



## Force panel with pulleys, springs, levers

EQ032JP

### Function

Intended for experimental study, physics laboratory and carrying out physics experiments on: Statics. Mass, weight and determination of local  $g$  value. Mass is a scalar quantity and force is a vector quantity, the vector. Measuring mass weights. Table and graph. The composition of competing coplanar forces, at  $90^\circ$  to each other. Force and vector. Characteristics of a vector. Graphical representation of a vector quantity. Collinear vectors and coplanar vectors. The resulting vector. Operations with coplanar and non-parallel vectors. Some types of strength. Measuring the weight force of the set of masses. Measuring the component forces and determining the resultant force. Comparing the resultant force with the balancing force. The composition and decomposition of competing coplanar forces at  $60^\circ$  to each other. The parallelogram rule. Measuring the angle between component forces. Measuring the component forces and determining the resultant force. Comparing the resultant force with the balancing force. The composition and decomposition of competing coplanar forces within  $120^\circ$  of each other. The composition and decomposition of competing coplanar forces. Mass is a scalar quantity and force is a vector quantity. The resulting vector. Vector operations. Force diagram. Measuring the angle, the component forces and determining the resultant force. Calculating the percentage relative error. Rigid body equilibrium conditions, Varignon theorem. The pure translational motion of a rigid body. The pure rotational motion of a rigid body. What is meant by torque (or conjugate, or moment of a force) in relation to the center of moments. The torque direction. The direction of torque, right-hand rule. Measuring weights and calculating the average value. The two conditions, necessary and sufficient, for the

equilibrium of a rigid body. Checking the equilibrium conditions of the rigid body. Checking the equilibrium conditions in an interfixed lever, Varignon theorem. The lever interfixes and the forces that act, neglecting the weight of the lever. Identifying the values  $\ell_i$  of the acting forces and the positions in which they act. Determining the resultant force on the interfixed lever, neglecting the weight of the lever. Determining the resulting moment of the forces acting on the lever, neglecting the weight of the lever. Dynamics. The simple machine called fixed pulley. Identifying the motor force and the resistant force when using the fixed pulley. The simple machine called movable pulley and its mechanical advantage. Identifying the motor force and the resistant force when using the movable pulley. Determining the mechanical advantages of the fixed pulley. An application of fixed pulleys, a load elevator system. The elastic constant of a helical spring, Hooke law, restoring force. Building the table and graph F versus x. Elastic deformation and plastic deformation. The elastic constant of a series association of springs, Hooke law, restoring force. The elastic constant of a parallel association of springs, Hooke law, restoring force. Energy Conservation. Work and mechanical energy in a mass and helical spring system. The physical meaning of the graph area F versus x. Wave. The simple pendulum and its laws. The ideal simple pendulum. Elongation and amplitude in the movement of a simple pendulum. The period and frequency of a simple pendulum. The law of pendulum isochronism. The law of masses and pendular substances. The law of lengths of the simple pendulum. The mass and spring oscillator, dynamic determination of the elasticity constant. Simple harmonic motion (MHS) in a mass and spring system. The elongation and amplitude of an MHS, etc.

## Knowledge areas

Physics

## Key Experiments

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