



## Material

Item-no.	Qty.	Description
DS090-3K	1	Claw base "Sepp", 260 x 220 mm
DS093-04	1	Sliding saddle "Sepp", H=40 mm
DS095-3K	1	Bosshead cross-pattern, demo 03
DS201-00	1	Support rod, round, L=1000 mm, D=12 mm
DS204-2L	1	Bearing pin with clamp insert
DG110-1G	1	Pointers for rods, pair
DM210-3A	1	Pulley, plastic, D=100 mm
DM210-2L	1	Pulley, movable, with hook, D=100 mm
DG200-1S	1	Cord, D=1.7 mm, L=5 m
DM121-7A	1	Weight on hook 1 kg, profi
DM121-6A	1	Weight on hook 500 g, profi
DM725-ND	1	Newtonmeter "inno" 20 N / 2000 g
P3120-5B	1	S-shaped assembly platform

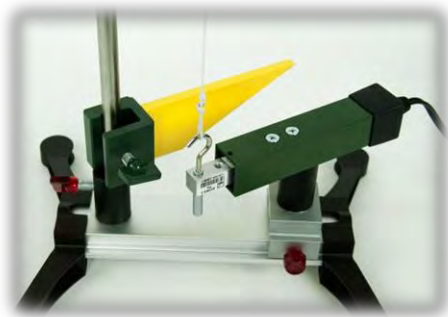
## Purpose

A block and tackle is a combination of fixed and loose pulleys; a simple block and tackle consists of one fixed pulley and one loose pulley.

## Preparation

Insert the 1000 mm support rod into the sliding saddle of the claw base; afterwards mount the sliding saddle "Sepp" on the end of the claw base.

The weighing bar of the Newtonmeter is mounted in this sliding saddle.



Mount the bosshead at a height of 90 cm on the support rod; the pulley without hook is fixed at this bosshead with the help of the bearing pin with clamp insert.

Cut off a 170 cm piece of the cord and make loops at both ends of the cord; the remaining length after making the loops should be 160 cm approximately.

Hang one side of the cord to the bearing pin, place the moveable pulley in the cord, move the cord over the fixed pulley and mount the cord on the hook of the weighing bar.

Place the Newtonmeter on the S-shaped assembly platform for better visibility, set the **measuring range of the Newtonmeter to „N“ (Newton)**, turn it on afterwards and tare if required (set to 0).



## Experiment 1

Load one or more weights on the movable pulley.

## Result

Approximately half the force of weight is required to hold the mass; the "second half" of the force of weight is held by the bearing pin.

The friction of the pulleys causes a small loss of force, thus the force of weight will be a little less than the half.

## Experiment 2

Adjust the upper pointer so that it marks the bottom end of the pulley.

Remove the weighing bar from the sliding saddle and raise it by 40 cm approximately; thus the weight moves down.

Measure the two paths with a ruler or tape measure and compare them.

## Result

For the simple block and tackle the following applies:  
The force is halved when the path is doubled.

$$F \times s = \frac{F}{2} \times 2s$$

The change of the direction of force can be observed too. The fixed pulley can be seen as a two-sided lever and serves only to redirect the line of action of the force.

It is easily understandable that only half the force is needed because the weight acts on both cords while only one is pulled.

## Practical application

For example to lift loads or to gain strength.

