



## EXPERIMENT PROCEDURE

- Measure the force  $F_1$  as a function of the load  $F_2$ , the distance between the load and the fulcrum  $x_2$  and the distance between the force and the fulcrum  $x_1$  for a second-class lever.
- Measure the force  $F_1$  as a function of the load  $F_2$ , the distance between the load and the fulcrum  $x_2$  and the distance between the force and the fulcrum  $x_1$  for a first-class lever.

## OBJECTIVE

Verification of the law of the lever.

## SUMMARY

The law of the lever follows from the equilibrium of moments, which works for all three classes of lever. It represents the physical basis for all kinds of mechanical transmission of force.

## REQUIRED APPARATUS

Quantity	Description	Number
1	Lever	1008539
1	Precision Dynamometer 2 N	1003105
1	Precision Dynamometer 5 N	1003106

# 1

## BASIC PRINCIPLES

A lever is a fixed body which can rotate around a fixed axis and can be used to lift and move loads. A force or effort is applied at a certain point from the fulcrum in order to move a load or resistance at another point along the lever. With a second-class lever, the effort  $F_1$  and load  $F_2$  are both on the same side of the fulcrum and both the forces act in opposite directions. With a first-class lever, the forces are on different sides of the fulcrum and are both directed the same way.

For both types, the law of the lever follows from the equilibrium of moments:

$$(1) \quad F_1 \cdot x_1 = F_2 \cdot x_2$$

This represents the physical basis for all kinds of mechanical transmission of force.

## EVALUATION

From the values measured, calculate in each case the products  $F_1 \cdot x_1$  and  $F_2 \cdot x_2$  and make a comparison between them.

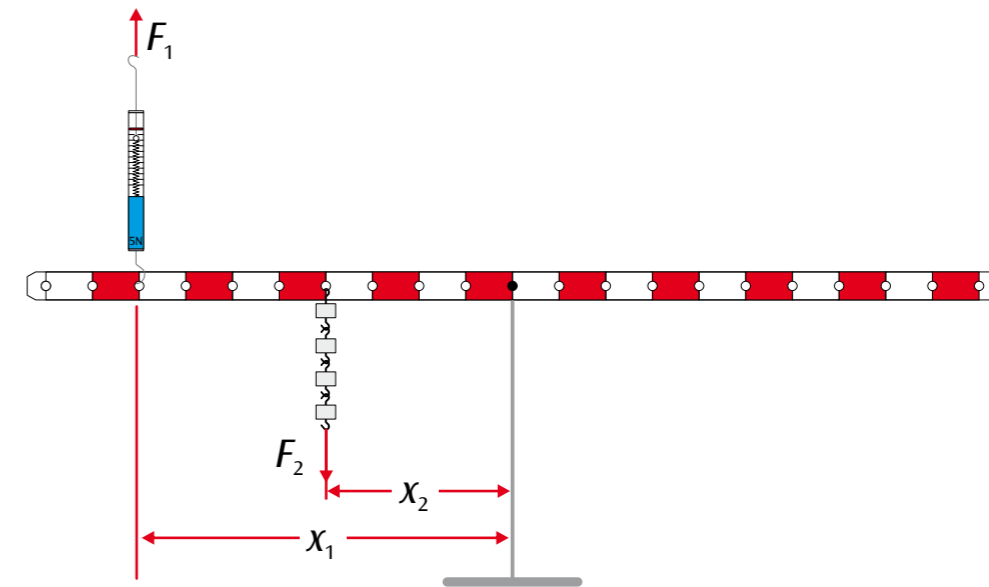


Fig. 1: 2nd-class lever

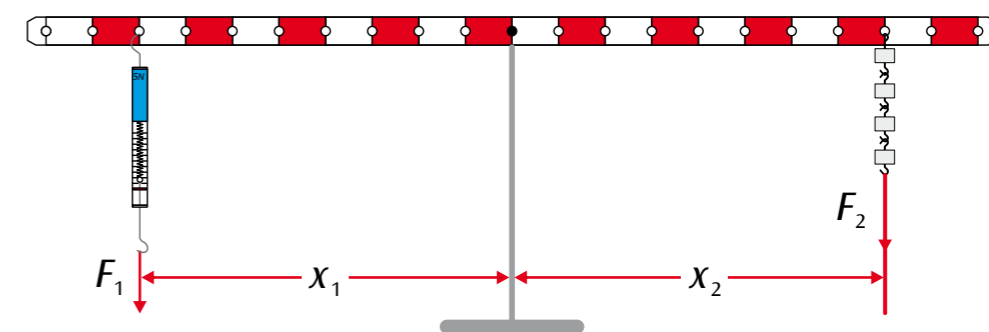


Fig. 2: 1st-class lever