



## Mechanics set 1 and 2

SCN-F002E1

### Function

Intended for the study of: Physics. Kinematics. Reference, position, movement and trajectory. What is meant by mobile. The trajectory and displacement. The difference between displacement and distance travelled. The Cartesian frame of reference in the plane, orthogonal Cartesian plane. The quadrants. The coordinates of any point on the plane that contains the orthogonal Cartesian system. Differences between scalar magnitude and vector magnitude. Static. Experimental determination of the mechanical advantage of the inclined plane. The driving force and its equilibrant, the condition of equilibrium of a piece of furniture on an inclined plane. Dynamics. Friction forces and Newton first law of motion. The force of friction and the nature of the surfaces in contact. Friction between contacting surfaces versus Newtons first law of motion. The friction forces between surfaces of different nature that are in contact. The friction force, the apparent area and the real area of contact of the surfaces. The force of kinetic friction. The helical spring and Hooke law. Temporary deformation, elastic deformation. Permanent deformation, plastic deformation. Building table and graph. Determining the spring elasticity constant. What does Hooke law say? Association of two helical springs in series. Determining the elasticity constant of two springs in series. Association of two helical springs in parallel. Determining the elasticity constant of two springs in parallel. Energy Conservation. Work and energy in a mass and helical spring system, conservation of mechanical energy. The energy exchanges that occur in an oscillating mass-spring system. The work done by a force acting on a body and causing a displacement in that body. Elastic potential energy. Hydrostatic. The thrust, experimental proof. Determining,

by difference, the buoyant force acting on a body submerged in a liquid. Archimedes principle, buoyancy and its relationship with the volume and density of the displaced liquid. The principle of the impenetrability of matter. How to fix the volume difference. Measuring forces with the dynamometer. Calculating and determining the characteristics of the buoyant hydrostatic force. Determining the weight of the volume of liquid displaced. The relationship between buoyancy and the weight of the volume of liquid displaced. Archimedes principle, Archimedes theorem. Absolute density (specific mass) and relative density. The specific weight. The relationship between specific gravity and absolute density. The relationship between buoyancy and volume, the density of the displaced liquid and the acceleration due to gravity. The relationship between buoyancy and the volume and specific weight of the liquid displaced. Wave. The MHS in a mass system and oscillating helical spring. Simple harmonic motion (MHS) performed by a mass coupled to a spring. The expression that translates MHS. Elastic potential energy. The pulse of the MHS, etc.

## Knowledge areas

Physics - Math & Science Fundamentals - Compact Kits

## Key Experiments

The movement and the trajectory.

The frictional forces and Newton's first law of motion

The movement and the trajectory.

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