UNIT 3. WORKPLACE. TOOLS.

CONTENT AIMS

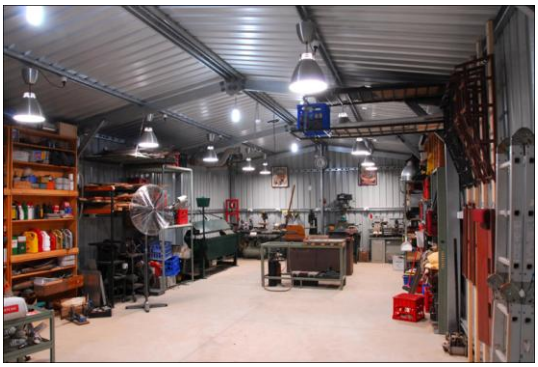
- Learn the parts of a workshop and its features.
- Learn the name of the tools used in the workshop.
- Learn to use these tools.

LANGUAGE AIMS.

- Learn the name of the tools used in the workshop in English and Spanish.
- Be able to describe a tool.
- Be able to describe what can be done with every tool.

CONTENT.

1. **Workshop**: A room or building which provides both the area and tools (or machinery) that may be required for the manufacture or repair of manufactured goods. A place to work. With enough space to place the workdesks. Ventilation is a must. If there are welding machines, there must be an extraction system.
   A workshop has a flat, easily cleaned and anti-slip floor.
   Illumination: If possible, daylight is better than artificial light. Windows should be oriented to avoid direct sunlight. The walls in the workshop should be clear.
   The Temperature should be between 16-18º



Warehouse: A place to store the raw materials to manufacture parts, like bars, plates, sheets…

Work desk or work bench: A robust Steel or wood table, with a vise and a drawer to store tools. Electrical sockets in the surrounding walls of the work desk to use power tools.

2. Workshop machinery:

Fixed machines: large and expensive precision machines. These machines cannot be moved. Examples: Lathe, milling machine, Drill…

3. Workshop power tools: Tools actuated by a power source. More versatile machines, cheaper. Smaller. These machines can be carried by a worker.

Examples: Drills, Jigsaws, sanders, angle grinder…

Cordless drill	Jigsaw	Sander	Angle grinder

- **Drill: A power tool, electric or pneumatic, used to bore holes. It has a chuck to attach a drill bit.**

  - Corded drill: Works with AC current (100 – 240 V). Need a cord and a plug. Powerful and fast.

  - Cordless drill: Works with DC current, 12 – 18 V. Less powerful and slower. Uses NiCd batteries or, Li-ion batteries. They have normally two speeds. The slower speed to screw and the faster to drill. A clutch allows the user to set the torque to apply.

- **Jigsaw**: A saw with a reciprocating (up and down) movement.

- **Sander**: a power tool used to smooth surfaces by abrasion with sandpaper, equipped with a motor that moves the sand paper very fast. There are different types: Belt sander, Disc sander, Orbital sander, Delta sander, Random orbit sander.

- **Angle grinder**: A handheld power tool used for cutting, grinding and polishing. An electric or pneumatic motor drives a geared head at a right-angle on which is mounted an abrasive disc or a thinner cut-off disc or a Flap disc. There are three sizes for 115, 125, 230 mm. discs.

Jigsaw blades: Wood, metal.	Orbital sand paper	cut-off disc	Flap disc
			

4. Hand tools. Usually made of chromium-vanadium (Cr-Va) or Chromium-molybdenum (Cr-Mo) alloy steel.

- **Wrench or spanner (llave):** Metric or Whitworth. Is a tool to apply torque to turn fasteners like nuts, bolts or screws. The good ones are made of high strength steel (Cr-Va, Cr-Mo).

- Types of wrench:

  - **Open-end wrench (llave plana)**: With 2 U-shaped ends. Each end has a different size, normally: Metric: 6-7, 8-9, 10-11, 12-13, 14-15, 16-17, 18-19, 20-22, 21-23, 25-28….mm.

    Whitworth: 1/8 – 3/16, ¼ - 5/16, 3/8 – 7/16, ½ - 9/16, 5/8 – 3/4,…inches

    It is important to use the correct sized wrench to avoid stripping screws and nuts.

  - **Box-end wrench / Ring spanner (llave acodada)**: A double-ended wrench. Each end has an enclosed opening, with 6 or 12 points. The handle is in a raised position.

  - **Combination wrench (llave combinada)**: A double-ended wrench. Both ends are the same size, one open-ended, while the other one is box-end.

- **Tube wrench (llave de tubo).** Usually turned using an open ended wrench of the biggest size of the tube wrench.

- **Ratchet box wrench (carraca)**: Double-end wrench. Each end contains a one-way mechanism. When the wrench is turned forward and backwards, only one movement is applied to the bolt or nut.

- **Adjustable wrench (llave inglesa)**: Wrench with a wheel to move the gripping faces of the jaws, so it can be adjusted to different bolt or nut sizes.

- **Pipe wrench or plumbers wrench (llave de tubo)**: A tool that is similar in design and appearance to an adjustable wrench, but with self-tightening properties and hardened, serrated jaws that securely grip soft iron pipe and pipe fittings. Sometimes known by the original patent holder's brand name as a "Stillson wrench".

- **Socket wrench (llave de vaso)**: A type of wrench that has a socket attached at one end, usually used to turn a fastener. The sockets (vasos) have a squared hole of different sizes: ¼'', 3/8'', 1/2'', 1''.

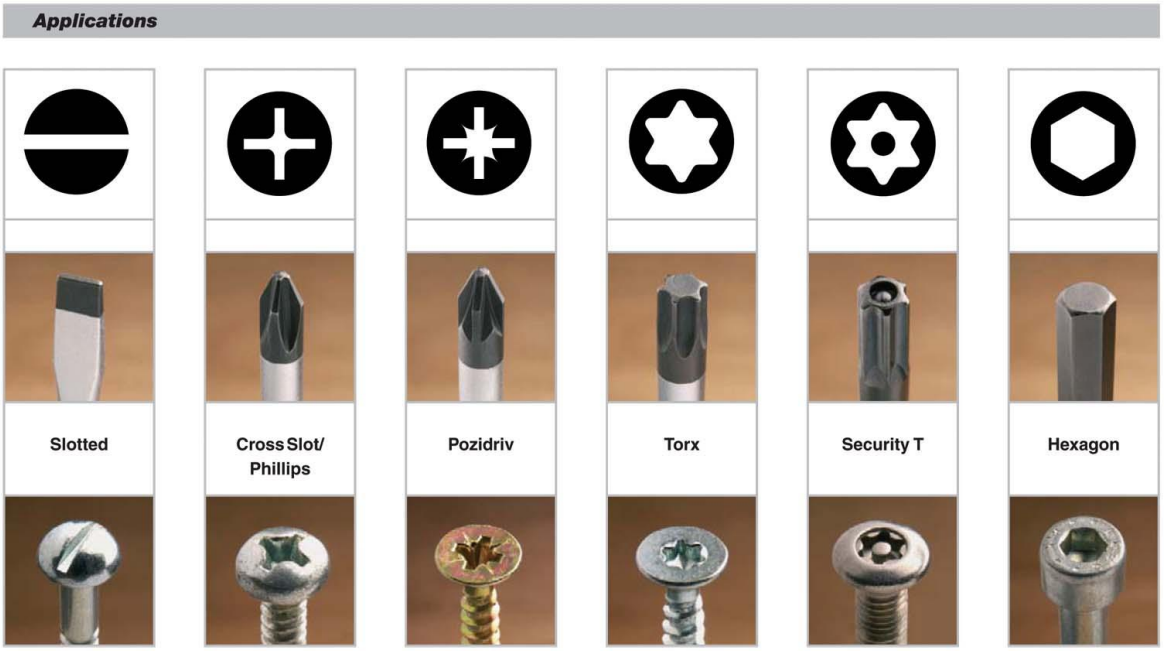
- **Torque wrench (llave dinamométrica)**: A socket wrench drive tool that is employed to impart a precise amount of torque to a fastener

An angular device can be added to turn the wrench a known angle.

- **Allen / Hex wrench/key**: A wrench used to drive screws or bolt heads designed with a hexagonal socket (recess) to receive the wrench. A ball on one end allows the tool to be used at an angle off-axis to the screw.

- **Torx wrench**: An internal socket-head screw design. The cross-section resembles a star. Very resistant to cam-out.

- **Screwdrivers (destornillador)**: A screwdriver is a tool, manual or powered, for turning (driving or removing) screws. A typical simple screwdriver has a handle and a shaft. The end of the shaft has a tip, that fits into the screw head. The tips could be:



- **Tools to hold parts:**
    - **Pliers (alicates):** Pliers are a hand tool used to hold objects firmly.
        - **Combination pliers**: are a type of pliers used by electricians and other tradesmen primarily for gripping, twisting, bending and cutting wire and cable.

        - **Locking pliers (alicates de presión):** Are pliers that can be locked into position, using an over-center action. One side of the handle includes a bolt that is used to adjust the spacing of the jaws, the other side of the handle (especially in larger models) often includes a lever to push the two sides of the handles apart to unlock the pliers

        - **Needle-nose / long nose pliers**

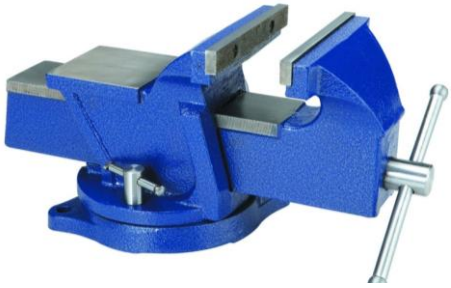
        - **Pincers (tenaza)**

- **Tongue and groove pliers (pico de loro)**

- **Round nose pliers. To open or close circlips.**

- **Diagonal pliers / Wire cutter.**

- **Vise / Vice (tornillo de banco).**



- **Cutting tools.**
  - **Hacksaw (sierra de arco)**

  - **Chisel, cold chisel (cincel)**

  - **Scissors (tijeras)**

  - **Drill bits:**

    Wood drill bits (broca Madera)

    Mansory drill bit (broca widia)

    Step drill bit (broca escalonada). A drill bit with different diameters. Only to drill sheets of metal.

Hole saw bit (corona): To cut bigger holes.

Twist drill bit (broca)

Twist drill bit with Morse taper shank (brocas con cono morse)

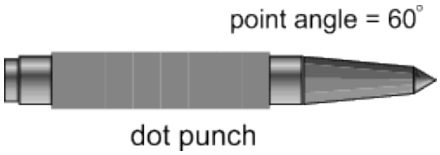
- **Impact tools**
  - **Mallet (maza)**

- **Ball hammer (martillo de bola)**

- **Wrecking bar / crowbar (pata de cabra).**

- Pin punch (botador). To take out pins.

- Dot punch (granete). To mark points on steel parts.



5. Safety at work.

Use always as Personal Protective Equipment (PPE) as possible:

Gloves, Overalls, Hard Hat, Safety boots, Ear protection, Safety goggles, mask, shield mask.

● The employer must provide the Protective Equipment to the workers. Other devices should be provided too, like emergency exits, Fire extinguishers, machine protective devices…

● The worker should know the risks and use the appropriate PPE.