

Information on certain aspects of the science and technology programs

The Living World

BIODIVERSITY

The biodiversity of a community is defined as the relative abundance of the species living in that community. This necessarily implies that the species richness (the number of species) has already been taken into account.

The Material World

DIRECTION OF CURRENT

The direction of the current should be determined according to the polarity of the terminals, which is indicated on the source or ends of the wires.

NOBLE GASES

Group VIIIA (or group 18) consists of the elements that will be referred to as noble gases.

The Technological World

According to the Progression of Learning, the graphical language associated with the various techniques is characterized by the increasing complexity of the objects to be represented. Students are required to know the drawing techniques used to represent a multiview orthogonal projection.

DIMENSIONING

Set of dimensions and tolerances that must be observed to manufacture an object and ensure that it works properly

TOLERANCE

Precision (acceptable deviation) required in manufacturing the components of an object. If necessary, this tolerance is indicated as \pm and is included in the title block.

FUNCTIONAL DIMENSIONING

Specific tolerance (acceptable deviation) that is associated with the dimensions (minimum and maximum) of a part of a component or of a component of an object and that is required for the object to work (e.g. $32.5^{+0.1}$ or $32.5_{-0.2}$ or $32.5 \pm_{0.1}^{0.3}$)

Play is the space allowed between two parts to ensure that they can move freely. Depending on the situation, there may or may not be any play between the parts.

CONSTRAINTS

External forces (shearing, compression, deflection, torsion and tension) exerted on materials and that have a tendency to deform them

MECHANICAL PROPERTIES

Properties (ductility, hardness, elasticity, fragility, malleability, resilience, stiffness) that affect materials when they are subjected to one or more constraints

OTHER PROPERTIES

Corrosion resistance, electrical conductivity and thermal conductivity

BASIC MECHANICAL FUNCTIONS

All parts or organs that make up a technical object have a mechanical function : the role this part plays inside the object.

The four basic mechanical fonctions are : linkage, guidance, lubrication and seal.

LINKING OF MECHANICAL PARTS (TYPES OF LINKS)

A large number of links exists. Some of the most common ones are: embedded, helical, pivot, sliding pivot, slide and ball joint.

GUIDING

Function of a component that controls the motion of a moving part so that it follows a specific trajectory.

DIRECT LINK

A link is direct when the parts are designed to hold together without the intermediary of another organ.

INDIRECT LINK

A link is indirect when the parts need an intermediary organ (nail, screw, glue, etc.) to hold together.

RIGID LINK

A link is rigid when it entails a rigid linkage organ OR when the surface of the parts is rigid and their complementary shapes ensure the link.

FLEXIBLE LINK

A link is flexible when there is a flexible linking component or flexible material. It ensures that the parts will return to their initial position if the object works properly.

REMOVABLE LINK

The link is removable when the parts can be taken apart without damaging the surfaces or the linkage organ.

PERMANENT LINK

The link is permanent when separating the parts entails the deterioration of their surfaces or of the linkage organ.

PARTIAL LINK

A link is partial when the linked parts must move in relation to one another for the object to work properly.

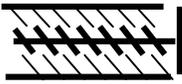
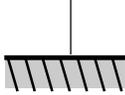
COMPLETE LINK

A link is partial when the linked parts must move in relation to one another for the object to work properly.

REVERSIBILITY

A mechanism is reversible when a driven component can become a driver component and vice versa.

BASIC SYMBOLS FOR DIAGRAMS

			
Screw or bolt	Nut	Nut and bolt system	Reference solid base
			
Part free for rotation and linked for translation	Part free for rotation and translation	Complete link (embedded)	Part free for translation and linked for rotation
			
Angle spring (Torsion spring)	Compression spring	Gear	Wheel or pulley
			
Rack	Tension spring	Gear (side view)	Pulley (side view)

MATERIALS

The different materials will be examined with a view to associating them with some of their properties.

The use of materials will be studied, but not the way they are manufactured.

Metals and alloys	Electrical conductivity Hardness Magnetism Oxidation	
Ceramics	Hardness Low electrical conductivity Wear resistance Heat resistance Corrosion resistance	
Composites	Durability Hardness Elasticity Lightness Resilience Stiffness Corrosion resistance	
Plastics	Thermoplastics	Chemical neutrality (unreactive) Elasticity Lightness Resilience Corrosion resistance
	Thermosetting plastics	Hardness Resilience Heat resistance Stiffness