



Material:

Item-no.	Qty.	Description
DS090-3K	1	Claw base "Sepp", 260 x 220 mm
DS201-75	1	Support rod, round, L=750 mm, D=12 mm
DS095-3K	1	Bosshead cross-pattern, demo 03
DS130-1S	1	Inclined plane, simple (02)
DM650-1R	1	Roller, 500 g
DM132-1D	1	Torsion dynamometer 5 N
DS130-1T	1	Holder for torsion dynamometer for inclined plane
DS101-50	1	Stand rail, universal, L=500 mm
P5310-1S	1	Rail bond SE, universal

Purpose

Can force or work be saved due to the usage of an inclined plane?

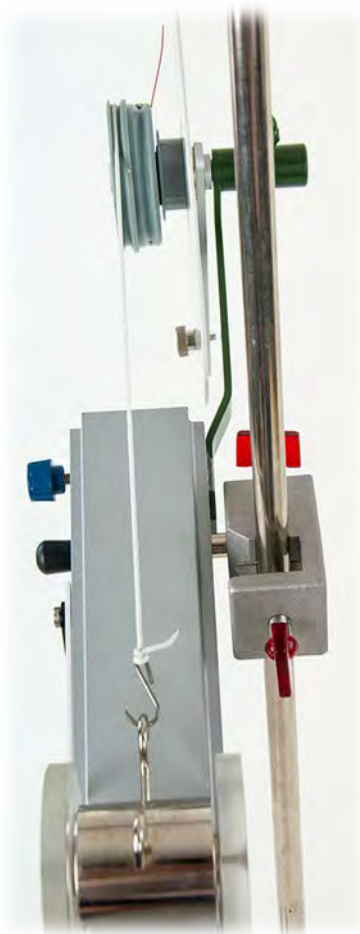
Preparation

Insert the 750 mm support rod into the sliding saddle of the claw base.

Mount the bosshead at a height of 55 cm on the support rod.

Connect the Inclined plane with the help of the rail bond to the 500 mm stand rail, thus we receive a track with a length of 820 mm.

Afterwards fix the combined track with the rod (part of the inclined plane) at the bosshead.



Fix the holder for the torsion dynamometer on the bottom side of the upper end of the combined track.

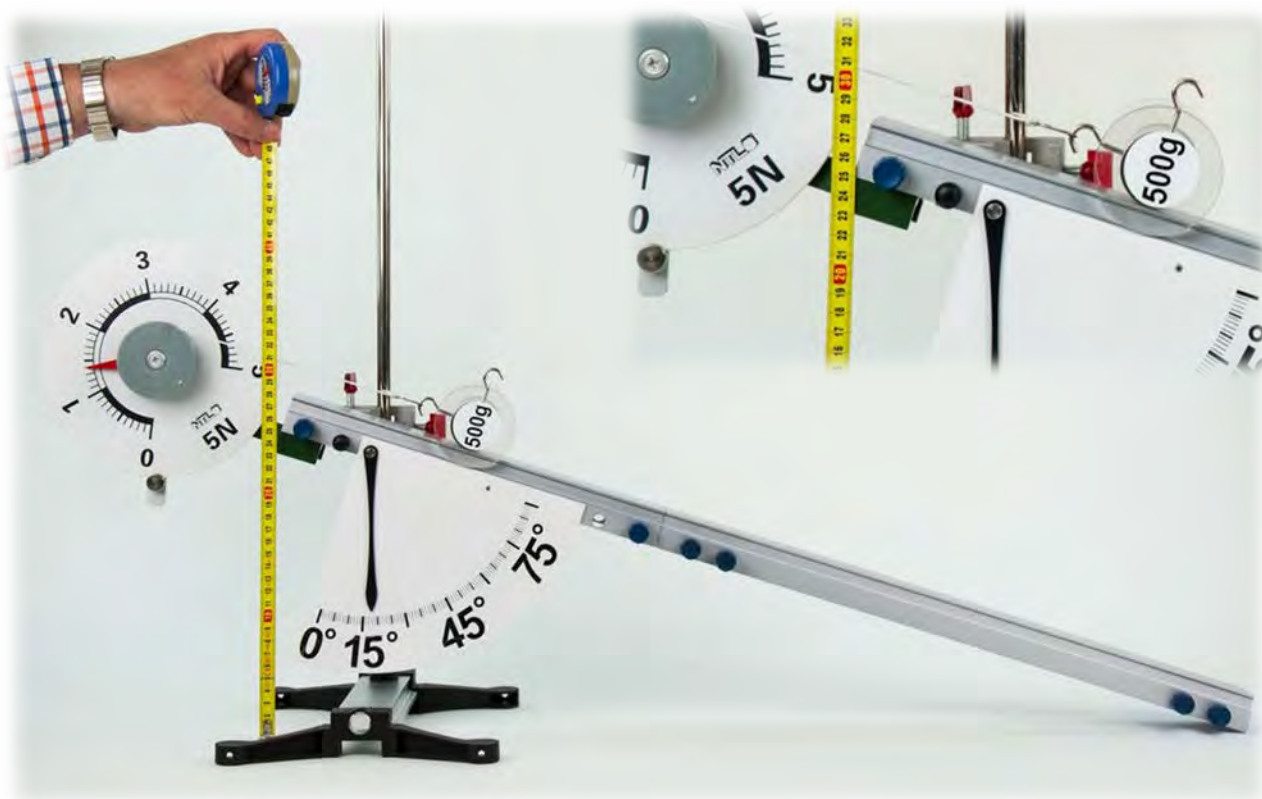
Now the torsion dynamometer can be mounted at this holder.

Adjust the scale of the torsion dynamometer to Zero, to achieve this loosen the screw on the scale so that the scale can be moved.

Hang the 500 g roller into the hook of torsion dynamometer.



Experiment 1 - A



The upper end of the combined track is fixed at a height of 25 cm.

To do this loosen the bosshead and move it to the given height, use a measuring tape to make sure that the track is at a height of 25 cm (measure from the table to the bottom edge of the combined track).

The torsion dynamometer indicates the pull force that it is required to lift the roller at a slight slope.

The required work can be calculated as follows:

$$\text{Work} = \text{Force} \times \text{Distance}$$

Note your measurements and calculations in the chart below.



Lift height 25 cm	Force N	Distance m	Work J
Track with slight slope		0.82	
Vertical lifting		0.25	

Experiment 1 - B



Raise the upper end of the combined track to a height of 50 cm.

Use the same parameters as in the 1st experiment and compare the performed work.

Lift height 50 cm	Force N	Distance m	Work J
Track with strong slope		0.82	
Vertical lifting		0.50	

Conclusion

The performed work is equal in both experiments.

If a weight is pulled up on an inclined plane less force is required, however a longer distance has to be travelled.

The lifting work is only depending on the weight and the lift height:

$$W = N \times m = \text{Mass} \times \text{Gravity (g)} \times \text{Distance (m)}$$

Note

The roller causes a certain amount of friction on the combined track, thus the results will not be absolutely identical.