

**BASIC TECHNOLOGY**  
**JS2                  WEEK 2**

**METAL WORK HAND TOOLS**

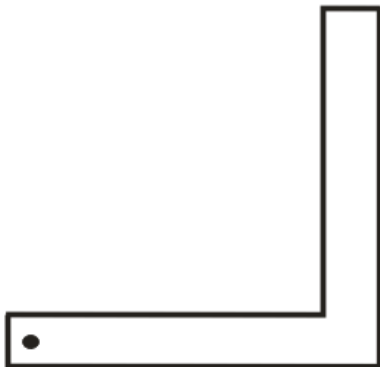
Metal work hand tool are those hand tools that are used in the metal working field mostly held in the hand during operation. Which includes:

- ❖ Marking Out Tools
- ❖ Measuring Tools
- ❖ Cutting Tools
- ❖ Driving Tools
- ❖ Boarding Tools
- ❖ Holding Device

**Marking Out Tools:** They are tools used for setting and marking out

Examples are

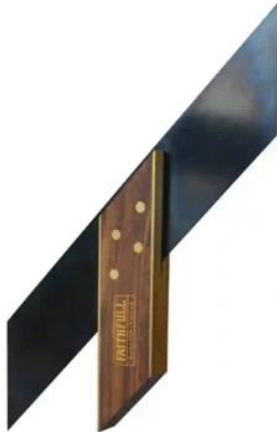
1. **The Try Square:** This is a marking out tool used for checking how square an edge is. We also use it to mark out straight lines at right angles to a given edge



2. **The Sliding Bevel:** This is made up of a steel blade and a wooden stock. It can be adjusted and set to any angle. We use it to mark out lines that cross at an angle and it is also use to check bevels



3. **The Mitre Square:** This is used for setting out and checking angles of 45° and 30°.



**The mitre square**

**Driving Tools:** Tools used by carpenters to drill, insert and drive screw, nuts and bolts into surfaces

**Examples:**

1. **Hammer:** The hammer is one of the most commonly used of all hand tools. It is made up of metal head and a wooden handle like the claw hammer.



**Hammer**

2. **Mallets:** These are soft faced hammers used in some certain works to avoid damage as a result of use of strong hammer. Steel hand hammer may be too strong for certain types of work. Mallets should be treated with care since they are not as strong as steel headed hammer



**Measuring Tools:** This is a tool used for measuring physical quantity

**Examples**

1. **Callipers:** e.g inside calliper, outside calliper and odd leg. The inside callipers are used to measure diameter of a tools. They measure the inside of dimensions of any object within their capacity



**Inside Calliper**

2. **The Outside Callipers:** Are used to measure dimensions of any object with their capacity



**Outside Calliper**

3. **The Steel Rule:**



## PERIOD II

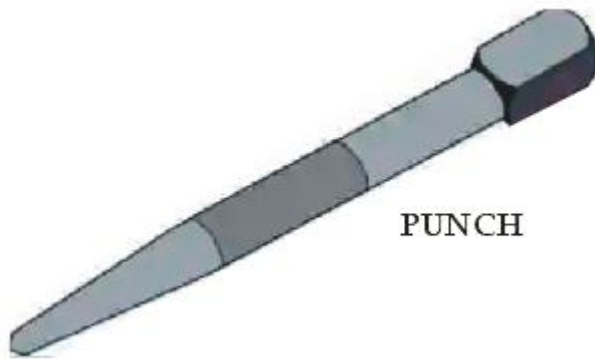
### METAL WORK HAND TOOL (DRIVING TOOL BORING TOOL ETC)

**DRIVING/BORING TOOL:** Examples are screw driver, puncher, brace etc. Screw driver is used for fixing or removing screws with slotted heads, made of several types



A rip saw

**PUNCHER:** For striking small dots or scribed lines, also used for locating hole - centres for drilling operations.



**THE BLACE:** Is a tool used for holding and turning the drive bits like the ratched brace or weel brace

### THE CUTTING TOOL

**THE SAW:** Saws are cutting tools made of high quality steel. It is so strong that the teeth of saws are set alternately left and right to allow for crevance. Saws are of several types e.g the rip saw, cross - cut saw, Aenon saw, dove tail etc.



**THE DOVE - TAIL SAW:** This saw look like tenon saw but it is smaller in size and has an open handle used for cutting dovetail joints and other small jobs in bench



**A dove - tale saw**

**THE CHISEL:** This is another cutting tool used for shaping wood

### **NOTE OF LESSONG FOR WEEK 3**

#### **ENERGY - BASED TECHNOLOGY**

Energy as we all know is the ability to do work. It can be converted from one form to another

#### **Examples:**

1. **ELECTRICAL ENERGY:** Can be converted to heat energy in an electric pressing iron
2. **CHEMICAL ENERGY:** Can be converted heat energy in a kerosene stove
3. **A generator converts mechanical energy to electrical energy**

There are some appliances that operate based on energy conversion like electric cooker, water heater, gas lamp, gas cooker, kerosene stove, electric fan, electric grinder etc.

Electrical energy base appliance are those appliances we uses in our home which are operated by electrical energy. These are appliances convert electrical energy into heat energy when they are in operation. The input energy is electrical and the output energy is heat.

#### **PRINCIPLES OF OPERATION**

**ELECTRIC PRESSING IRON:** When the iron is connected to a source of electrical energy, the heating element becomes hot by converting the electrical energy into heat energy. The heat generated is transferred to

the bottom of stainless steel plate. The thermostat is used to control the heat generated

**THE ELECTRIC COOKER:** When switched on the electric current flows through the nichrome element, which is converted into heat energy. When the nichrome wire is exposed the red hot nichrome element will produce the heat used in cooking

**ELECTRIC KETTLE:** Just plug to power source then current flows to the nichrome element, which in turn becomes hot by converting electrical energy to heat energy using the electrical kettle to boil water is neater, convenient and faster

**KEROSINE STOVE:** The stove is filled with kerosene and light to produce the fire which is used in cooking, the wick when lighted burns to produce heat for cooking. To avoid explosion, you must put OH the light from the stove before typing to refuel it again

**GAS COOKER:** Having connected the gas cylinder to the burner, then you open the value so that gas can flow to the burner, ignite the gas to produce flame, be careful not to open gas cylinder value before lighting the match, it is dangerous.

#### **NOTE OF LESSONG FOR WEEK 4**

### **PRINCIPLES OF EVAPORATION LEADING TO COOLING BY REFRIGERATOR**

Evaporation is a process of liquid converting to the gaseous state, the process whereby a portion of liquid turns into vapour.

**OPERATION OF A REFRIGERATOR:** The fridge operates with gas. This operation is guided by the principle that fluid absorbs heat when changing from a liquid state to a vapour state. The work of the condenser is to pump in gas to the condenser at high temperature and pressure. The electrical energy causes the compressor to work. The compressed vapour is discharged into the condenser and as it expands, it becomes cooler and condenses to liquid vapour. The essential

components of a refrigeration system are refrigerant, evaporator, condenser and appropriate control.

### **AIR - CONDITIONER**

An air conditioner works on the same principle as a refrigerator. It also achieves cooling by the refrigeration cycle. In other words, an air conditioner also has a condenser, evaporator, compressor and throttle valve.

### **THE PRINCIPLE OF OPERATION OF ELECTRIC FAN**

The electric fan is basically an induction motor. The fan capacitor torques up the electric motor, allowing it to start and run. An electric current reaches the motor and then enters coils of wire that are wrapped around a metal base.

### **THE WORKING PRINCIPLES OF A GENERATOR**

Generator is a machine that converts mechanical energy into electrical energy. It works based on the principle of Faraday's Law of Electromagnetic induction. Faraday's Law states that whenever a conductor is placed in a varying magnetic field, EMF is induced and this induced EMF is equal to the rate of change of flux linkages.

### **WORKING OF GENERATOR**

Generators are basically coils of electric conductor, normally copper wire, that are tightly wound onto a metal core and are mounted to turn around inside an exhibit of large magnets. A electric conductor moves through a magnetic field, the magnetism will interface with the electrons in the conductor to induce a flow of electrical current inside it.

### **THE PRINCIPLES OF OPERATIONS OF A BICYCLE DYNAMO**

A bicycle dynamo is a type of generator attached to a bicycle to produce electricity for the bicycle's light. The bicycle dynamo works by converting the mechanical motion of the rotating wheel into electrical motion with the use of a magnet.