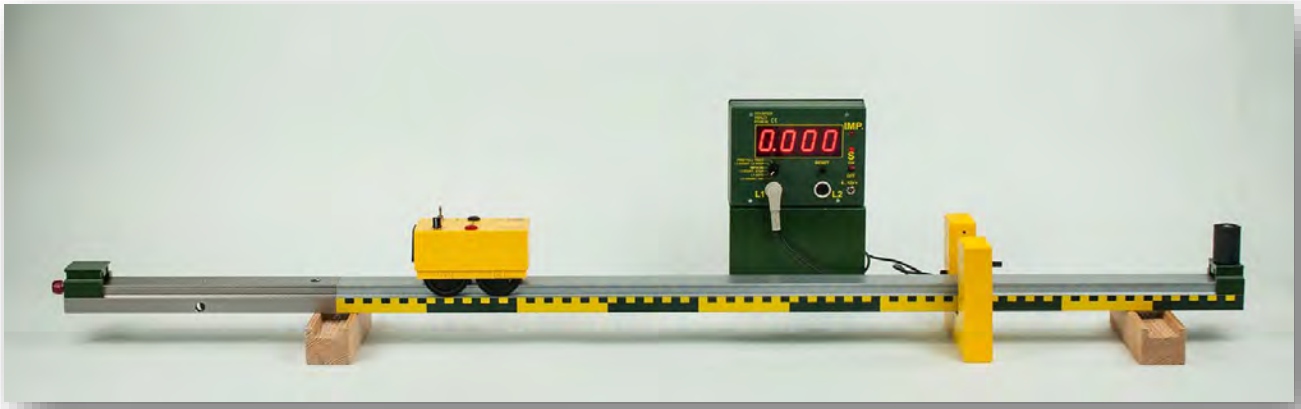
SPEED

MED 04.04a



Material

Item-no.	Qty.	Description
DS101-3B	1	Stand rail with scale, L=1000 mm
P7210-5C	1	Stand rail NTL, L=300 mm, SE
P5310-1S	1	Rail bond SE, universal
DS103-1H	1	Holder for guide rail
DM362-1E	1	Baffle block
DS102-2G	1	Clamp saddle
DM300-3A	1	Trolley with variable speed
P1320-4A	1	Light gate "demo" 04
P1321-3K	2	Block for light gates
P3120-2Z	1	Universal timer "inno"
P3120-5B	1	S-shaped assembly platform

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Purpose
To measure the speed of a uniform movement.

Preparation
Connect the 100 cm stand rail and the 30 cm stand rail with the support of the rail bond; afterwards fix the holder for guide rail on the right side of the track and attach the baffle block to this holder.

Positon the blocks for light gates and the light gate as shown on the image on the left side. Place the light gate at the 70 cm mark of the track, afterwards place the track on the light gates - the small bridges of the light gate should be exactly on these marks. Place the universal timer “inno” on the S-shaped assembly platform for a better visibility.

Connect the light gate to the “L1”-socket of the universal timer and select the “L1 GATE”-setting with the switch.
Place the trolley with variable speed on the track and test if it can pass through the light gates without touching them.
Once this is ensured place the trolley with variable speed on the left side of the track.

Experiment
Turn on the universal timer and adjust the brightness controller of the light gate so that the diode is just not lighting up.
Afterwards push the “reset”-button on the universal timer.
The speed controller on the trolley is set approximately in the middle.
Turn on the trolley now.

Result
After the car has passed through the light barrier, the counter shows the time it took the trolley to travel through its own length (l = s = 125 mm).
(= Darkening time of the beam of the barrier).

If the trolley length is divided by the time you get the current speed at the position of the light gate.

The formula to calculate the speed is $v = \frac{s}{t}$

The measurements are repeated at different speeds of the trolley and the respective instantaneous speeds are determined.

v_1 = 0,125 m/ ……. s = ……. m/s v_2 = 0,125 m/ ……. s = ……. m/s

Conclusion
The speed of a uniform linear movement is always the same regardless of the positon or after what time it is measured. Since the speed is a directional quantity, it is indicated by a vector with a certain amount (length) and a certain direction.

The length is always the same - uniform (v = constant)
The direction is always the same – straight.

The speed can also be determined using the darkening time of a light beam.
v = length of the darkening distance / time of darkening

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