Cars and carpet

The idea of this experiment is to enable you to understand the connection between energy, force and distance and to use this to workout the braking force of a toy car (or dynamics trolley)

You will need
A toy car, a ramp, a piece of carpet, a light gate and timer unit, a ruler, plasticene, card, access to a balance and a wooden block
Set up the apparatus as shown in the diagram and set your QED unit to measure speed.
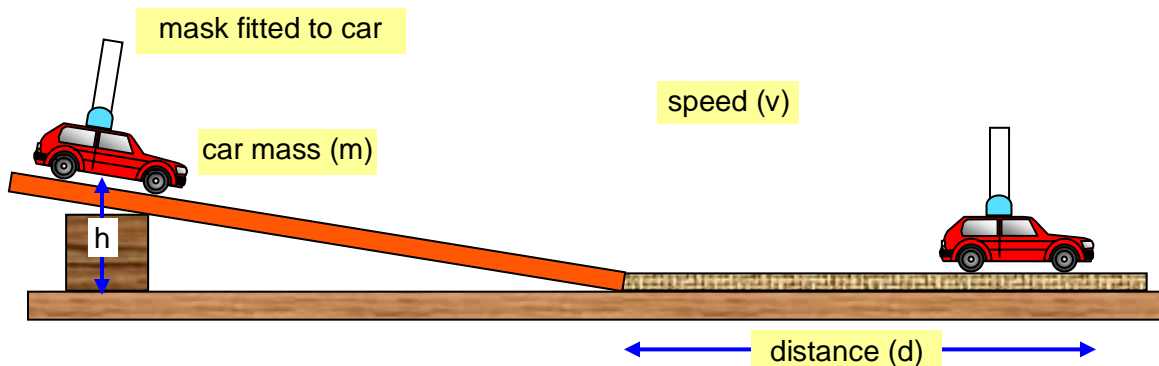
Measure the mass of the car (in kg)

Allow the car to run down the ramp and record:
(a) the height (h) above the carpet that the car starts from
(b) the distance (d) (in metres) that the car travels on the carpet before stopping

Repeat this twice so that you have three pairs of values of speed and distance.

The kinetic energy of the car as it leaves the end of the ramp is converted into heat as the car slows to a stop on the carpet.

Work out the energy of the car as it leave the ramp from the formula:

$$\text{Energy as the car leaves the ramp} = mgh$$

Work out the braking force of the car from the formula:

Braking force (F) = [Energy on leaving ramp]/d

Repeat the whole experiment for two other positions of the car on the ramp and finally work out the average braking force of the car.

If there is time try another surface such as the bench or a different piece of carpet.

(We have assumed that no energy is lost due to friction on the ramp)