



## Function

Intended for experimental study, laboratory of natural sciences, physics, chemistry and biology to carry out experiments on: Matter and energy. The melting of ice, the change from a solid state of water to a liquid state. The general properties of matter. The specific properties of matter. Burning the candle produces light and heat. A simple machine called a fixed pulley. Force applied to a spring and the elongation suffered. The differentiation between force and pressure. The Magdeburg hemisphere experiment and atmospheric pressure. What is meant by Magdeburg hemispheres. Reducing internal pressure to the discs. Balancing the internal pressure of the discs with atmospheric pressure. The free surfaces of a liquid within communicating vessels. The thermoscope. The difference between thermoscope and thermometer. The difference between heat and temperature. The physical states of water. The solidification of water, obtaining colored ice. Boiling and condensation of water. The means of heat propagation. Kinematics. Reference, position, movement and trajectory. A simple machine called a movable pulley. Dynamics. Friction forces and Newton first law of motion. The helical spring and Hooke law. Association of helical springs in series. Determination of the elasticity constant of helical springs in series. Energy Conservation. Work and energy in a system of mass and oscillating helical spring, conservation of mechanical energy. . Static. The experimental determination of the mechanical advantage of the inclined plane. The balance of a piece of furniture on an inclined plane. Hydrostatic. Buoyancy, a vertical force, directed from bottom to top. Electricity. Electrical conductors and electrical insulators. Series, opposition and parallel connections between batteries. Associations of lamps in

series and parallel. Ohm law. Associations of resistors in series, parallel and mixed. The mesh laws and Kirchhoffs knot law. The potentiometer, a variable resistor. Measurements in mixed circuits, electrical power, direct current. The series RC circuit, direct current. Magnetism. Permanent magnets, temporary magnets and the electromagnet. Electromagnetism. The electrical voltage transformer. Wave. Main characteristics of waves in a spring. The propagation speed of a pulse in a spring. Mechanical waves. Remembering what a wave pulse is. The phenomenon of reflection and interference in a transverse wave in a spring and the standing wave. Chemical. Material properties. How to determine the density of a liquid using a pycnometer? Periodic table. The electronic distribution of chemical elements. The kinetic behavior of gases. Influence of temperature on the atomic and molecular movement of a gas. Separation of mixtures. How to separate heterogeneous mixtures through magnetic separation? How to separate homogeneous mixtures using paper chromatography? Chromatography. Adsorption is an interface phenomenon, surface phenomenon. Chemical bonds. How to relate the properties of substances through electrical conductivity? Chemical reactions. How does the double exchange reaction occur? Inorganic functions. How to identify the character of an acidic oxide? How do acids and bases behave in relation to different indicators? Organic chemistry. Construction of three-dimensional organic structures. Alcohol, water absorption. Biology. Are all circulatory systems the same? How to use the biological microscope? Genetics. Are we all the same? What is the probability? AND rule and OR rule in genetics. Genetic crosses, using a Punnett square. Vision defects, correction of hyperopia and myopia with lenses, with a laser flashlight, a beam, etc

## **Knowledge areas**

Physics - Chemistry - Biology - Mathematics - Math & Science Fundamentals - Compact Kits

## **Key Experiments**

Fusion, the change from solid to liquid state

The specific properties of matter

Some transformations of energy: the candle produces light and heat when burning

The experiment of the Magdeburg hemispheres and atmospheric pressure

The thermoscope and thermometric scales

Boiling and condensation of water

The movement and the trajectory.

The frictional forces and Newton´s first law of motion

The experimental determination of the mechanical advantage of the inclined plane

The equilibrium of a moving object on an inclined plane

The experimental proof of buoyancy

Electrical conductors and electrical insulators

The links in series, in opposition and in parallel between cells

Permanent magnets, temporary magnets and the electromagnet

Pulse, frequency and wavelength of a spring

Producing and identifying the waves on a long spring

The standing wave in a long spring

How to separate heterogeneous mixtures through magnetic separation. Part II of V

How to separate homogenous mixtures using paper chromatography. Part I of II

How do you list the properties of substances by electrical conductivity?

Classification of inorganic reactions – How does the reaction of hydrogen displacement (simple exchange) occur? Part III of IV

Classification of inorganic reactions – How does the formation of precipitates (double exchange) occur? Part IV of IV

Inorganic chemical functions – How to obtain an acid oxide. Part II of III

Inorganic chemical functions - How do acids and bases behave in relation to different indicators? Part I of II  
Construction of three-dimensional organic structures.  
Organic functions - Alcohol - Water absorption  
Are all circulatory systems equal?  
How do you use the biological microscope?  
Are we all equal?  
What is the probability? E rule and OU rule in genetics.  
How to use the insufflation bulb  
The determination of the density of a liquid

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