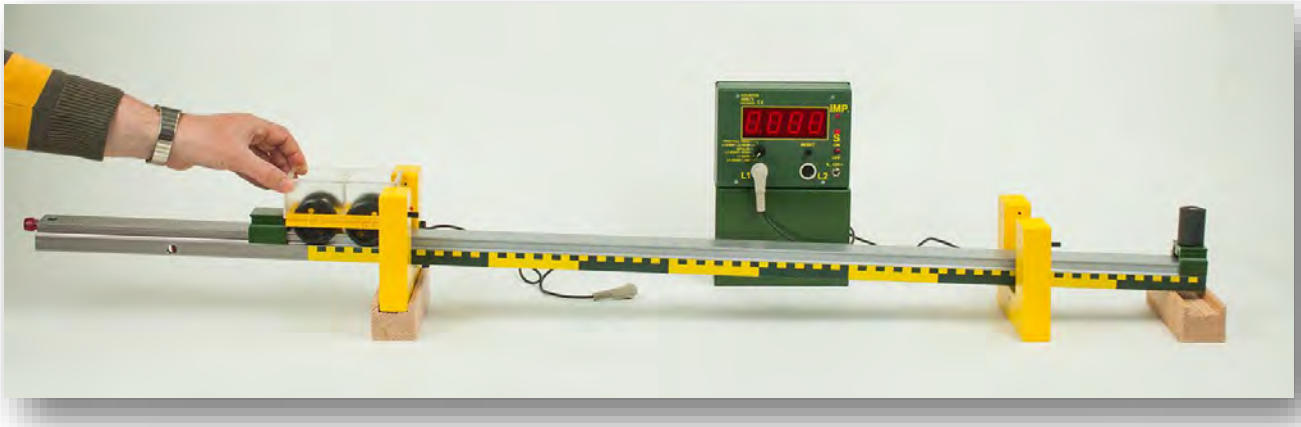
VELOCITY - TIME LAW OF A UNIFORMLY ACCELERATED MOTION (LIGHT GATES)

MED 04.12a



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
DM300-2A	1	Dynamics trolley, demo, 50 g
P1312-2A	1	Car body for trolley SE
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
Using speed measurements to determine that the speed increases proportionally with time during this movement.

v (t) = a. t (a ... acceleration is constant - proportionality factor)

Preparation
This experiment requires that the experiment 04.09a is carried out before since measurement results from that experiment are required!

Same setup as in experiment 04.09a except that the left light gate gets unplugged and the right one is plugged into socket L1; next switch the counter to the "L1 GATE" position.

Experiment
Determine the speed for a distance of 70, 60, 40, 20 and 10 cm.
Measure the darkening time with the light gate at L1 and note the measured values in the chart below.
We use this to calculate the momentary speed and also enter this in the chart

Distance (in m)	0.1 m	0.2 m	0.4 m	0.6 m	0.7 m
Darkening time for 125 mm					
Momentary speed					
Time (in sec.)					

We transfer the time it took the car to travel from the first to the second light gate (see preliminary test) and note this in the last row of the chart.

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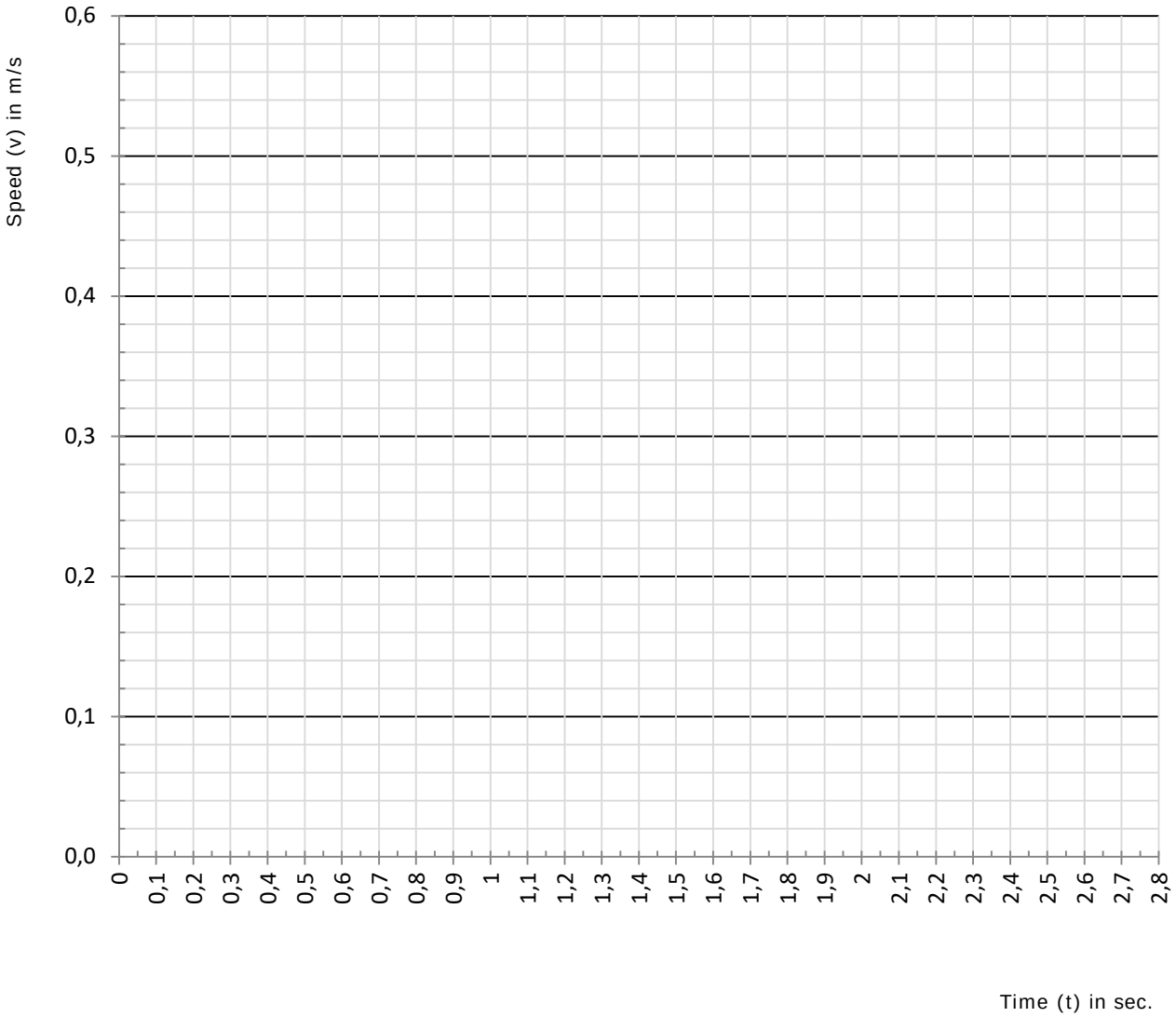
Create a speed-time diagram from the calculated values.



Conclusion
The speed increases the same amount at the same time intervals.
The increase per second is the acceleration a.

The following therefore applies: v (t) = a * t.