**WEEK 5 YEAR 10 BASIC TECHNOLOGY**

**STRAND: HAND TOOLS & MATERIALS**

**LESSON 11: MANUFACTURED BOARD**

**LEARNING OUTCOME: IDENTIFY TYPES OF MANUFATURED BOARDS & ITS USES**

1. Manufactured Boards
* They are available in large, stable, standard sheets (1525mmX1525mm, 1220mmX2240mm), of uniform thickness and quality.
1. Plywood
* Plywood is the name given to panels or sheets constructed by gluing together three or more layers of this wood called ‘veneers‘ or ‘plies‘ so that the grain of one layer runs at right angles to that of an adjacent layer.



1. Uses of Plywood
* Furniture Manufacture: In carcass construction, it is glued to a framework. It is also used as backing for cabinets, drawer bottoms, radio cabinets, door panels and chair backs and bottoms.
* Building Works: In building works it is used for panelling, flush doors and built-in fitments.
* Exterior grades are used for wall sheathing and concrete form-work. Boat Building: It used in crafts and yachts of all sizes. Special waterproof marine grade plywood is manufactured to resist water indefinitely.
* Aircraft Construction: The strength of the plywood combined with its light weight makes it ideal for this type of work, light gliders and sail planes.
* Other Uses: It is also used in coachwork, railway carriages and boxes.
1. Core-board
* Core board is a manufactured board with a wood fibre or wood chip centre and bonded veneer faces on both sides.
* It is very strong, lightweight, and easily cut material used for the mounting of photographic prints, as backing in picture framing, in 3D design, and in painting.

**LESSON 12: MECHANICAL PROPERTIES**

**LEARNING OUTCOME: IDENTIFY ALL MECHANICAL PROPERTIES OF METAL**

Working with Metals

* A metal is a material that is typically hard, opaque, shiny, and has good electrical and thermal conductivity.
* Some examples of metals are aluminium, copper, iron, lead, zinc, tin, silver and gold.

Mechanical Properties

Mechanical Properties refers to the behaviour of material when external forces are applied. Some of the mechanical properties are:

1. Hardness
* Hardness refers to the ability of a metal to resist scratch, penetration, cutting action, or permanent distortion.
* Hardness may be increased by working the metal and, in the case of steel and aluminium alloys, by heat treatment and cold-working.
1. Brittleness
* Brittleness is the property of a metal that allows little bending or deformation without shattering.
* In other words, brittleness is the ability to break or crack without changing shape.
* Since structural metals are often subjected to shock loads, brittleness is not a very desirable property. Cast iron, cast aluminium, and very hard steel are brittle metals.
1. Malleability
* A metal that can be hammered, rolled, or pressed into various shapes without cracking or breaking is said to be malleable.
* This property is necessary in sheet metal that is to be worked into curved shapes. Copper is one example of a malleable metal.
1. Ductility
* Ductility is the property of a metal that permits it to be permanently drawn, bent, or twisted into thin lengths without breaking.
* This property is essential for metals used in making wire and tubing.
* Ductile metals are greatly preferred for aircraft use because of their ease of forming and resistance to failure under shock loads.
* Ductility is similar to malleability.
1. Toughness
* A material that possesses toughness will withstand tearing or shearing and may be stretched or otherwise deformed without breaking.
* Toughness is a desirable property in aircraft metals

**LESSON 13: WOOD FINISHING**

**LEARNING OUTCOME: IDENTIFY THE TYPES OF WOOK FINISHING**

 Wood Finishing

* Finishes serve to prevent wood absorbing moisture, protect against decay and enhance appearance.
1. Staining
* Stain can be used to match different components in construction and to achieve attractive contrasts of tone.
* Wood stains ready-mixed are available in hardware stores.
* The stain that is needed to be used should always be tested on an off cut of the same piece of wood.
1. Varnishing
* **A** [liquid](https://www.britannica.com/science/liquid-state-of-matter) coating material containing a [resin](https://www.britannica.com/science/resin) that dries to a hard transparent [film](https://www.britannica.com/art/motion-picture).
* It is easier to apply and produces clearer result.
1. Painting
* Paint provides a protective colouring for both indoor and outside softwood.
1. Lacquers
* A liquid made of shellac dissolved in alcohol, or of synthetic substances, that dries to form a hard protective coating for wood.
* Several coats of Lacquers is needed for an effective finish since it is thinner compared to varnish. Spray application is used for best results but not always used.
1. Wax
* Waxes have been used for centuries to enhance wooden furniture & provide wood protection against stains
* To suit different wood types, furniture wax can be obtained ready coloured.
* Over some time the wax applied on the material will form deep lustrous colour within the wood surface.
1. Oil
* Since oil is natural and waterproof, it provides a perfect finish for outdoor furniture.

**ACTIVITY**

1. Name a manufactured Board
2. State two uses of a plyboard
3. What is core board made of?
4. Identify two types of wood finishing.

**WEEK 6 YEAR 10 BASIC TECHNOLOGY**

**STRAND: HAND TOOLS & MATERIALS**

**LESSON 14: METAL FINISHING**

**LEARNING OUTCOME: IDENTIFY THE TYPES OF METAL FINISHING**

 Metal Finishing

* To protect metal from rust, coat it with Vaseline or light grease.
1. Oil Finishing
* Steel can be either dipped in machine oil burnt into the metal or the metal can be heated to dull red and quenched in oil.
1. Painting
* For painting metal, the surface must be thoroughly cleaned and then washed with hot water and detergent.
* Metal primer is suitable for most metals.
* For maximum protection an oil-based undercoat and top coat should also be used.
1. Plastic Coating
* The most suitable method is to dip pre-heated metal into a tank of liquefied thermoplastic such as polythene, PVC or nylon.
* This is done to prevent metal from corrosion and to provide electrical insulation
1. Electroplating
* Thin layer of metal is deposited on the surface of the metal to be used.
* Some examples are chromium plating on steel, silver and gold plating on jewellery and simple copper plating.

**LESSON 15: SANDSTONES**

**LEARNING OUTCOME: IDENTIFY SANDSTONES & ITS USES**

1. Sandstones
* Sandstone is a sedimentary rock, typically formed from the most common minerals in the earth‘s crust.
* This type of stone can come in many different colours, from yellow, orange and brown to red, pink and black.
* Sandstone has been a popular building material for thousands of years, used by ancient civilizations for construction, as well as for housewares.
1. Common uses of sandstone
* Sandstone is a popular choice for both flooring and walls, indoors and outdoors.
* It‘s also commonly used as a decorative stone, or carved into items like bookends, coasters and paperweights.
* Sandstone is often found in backyards and patios, whether as pillars, arches, fountains or simple arts & crafts.
1. Common finishes of sandstone
* Along with slate, sandstone often comes with a natural cleft surface finishing
* One popular choice is a honed finish.
* This finish is created by grinding and sanding, resulting in a smooth surface that is not as glossy as a polished finish.
* This is a good choice for high-traffic areas where low maintenance is desired.
* For instance, while a polished finish might wear off in a busy walkway, a honed finish will keep its smooth surface.
* The Stone Oil has excellent penetration properties and therefore ensures a hard-wearing, dirt and water resistant surface.
* The Stone Oil is a pre-polish sealer formulated to give an aged appearance to natural stone and enhances the natural structure of the floor.
* Stone Oil may be used indoors on all unfinished, open structured floors of stone, quarry tiles and marble

**LESSON 16: SHARPENING HAND TOOLS**

**LEARNING OUTCOME: IDENTIFY THE TWO OPERATION IN SHARPENING HAND TOOLS**

Sharpening Hand Tools

* Planes and chisels cut well only if they are sharp.
* Two kinds of operations are done to sharpen these tools.
* Grinding reshapes the cutting edge of tool.
* It should be done only when the tool needs a new bevel or when the edge of the cutter is nicked.
* Otherwise, honing-sharpening the tip of the cutting edge is enough.
1. Grinding plane blade
* Check the cutting edge of the blade under light. If it reflects light, sharpening is needed.
* Hold a try square on the edge of the blade and check to see if the cutting edge is square with the sides. If it does not, grind off the old edge at right angles to the sides till the edge is straightened.
* If you are grinding the blade ―freehand, grind as close as possible to the same angle each time the blade is returned to the wheel.
* Continue to grind the blade until a wire edge appears
1. Sharpening the Blade
* Apply few drops of mineral oil to the face of the oilstone.
* Place the blade at an angle of about 30 to 35 degrees to the stone.
* To hone the edge, move the blade back and forth in a straight line.
* Now turn the blade over and place it flat against the stone. Move it back and forth to remove the wire edge.
* To test for sharpness, try slicing a piece of paper with the blade.

**ACTIVITY**

1. Identify any type of metal finishing
2. Differentiate plastic coating & electroplating
3. Define Sandstone
4. Identify the two operations of sharpening hand tools

**WEEK 5 WORKSHEET**

1. Describe the two operation in sharpening hand tools
2. What is plywood made of?
3. State a property of core board
4. Differentiate malleability & ductility
5. State an advantage of wood finishing

**WEEK 6 WORKSHEET**

1. State an advantage of metal finishing
2. Identify some uses of sandstones
3. Explain the following process :
* Grinding plane blade
* Sharpening of blade
1. State an advantage of oil stone
2. Describe the process of painting metal