SIMPLE FIXED PULLEY

MED 11.01

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
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

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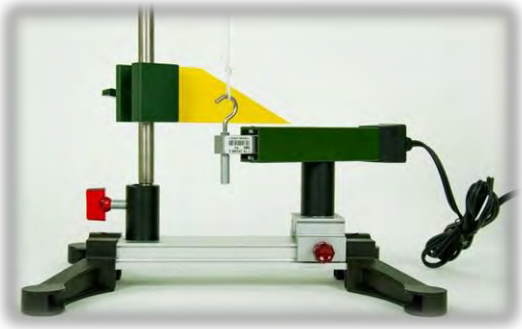
Purpose
To demonstrate the condition for equilibrium on a simple fixed pulley.

Preparation
Insert the 1000 mm support rod into the sliding saddle of the claw base; afterwards mount the bosshead at a height of 80 cm on the support rod.

Mount the pulley in this bosshead with the help of the bearing pin with clamp insert as shown on the image to the right.



Place the sliding saddle at the end of the claw base and mount the weighing bar of the Newtonmeter in this sliding saddle with the hook facing upwards.

Cut off a 100 cm piece of the cord and make loops at both ends of the cord; the remaining length after making the loops should be 90 cm approximately.

Hang the cord into the hook of the weighing bar and place it over the pulley.

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).

The pointers are positioned as shown on the images.

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Experiment 1
Hang a weight of 1 kg on the cord and read off the force of weight.

Experiment 2
Loosen the screw on the sliding saddle and raise the weighing bar, thus the weight on the opposite side moves further down - compare the two paths!

Experiment 3
Change the setup as shown on the right image. Mount the weighing bar in the bosshead with the hook facing downwards; the pulley is not required for this setup.

Compare the two forces of weight.

Result
The forces of weight are nearly equal.

The friction of the pulley causes a small loss of force, thus the force of weight is smaller in the 1st experiment.

The fixed pulley is a double-sided lever with the same arm length, therefore: $F_1 = F_2$
When lifting or lowering the weight the two paths are the same.

Note
The fixed pulley is described as a machine because changing the direction of force can make "work" easier.

The direction of force can not only be changed by 180 ° as shown on the image but practically as desired. The cord can be carried away tangentially anywhere on the pulley.
The lever arm is always the same as the radius.