

THE TECHNOLOGICAL PROCESS AND MATERIALS FOR TECHNICAL USE

Technology 1st year of CSE

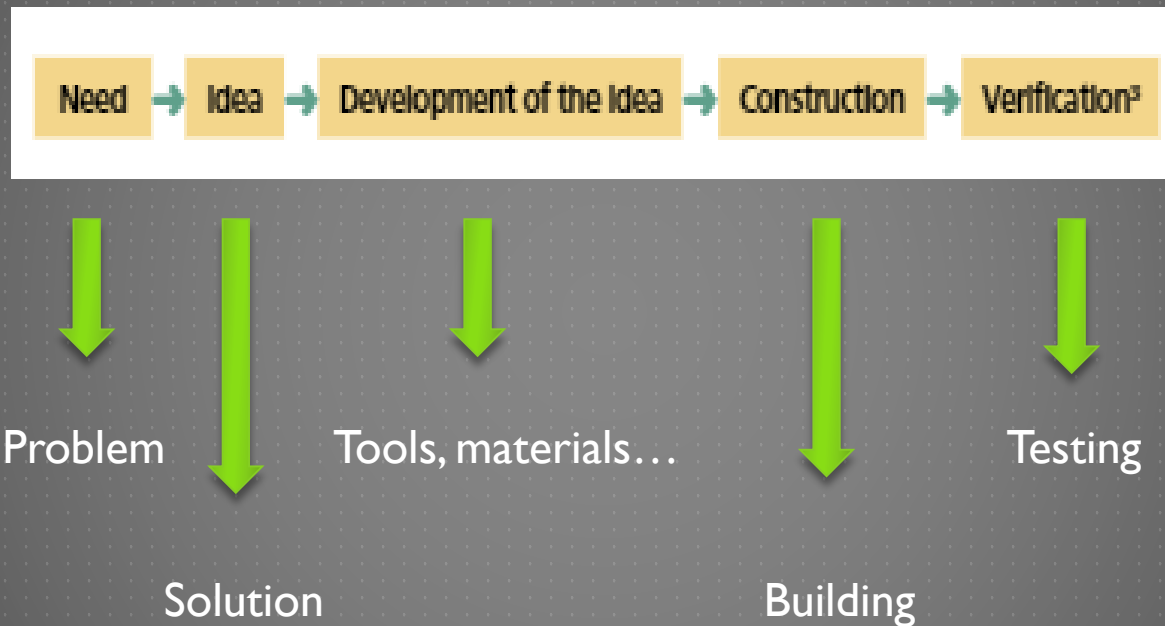


- ▶ TECHNOLOGY produces objects and develops strategies that satisfy our needs and make our life easier.



- ▶ THE TECHNOLOGICAL PROCESS consists of various stages to obtain a solution to a problem or need.

A possible sequence in the technological process could be:



▶ **RAW MATERIAL:** is a substance that we get directly from nature. Depending on its origin can be classified into three groups:

- ▶ Animal raw materials: wool, silk, hides, ...
- ▶ Vegetable raw materials: wood, cork, cotton, linen, ...
- ▶ Mineral raw materials: clay, sand, marble, ...

▶ **PROCESSED MATERIALS:** are material that have been prepared and are available for making other products.

Material	Source	Applications
 wood	We get this from the trunks parts of trees.	Construction, making paper, construction, wall and floor covering, furniture, fuel ...
 plastic	We get this from oil, coal, natural gas, vegetable matter and animal proteins.	Pipes, packaging, containers, covering for cables ...
 metal and alloy	We get this from minerals in earth.	Structures and parts of machinery, tools, electrical components, pipes ...
 textiles	We get this from vegetable, animal and mineral raw materials.	In the form of thread for making different fabrics for different purposes, clothes, carpets, curtains ...
 stone	We get this from different layers of earth, from huge blocks to sand.	Construction material and decoration.
 ceramics	We get this from shaping clay and cooking it at high temperatures.	Construction material for tiles, dishes, basins and decorative elements.

Types	Properties	Machines and tools
Hardwood trees: oak, cherry Softwood trees: pine, spruce Derivatives: cardboard, tissue paper, cord	<ul style="list-style-type: none"> • Durable • Renewable • Electrical insulator • Thermal insulator • Biodegradable • Renewable 	Saw, drill, files and rasp files, sandpaper, hammer, screwdriver, glue ...
Natural: cellulose, latex Synthetic: thermoplastic (polypropylene, nylon), thermosetting polymers (epoxyresin), elastomers (rubber, Neoprene)	<ul style="list-style-type: none"> • Malleable • Durable • Mechanical strength • Electrical insulator • Thermal insulator • Impermeable (waterproof) 	Sissors, file, glue ...
Ferrous: contains iron, like steel Non-ferrous: doesn't contain iron, like copper, aluminium	<ul style="list-style-type: none"> • Hard • Tough • Durable • Electrical conductor • Heat conductor • Impermeable 	Circular saw, drill, welding iron ...
Natural: wool, cotton Synthetic: rayon, lycra	<ul style="list-style-type: none"> • Flexible • Resilient • Impermeable • Durable 	Sissors, sewing machine ...
Pure: marble, granite Blends: glass, cement	<ul style="list-style-type: none"> • Hard • Durable • Corrosion • Impermeable • Resilient • Thermal insulator • Electrical insulator 	Tools used for cutting, polishing, painting ...
Thin: cellophane Thin: cellophane, parchment	<ul style="list-style-type: none"> • Impermeable • Thermal insulator • Electrical insulator 	Cheese, paper, varnish ...

- ▶ About properties, they make materials behave in a certain way under certain stimuli and determine how materials are used.

These properties are linked to the nature and composition of the material.

We can divide properties into two groups:

- TECHNICAL PROPERTIES (physical and chemical)
- ECOLOGICAL PROPERTIES

► TECHNICAL PROPERTIES:

■ **Electrical, thermal and acoustic conductivity:** This refers to the capacity of certain materials to transfer electricity, heat or sound, respectively.

■ **Thermal expansion:** This is how a material increases its size when the temperature increases.

■ **Fusibility:** This is the capacity of a material to go from a solid to a liquid when the temperature increases.

■ **Malleability and ductility:** Certain materials can be made into sheets or threads, respectively.

■ **Mechanical resistance:** This is the capacity of a material to bear external forces without breaking.

■ **Toughness:** This refers to the ability of a material not to break when it is hit by something.

■ **Hardness:** This is the resistance of a material to scratching.

■ **Permeability:** This is the ability of a material to let water or other liquids run through it.

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▶ TECHNICAL PROPERTIES:

■ **Oxidation:** This refers to the ease with which a material rusts, that is, it reacts with oxygen in the air or water.

CHEMICAL PROPERTIES

▶ ECOLOGICAL PROPERTIES:

Recyclable materials are those that can be treated to make materials that can be re-used. Recycling helps to preserve natural resources and to avoid the build-up of waste.

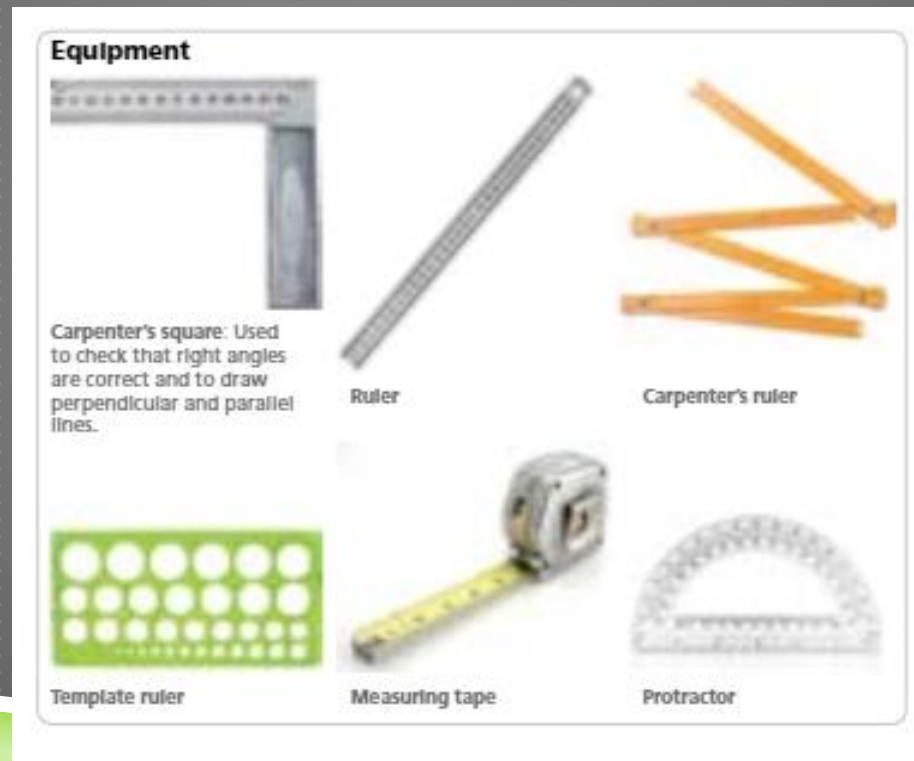
Toxic waste is anything that is harmful to the environment.

The term **biodegradable** refers to material that decomposes naturally and does not harm nature.

Some materials come from **renewable raw material**, which means that it can be regenerated.

- ▶ **EQUIPMENT, TOOLS AND MACHINES:** with them we usually prepare materials to make a finished product. The correct order for it is usually:

- ▶ **MEASURING**



► DRAWING MARKS AND LINES

Equipment and tools



Carpenter's pencil: Oval shaped to avoid slipping on the material. The lead is strong so you can use it on different surfaces (stone, wood, paper or cardboard). You sharpen it with a special knife.



Awl or punch: Used to make a small mark on the surface of the material so you know where to drill a hole.

Compass: Used to draw circles and arcs, and to transfer measurements.



Marking gauge: Used to draw lines which are parallel to the edge of the board.



Centre punch: Used to mark points on sheet metal. Put it on the point you want to mark and hit the other end hard once with a hammer.



Scriber: Used to mark straight lines on a sheet of metal or plastic.

► CLAMPING

Equipment



Bench vice: Fixed to the workbench. Turn the handle clockwise to move the mobile clamp towards the fixed clamp to fix the piece between them.



Bar clamp: Used to clamp pieces to the workbench or to clamp together two pieces that we want to glue together. It consists of a fixed head and a tall stop. The tall stop slides along the bar to the fixed head. You screw the handle to clamp the piece between the two parts.



C-clamp: Consists of a fixed head and a screw. Turn the screw to clamp the piece.



Ring clamp: Used to clamp circular pieces with different diameters.

▶ CUTTING



Handsaw: Used to make straight cuts.



Tenon saw: Used to make more precise cuts.



Keyhole saw: Its thin blade can be used to make curved cuts.



Coping saw: Used to make different cuts in thin wood.



Hack saw: Used to make straight cuts.



Fret saw: U-shaped with flat or round blades.



Pliers and cutters

► DRILLING

Tools



Gimlet: Used to drill through thin pieces of wood and make small holes.



Hand drill: Used to make more precise holes quickly and more easily, using different drill bits.

Power tools



Electric drill: Makes holes as the drill bit turns and moves forward. Used to make more precise holes easily.



Drill bits: Inserted into the front of the drill to make holes. They are made of different materials and have different lengths and diameters for different tasks.

▶ PLANNING AND SANDING



▶ JOINING



Equipment and tools



Screwdrivers: With a flat (slotted) or star-shaped (Phillips) point. Used to insert or remove screws.



Screws: Usually have a round head and are round, cylindrical, hexagonal and countersunk.



Spanners: Used to tighten and loosen nuts and bolts. The adjustable wrench can be used for different sized nuts and bolts.

Analyse

Adhesives

Contact adhesive: Sticks immediately.

Wood glue: Takes 20 minutes to set.

Epoxy glue: The two substances are mixed in the same proportion. Settling times are between 20 minutes and one hour. Very resistant to water.



Glue gun: An electric machine that you push a solid thermoplastic stick into. When you plug in the gun, the resistor melts the glue.

THAT'S ALL