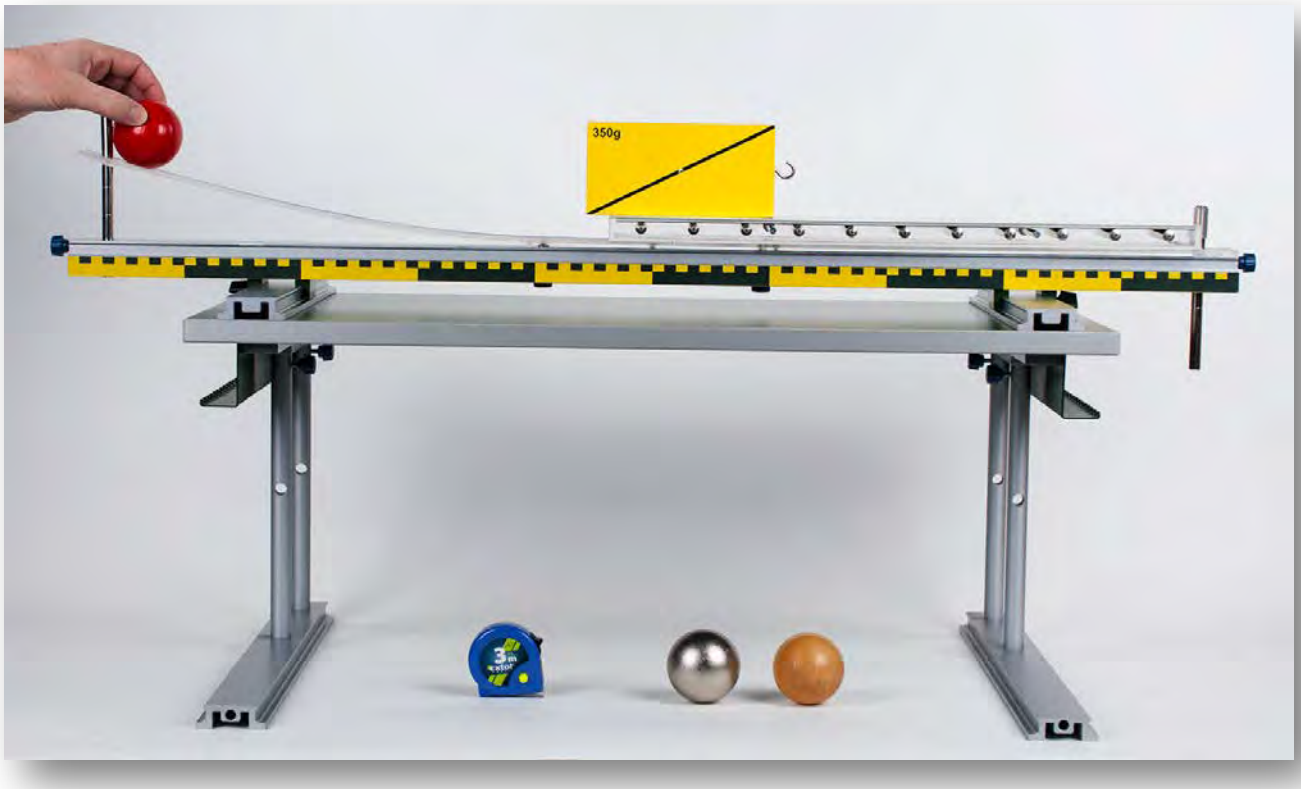
FRICTION, SURFACE AND KINETIC ENERGY

MED 05.05



Material

Item-no.	Qty.	Description
DS600-10	1	Assembly for lab table "NTL"
DS101-4B	1	Universal rail with scale and holes, L=1000 mm
DS101-2A	1	Flexible track, acrylic, L=1000 mm
DS102-2G	2	Clamp saddle
DM680-2P	1	Static, sliding and rolling friction board
DM680-2R	1	Block for friction and stability
DM360-5H	1	Ball, D=60 mm, wood
DM360-5R	1	Ball, D=60 mm, plastics, red
DM360-5E	1	Ball, D=60 mm, steel
P1100-1E	1	Measuring tape, L=300 cm

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Purpose
The dependence of the frictional force on the surface condition is shown by different stopping distances.

Preparation
Place the assembly on a stable surface and fix the two clamp saddles to the profile of the track as shown on the picture.

Place the flexible track on the universal track and put the two central rods through the holes of the universal track. Both plastic screws is positioned centrally on the lower thread; afterwards close the screws. The two support rods are inserted from the bottom into the outer holes and fixed there.

Place the Static, sliding and rolling friction board on the track and move it to the right support rod as shown on the image; the plastic side of the friction board is facing upwards.

Experiment
Place the block for friction and stability on the friction board so that it protrudes 2 cm beyond the left end. The balls are now rolled one after the other from the left end.

The stopping distance of the block for friction and stability is determined and noted in the chart below.

Material of the friction surface	Stopping distance in cm		
	Ball wood	Ball plastics	Ball steel
smooth (plastic)			
coarse (sand paper)			
Rolls (rolling friction)			

Depending on the mass of the ball there are different kinetic energies that are converted into friction work. Using different surfaces results in different stopping distances.
In this way coefficients of friction can be compared directly with another.

When determining the stopping distances on the rollers, it is recommended to place the mass body 350 g in front of the block for friction and stability so that it can rest completely on the rollers.

Conclusion
With the same amount of friction work, the stopping distance is small if the friction force is large.

Note
The following factors are decisive for the stopping distance of vehicles:
1. The coefficient of friction, which depends on the type of soil (asphalt, concrete, earth) and also on the condition of these (wet, dry, icy, etc.)
2. Whether there is sliding friction or static friction