass:** This compass is used for marking out arcs and circles.

DRIVING TOOLS

Driving tools are another useful tools in wood work. They are used for driving objects such as nails, screws pins into woods. Examples of driving tools include: hammer, screw drivers, punches.

HAMMERS

- **Hammers:** It has metal head (except mallet that has wood or plastic or rubber head) and wooden or metal handle.

TYPES OF HAMMERS

a. **Ball-peen hammer:** This is a general purpose hammer use for riveting, i.e. forming a cup like shape from a metal sheet. Also used for striking Chisel heads.

TYPES OF HAMMERS

b. **Cross-peen hammer:** This hammer is used for striking at the horizontal corners of metals.

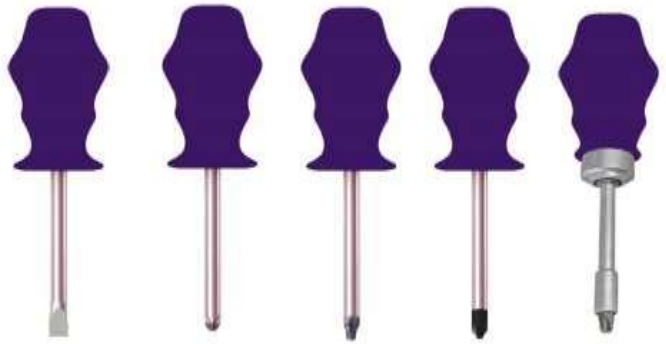
For example it is used during panel beating operations.

c. **Straight-peen hammer:** This hammer is used for vertical corners, i.e. for riveting metal sheet at awkward positions.

d. **Mallets:** These are special types of hammers. They are made from lead, copper, rawhide, wood, plastic or rubber. They are used where steel hammers may cause damage to certain jobs.

SCREW DRIVERS

- **Screw drivers:** Screw drivers are used to move screws in fastening parts together.



TYPES OF SCREW DRIVERS

a. **Flat screwdriver:** For driving slotted head screws.

b. **Star screwdriver:** For driving star head screws.

c. **Allen screwdriver:** For driving screws with holes that have six sides (hexagon) on top.

d. **Offset screwdriver:** It functions as flat screwdriver but used where the straight shape cannot reach.

PUNCHES

- **Punches:** Punches are used for the purpose of driving inward object outside or inside.

TYPES OF PUNCHES

a. **Dot or center punches:** For marking dots to aid drilling or cutting.

b. **Pin punches:** For driving out internal objects, e.g., pins.

c. **Bell punches:** For tracing the center of a round surface object.

BORING TOOLS

- Hand boring tools are tools used for making holes in wood.

TYPES OF BORING TOOLS IN WOODWORK

a. **Bits and Drills:** Bits and drills are generally referred to as drilling kits. They include the brace drills, auger bit, and fluted drill. Bits with a tapered square tang on the end of the shank are used with a bit brace while bits with flat shanks are used for brace, breast drill or power drill.

b. **Drill:** This is a machine with a pointed tip for cutting holes wood or metals.

BITS AND DRILLS

These drills are used based on a particular operation to be completed in any given work.

TYPES OF DRILL BITS

i. Flat drill

ii. Counter sink drill

iii. Combination or center drill

iv. Twist drill

v. Straight-fluted drill

DRILLING MACHINE

- **Drilling Machine:** This is a machine that positions a drill bit and performs drilling either by electrical or manual manipulations.

TYPES OF DRILL MACHINE

- **Manual hand drilling Machine:**

  These includes the ratchet brace, breast drill and the bradawl.

a. **Ratchet brace:** This drilling machine holds the auger and drill bits for boring any wooden jobs. The ratchet makes it possible for this tool to rotate in one direction only (either forward or backward movement).

b. **Bradawl:** This tools is used for making small holes in wood for screws and nails. It is used also for making the centers of holes for drilling.

c. **Electric hand drilling machine:** This is an electrically powered machine that rotates clockwise and anti-clockwise. It is used for drilling holes in wood and metals.

WOODWORK HOLDING AND SUPPORTING DEVICES (THE WORK BENCH AND ITS FITTINGS)

The work bench alongside its fittings are very useful in the workshop. The fittings are the appliances attached to the work bench. They are however, necessary to be identified based on their functions in order to promote the skill of selecting the right tools for the job at a time.

WHAT IS WORK BENCH?

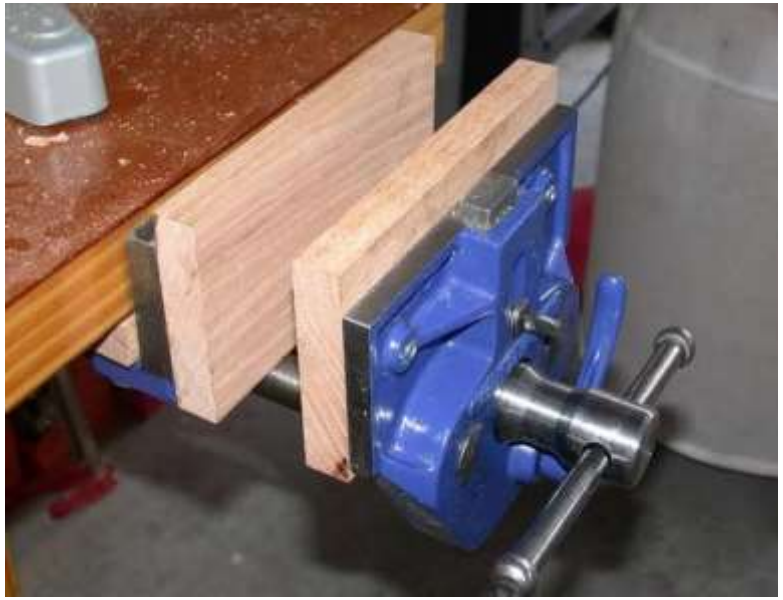
- Work bench is a table which may be made of wood and containing simple fittings such as bench stop, bench vice and bench hook. Work bench is an important feature of a modern introductory technology workshop.

WORKBENCH FITTINGS

The fittings are the appliances attached to the work bench to perform one function or the other. The fittings include:

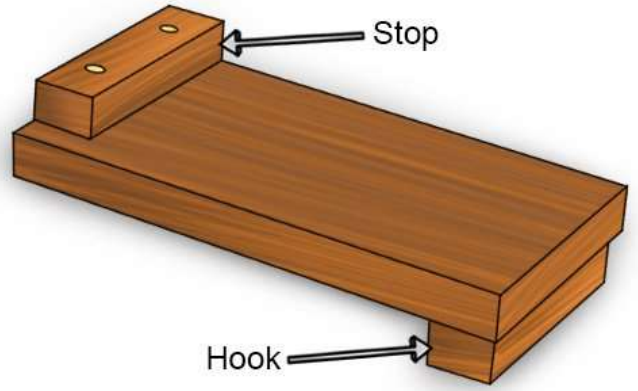
a. **Well:** A well is used for keeping tools temporarily during operation.

b. **Vise:** It is a device for holding an object that one is working on firmly. It consists of two flat jaws (one fixed and the other movable) that can be brought together with a screw mechanism.



c. **Bench stop:** A small piece of wood mounted on the surface at one end of the workbench. The work is placed on the bench with the end pushed against the stop.

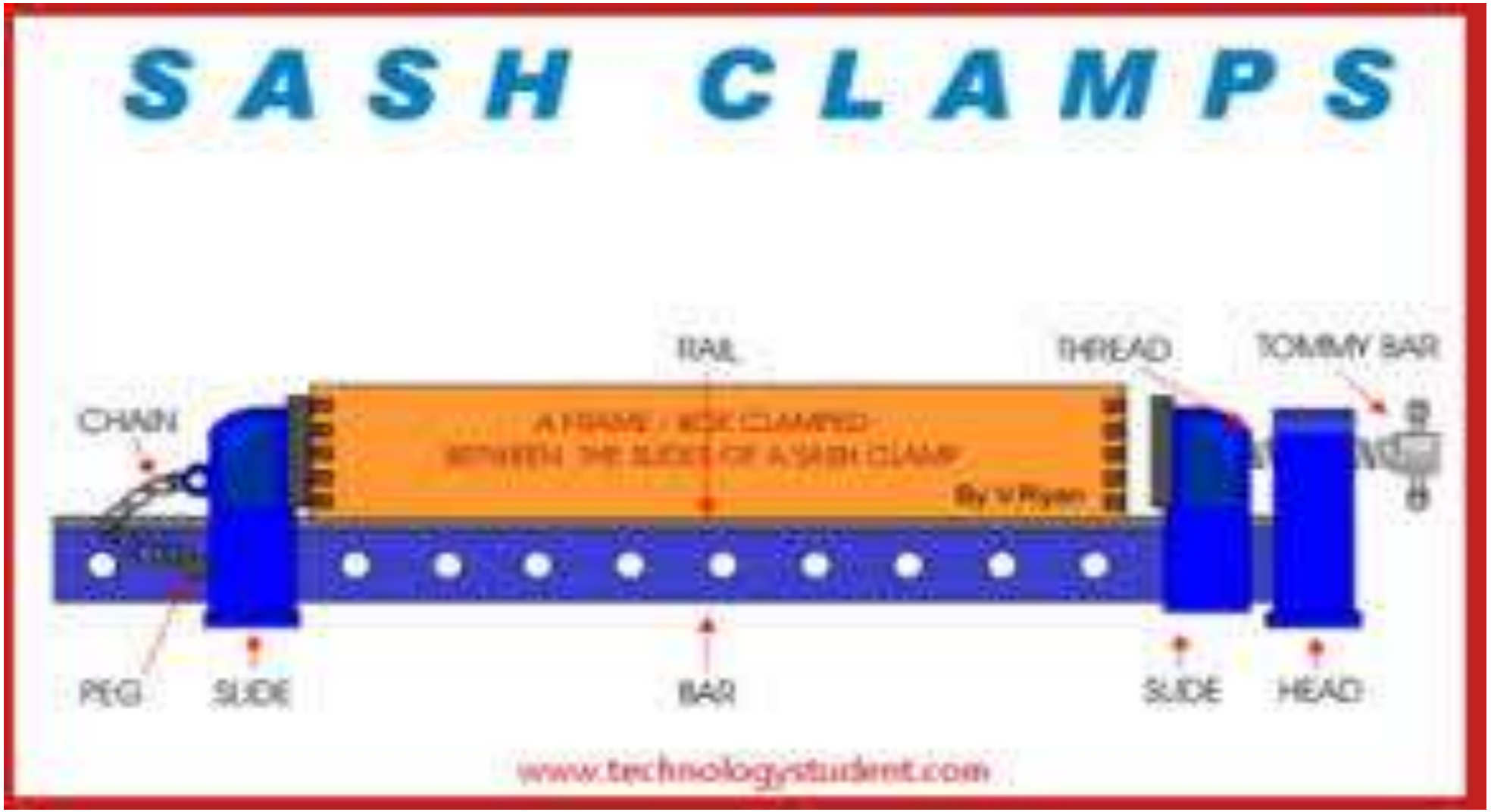
d. **Bench hook:** Bench hook is used to provide a stop against a piece of wood being worked by holding steadily while cutting, planning, or chiseling that piece of wood



e. **G-Clamp:** G- Clamp is used for clamping one side of a wood to another piece of wood. The save way to use it is by putting two scrap pieces of wood on either side of your job so that it does not mark or ruin the job.

f. **F- Clamp:** It has an F shape and it is used as the G-Clamp also but has a wider opening capacity (throat). This tool is used in woodwork where more permanent attachment is being done with screws or glue.

g. **Sash Clamp:** It is used for wider and bigger jobs for assembling and gluing operations. They vary in size and are normally used in pairs. The slides are arranged on either side and scrap wood is placed between each face and the work. This protect the work when the thread is tightened.


SASH CLAMPS
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THREAD
TOMMY BAR
CHAIN
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CUTTING AND PAIRING DEVICES

In woodwork, cutting tools are saws while pairing tools include planes, chisels and scrapers.

Saw is a tool that has a long blade with sharp points known as teeth along one of its edges. A saw can perform cutting on the wood through moving forward and backward by hand driven. To cut wood into measurable sizes.

TYPES OF SAW

1. **Straight Line Cutting Saws:** These are saws used for cutting along or across grains of wood. Examples are;

i. **Rip saw:** This is a long broad saw used for cutting timber along the grains, such as planks.

ii. **Cross-cut saw:** This is smaller than but similar to rip saw. It is used to cut timber across the grain of the wood.

iii. **Panel saw:** This is also smaller than but similar to cross-cut saw. It is a multipurpose saw, it can cut through fine wood and functions for the above two saws.

2. **Back saws:**

These are saws with brass metals on their backs for reinforcement. They include the following:

i. **Tenon saw:** It is used for cutting shoulders, tenons and joints. The blade is usually thicker. The steel or thick metal back adds to its weight and thereby makes it strong in cutting and handling.

ii. **Dovetail saw:** This is similar to but smaller than tenon saw, it is used to cut dovetail joints and other simple jobs on the bench.

3. **Curve Cutting Saws:** These saws are used for cutting difficult curves on wood. Examples:

i. **Coping saw:** This saw is suitable for cutting curves in woodwork. It has a metal frame and a wooden handle. They come in different sizes.

ii. **Bow saw:** This can be used to make a deep cut and circular curves on sheets of wood. It has an H shape.

iii. **Fret saw:** it is a saw designed to cut any complex shapes of curves in veneers and thin layers of wood. Artists make use of this type of saw. This is a saw used for cutting very small holes of different shapes into wood like keyholes.

PAIRING TOOLS

Pairing tools are tools used for cleaning away the bumpy, rough surface left by the teeth of the saw and rendering wood smooth and even.

Pairing tools can also be used for cutting wood into various forms, shapes and sizes.

TYPES OF PAIRING DEVICES

1. **Planes:** Planes are pairing tools used for cutting wood into a smooth and fine finish. It has a cutting edge held in a block that can be adjusted. The common planes are:

i. **Jack plane:** The jack plane can be used on rough sawn wood and produces a surface that is not very smooth. It is the largest type of plane.

ii. **Fore plane:** Like the jack plane, it is used for roughing out wood and for straight planning.

iii. **Smoothing plane:** This plane is the smaller version of the fore plane. It is used for smoothing the surface of wood after the jack plane has been used.

iv. **Trying plane:** This plane is used for leveling the surfaces of wood. It is slender and smaller in size.

v. **Spoke shave plane:** The spoke shave plane is used for removing light wooden particles from timber, especially on edges and curves.

2. **Chisels**

Chisels are pairing tools made of high carbon steel. It is used for shaping wood where finishing can be carried out. The common ones for wood work are:

i. **Firmer chisel:** This type of chisel is used for cutting deeper cuts in both heavy and light woodwork , such as mortise shaping.

ii. **Pairing chisel:** This is a chisel used for fine light woodwork like slicing off small amounts of wood in shaving and sculpturing.

iii. **Gouges chisel:** This type of chisel has a curved point and long handle and it is used for fine woodwork, such as carving , and sculpturing.

SCRAPPERS

These are tools used to manually remove small amounts of material and excels in tricky grain areas where hand planes would cause tear out.

Scrappers are most suitable for working with hardwoods, and can be used instead of sandpaper.

TYPES OF SCAPPERS

- Flat scraper
- Half round scraper
- Triangular scraper.

1. **Flat scraper:** This type of scraper can only be used on flat surfaces but is the most efficient scraper for the job. The sharpened scraping tip is often slightly convex to help prevent the corners of the scraping surface causing burrs.

2. **Half round scraper:** Also called ‘bearing scrapers, as they’re used for scraping the inside of bearings and other curved surfaces to achieve a better mating surface, curved blade scrapers have two sharp edges.

3. **Triangular Scraper:** Sometimes referred to as ‘three corner scrapers’, these scrapers have a long triangular blade that tapers to a point at the end. They also have three sharp scraping edges and can be used on both flat and curved surfaces. These types of scraper are mainly used to scrape into corners and the edges of flat surfaces or to remove burrs from the inside of small bearings.

EVALUATION

1. Name 3 of the wood work hand tools.

2. Describe the function of the hand tools.

3. Sketch out any of the hand tools.

THANK YOU FOR WATCHING!!!