

# Protocol 2

## Motion with Constant Acceleration

### Tasks

1. Estimate the initial position and the constant acceleration of a massless vehicle moving along the “x” axis.

$$x = x_0 + \frac{1}{2}at^2$$

2. Set up the theoretical problem in: [https://www.walter-fendt.de/html5/phen/acceleration\\_en.htm](https://www.walter-fendt.de/html5/phen/acceleration_en.htm) with  $x_{0,\text{th}} = +2\text{ m}$   $a_{\text{th}} = +1.5\text{ m/s}^2$
3. Record N, x, and t in a table.
4. Plot distance (x) vs. time (t). Is the relation linear? If not, can you make it linear?
5. Do a linear regression using the above method to estimate the initial speed and the constant acceleration with their respective errors.
6. Are these values close to the theoretical ones?



Use a separate  
chronometer

Reset

Start

☐ Slow motion

Initial position:  
 m

Initial velocity:  
 m/s

Acceleration:  
 m/s<sup>2</sup>

☒ Show velocity vector

☐ Show acceleration vector

W. Fendt 2000