

Measuring Acceleration

****VIP: These measurement methods are based on the initial velocity being 0 so that final velocity can be determined using average velocity.**

1. Measuring acceleration with a motion detector

The sensitivity selector must be set on cart.

Place the detector at least 15 cm from the start of the motion and pointing in the direction of the motion.

In logger pro, d-t and v-t graphs are automatically produced.

The slope of the v-t graph gives acceleration, found by highlighting the constant velocity section and clicking the "linear" button at the top.

Acceleration will be slope.

2. Measuring acceleration with timing gates

Timing Gates

Set up Logger Pro by going to: Probes & Sensors>Photogates

Choose Pulse Timer - Two Gates

Set it up so that it records the elapsed time, or calculate as shown above.

Velocity is found by using two gates over a displacement of 50. cm or so to find the time to go that displacement. Measure the displacement between the gates using the scale on the track.

To find acceleration, make sure \vec{v}_1 is 0 by placing the cart just before the first timing gate's beam.

Calculate \vec{v}_{av} using displacement and time.

Find v_2 from \vec{v}_{av} then use the acceleration equation.