

Straight motion

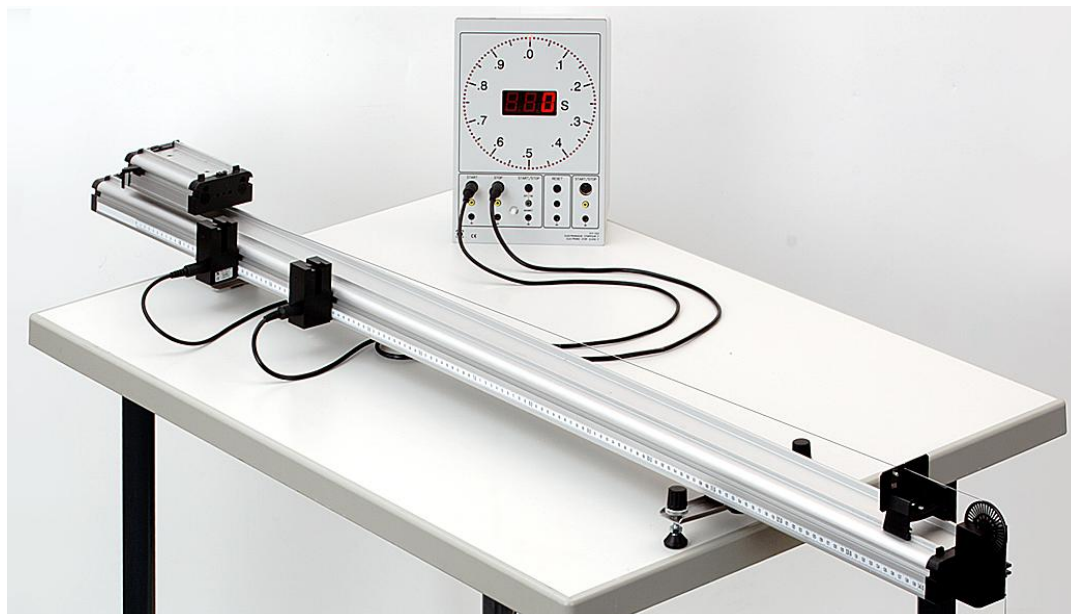
Uniform motion

Relationship between displacement, time and velocity -
Measurement using an electronic stopwatch

Objects of the experiment

1. Measuring the time t required by a body for covering a given path s
2. Calculating the velocity of the body

Setup



- Align the track horizontally.
- Choose the length of the fishing line so that the hanger with the slotted weights hangs over the ground at a height of 10 cm.
- In order that the fishing line hinders the motion of the trolley as little as possible, guide the line under the trolley and fasten it at the back side of the trolley.
- Attach a support clip at the back end of the track and another one at the end of the trolley so that the trolley can be held in its starting position by a loop of line.

- Position the light barrier 2 at distances of 40 cm, 60 cm, and 80 cm from the light barrier 1.
- Repeat the measurement for each distance.
- Calculate the velocity of the trolley from the path and the time.

Measuring example

Path s in cm	time t in s	velocity v in m/s
20	0.56	35.7
40	1.11	36.0
60	1.68	35.7
80	2.26	35.4

Apparatus

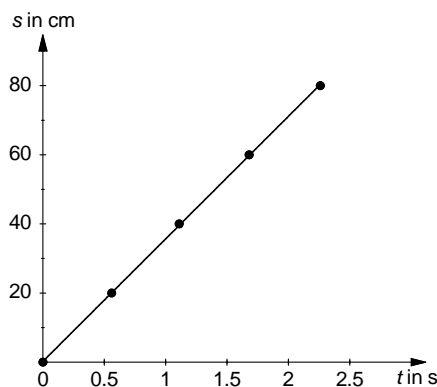
1 Track, 1.5 m.....	337 130
1 Trolley.....	337 110
1 Holder for combination spoked wheel.....	337 463
1 Combination spoked wheel.....	337 464
2 Combination light barriers.....	337 462
1 Slotted mass hanger, 10 g, small.....	315 410
2 Slotted weights, 10 g, red.....	315 416
2 Support clip, for plugging in, set of 5.....	314 04ET5
1 Electronic stop-clock P.....	313 033
2 Multi-core cables, 6-pole, 1.5 m.....	501 16
1 Fishing line, set of 2.....	309 48ET2

Carrying out the experiment

- Mark the starting point with the interrupter flag attached to the trolley.
- Position the light barrier 1 20 cm behind the starting point of the trolley.
- Place the light barrier 2 at a distance of 20 cm from the light barrier 1.
- Make the trolley move by releasing the loop of line from the support clip.
- Read the time for the motion between the two light barriers, and enter it into the table.

Evaluation

1. In the case of uniform motion, the path and the time are proportional to each other: $s \sim t$.



2. The velocity of a body in uniform motion can be calculated from the covered path and the required time: $v = \frac{s}{t}$. If a body moves uniformly, its velocity is equal at all times.