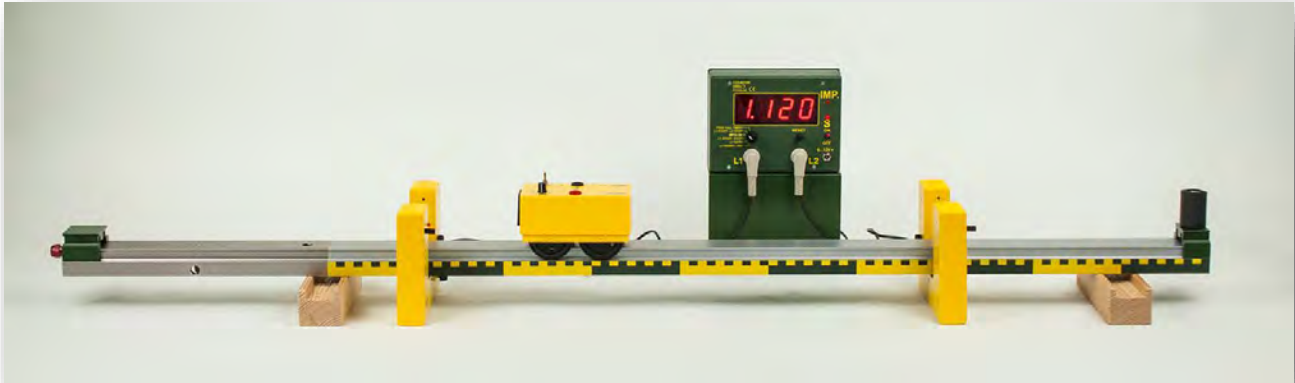


PATH - TIME LAW OF A UNIFORM RECTILINEAR MOTION

MED 04.05a



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	2	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 show that the path increases proportional to time: $s(t) = v \cdot t$
(v constant ... proportionality factor).

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.

Position the blocks for light gates and the light gates as shown on the image on the left side.
The distance between the two light gates should be approximately 60 cm.

Place the track on the light gates and position the light gates at the 10 cm and 70 cm mark; 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 and connect the two light gates to the universal timer.
Put the switch into the "L1 START – L2 STOP" position.

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 1

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.



We measure the time that the trolley (with the speed v_1) needs to travel a distance of 60 cm.

Move the left light gate to shorten the distance between the two light gates to 40 cm and afterwards to 20 cm. Again measure the time and note them in the chart below.

Distance	0,6 m	0,4 m	0,2 m
Time at v_1			
Time at v_2			

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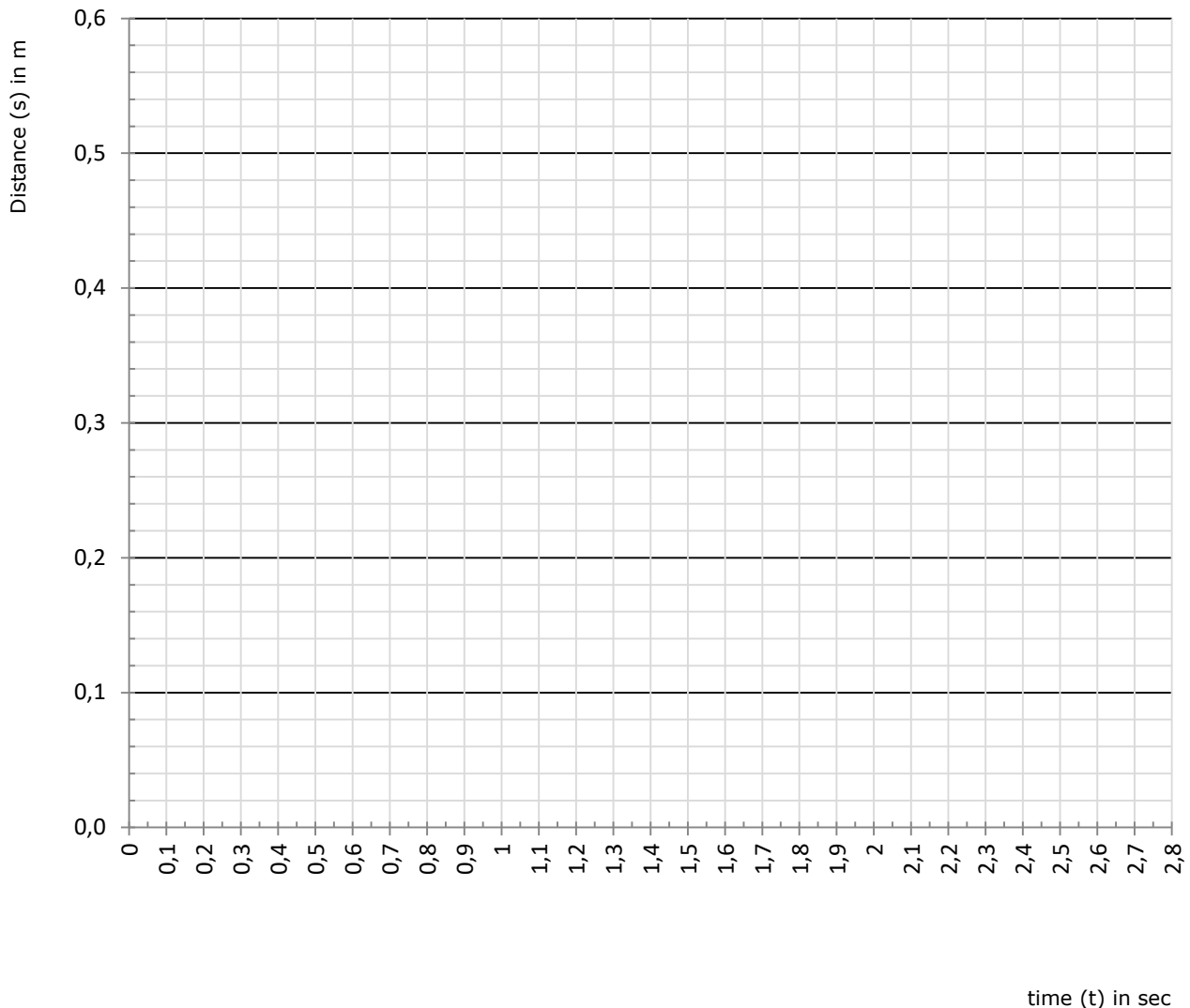
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Experiment 2

We set a different speed (v_2) at the trolley and repeat the first experiment.

Again we note our measurements in the chart.

Afterwards transfer all the measurements into the diagram and connect the points that refer to the same speed (v_1 or v_2).



Conclusion

For the uniform linear movement applies: $s(t) = v \cdot t$. The speed v is constant. If the path is not zero at $t = 0$ ($s(0) \neq 0$), then: $s(t) = s(0) + v \cdot t$.

The path changes proportionally (evenly, $v = \text{constant}$) with time.

In the time-path diagram, the path change is represented by a straight line (linear function).

$t = s/v$ means:

For a specific distance (for example $s = 0.5\text{m}$) the time is smaller the bigger the speed is.