Strand:	Tools, Equipment and Processes	**Sub-Strand:**	Measuring and Marking Out

BASIC 9

WEEKLY LESSON PLAN – WEEK 11

Content Standard:	B9.3.1.1 Demonstrate understanding of measuring and marking out tools and equipment				
Indicator (s)	B9.3.1.1.1: Identify and classify tools and equipment used for measuring and marking out	**Performance Indicator:** Learners can identify the uses of measuring and marking out tools.			
Week Ending	22-11-2024				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Career Technology				
Reference	Career Technology Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.				
Teaching / Learning Resources	Tape measure, marking chalk, Poster, Pictures, Video	**Core Competencies:**	• Critical Thinking and Problem Solving Communication and Collaboration.		

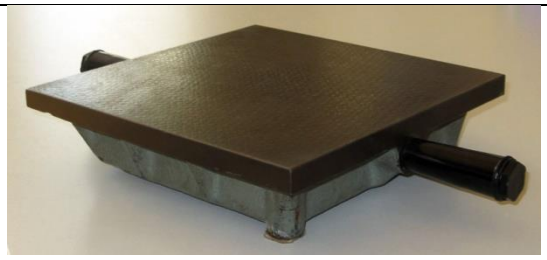
DAY/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
WEDNESDAY	Discuss with the Learners about the meanings of keywords and terminologies in the lesson. **Terminologies;** • Marking • Measuring • Techniques • Thermometer • Gauge • Trammel • workshop	1. Assist Learners to distinguish between "measuring" and "marking out". 2. Learners brainstorm to identify examples of measuring tools and equipment. 3. Show Learners samples and pictures of measuring and marking out tools. 4. Discuss with the Learners about the main functions of measuring and marking out tools. **MEASURING AND MARKING TOOLS** • **ENGINEER'S STEEL RULE:** It is a stiff, straight steel strip having all the faces machined true. On one of the flat faces, graduations are marked in inches and centimeters.	Through questions and answers, conclude the lesson. **Exercise;** 1. What are measuring tools? 2. Explain marking-out tools. 3. State 5 examples each of; I. Measuring tools II. Marking-out tools.

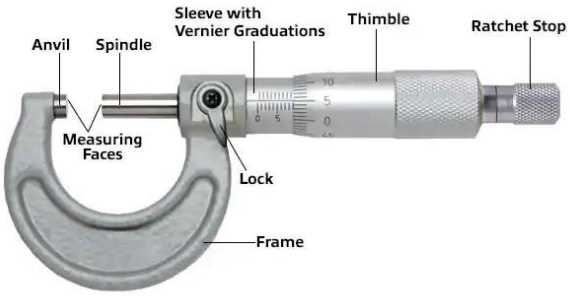
		 • **CALIPERS:** These are used with the help of steel rule to check outside and inside measurements. They are specified by the maximum length measured. Sizes vary from 100 mm to 300 mm. There are two types of caliper: (a) Outside Calipers (b) Inside Caliper Outside Calipers are used to are used to measure the outside diameter of round objects and to measure width and thickness. Inside Calipers are used to set internal dimensions, to transfer them to work or to check with standards.	

- **HERMAPHRODITE, JENNY or ODD LEG CALIPER:**

  It is made up of steel tapered strip which is hinged between washers at one end. One leg is bent at the tip inwardly and the other has a straight pointed end. It is used to find the centre of a round bar by holding a bent leg against a curved face of the bar and the pointed leg on the end face. It is also used to scribe parallel lines to the straight edges or for taking distance from the edges of the holes or plates and similar jobs.

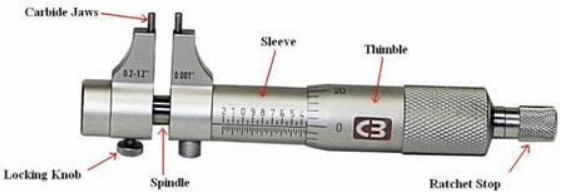
		• **DIVIDER:** A divider is an important instrument used for marking work. It is similar to calipers but its legs have sharp points. The dividers are used for measuring the distance between two points, dividing a given length in a definite ratio, drawing circles and arc and transferring dimensions from scales to objects.  • **SURFACE PLATE:** It is made of grey cast iron in various sizes. It is usually square or rectangular and has top and the adjacent four edges very accurately machined and scraped to form a true flat surface and brought in square. It is placed horizontally on a firm support whose working height is about 800 mm from the floor. It is used to check the trueness of flat surfaces and to copy the master surface on a work.	

			
THURSDAY	Organize a matching exercise for the Learners to match names of measuring and marking-out tools to their pictures.	1. Discuss with the Learners about the types of measuring and marking out tools. 2. Assist Learners to describe the uses of each measuring and marking-out tool and equipment. 3. Demonstrate on how to use examples of measuring and marking out tools. 4. Assist Learners to practice using measuring and marking-out tools. **OUTSIDE MICROMETER:** This is used for measuring external dimensions accurately. Figure shows a micrometer of 0 to 25 mm range with an accuracy of 0.01 mm. These are available in different ranges with interchangeable anvils varying from 0-25 mm to 2000 mm in sizes and 0.01 to 0.001 in accuracy. There are many types of micrometers designed for special purpose use. They include thread micrometers to measure thread dimensions, tube micrometers to measure wall thickness of tubes, etc.	Through questions and answers, conclude the lesson. **Exercise;** State 5 examples of measuring and marking out tools and their uses.



- **INSIDE MICROMETER:**

  This is used to measure inside dimensions accurately. Figure shows an inside micrometer. These are available in different ranges and accuracies.



- **DEPTH MICROMETER:**

  It is designed to measure the depth of holes, slots, recesses etc. The working principle of this is similar to the outside micrometer. Its base is hardened ground and lapped to reduce wear. These are available up to a range of 300 mm and accuracy of 0.01 mm. In this the reading is taken from the thimble end (right to left), unlike the outside micrometer where reading is taken from left to right.

- **FEELER GAUGES:**

The thickness gauges or feeler gauges are a set of gauges consisting of thin strips of metal of varying thickness. They are widely used for measuring and checking bearing-clearance, adjusting tappets, spark plug gaps, and so on. The thickness varies from 0.05 to 0.5 mm.

- **RADIUS GAUGES:**

Also known as fillet gauges, these are of thin flat steel tool used for inspecting and checking or laying out work having a given radius. Such a gauge is made in sets of individual gauges for measuring concave (internal) or convex (external) radius.

- **SCREW PITCH GAUGES:**

A screw pitch gauge is used for quickly determining the pitch of a threaded part or tapped hole. The gauge consists of a set of templates of teeth, each confirming to a standard pitch.

- **DRILL GAUGES:**

		Thin sheets with holes drilled accurately to the size marked are used as drill gauges for easy selection and checking of drill size. This is very much useful when the drill size marked on the drill wears out over repeated usage. These gauges are also available as stands for letter drills and number drills which are very small in size.	

Name of Teacher: **School:** **District:**