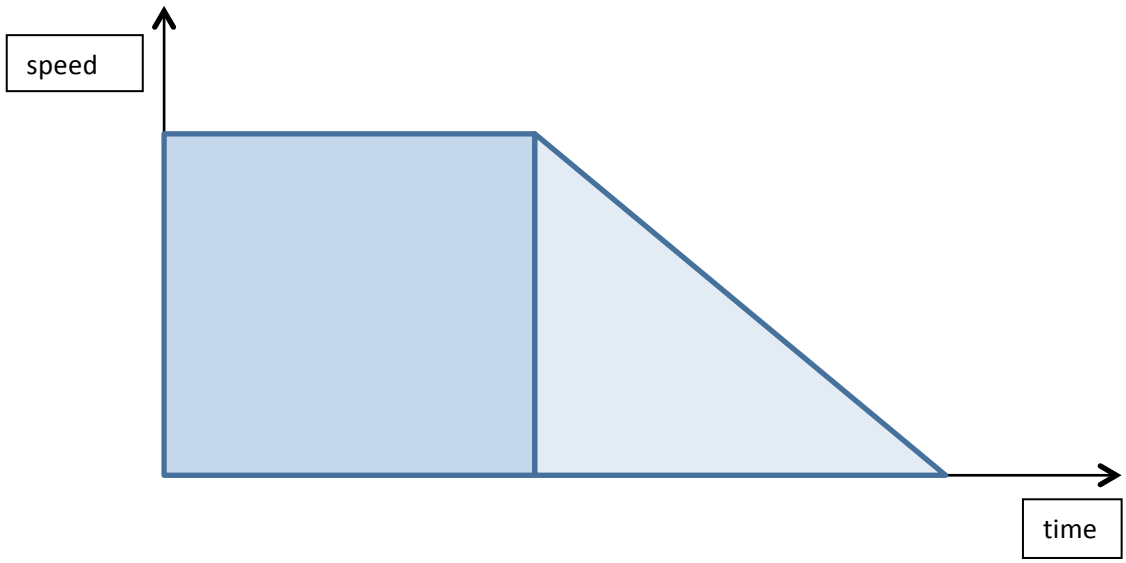
Stopping Distance for vehicles

Stopping Distance is the distance it takes a vehicle to stop once the driver has spotted a hazard. The driver will travel a certain distance while reacting to the situation, and before putting their foot on the brake pedal. This is called the Thinking Distance. Once the brake is applied the braking force will slow the vehicle down with a constant deceleration. The distance the vehicle travels while braking is called the Braking Distance.

Stopping Distance = Thinking Distance + Braking Distance



Add labels to the graph above to show reaction time(RT), braking time(BT), start speed of vehicle (v), thinking distance(TD), braking distance(BD).

How would you calculate thinking distance?

How would you calculate braking distance?

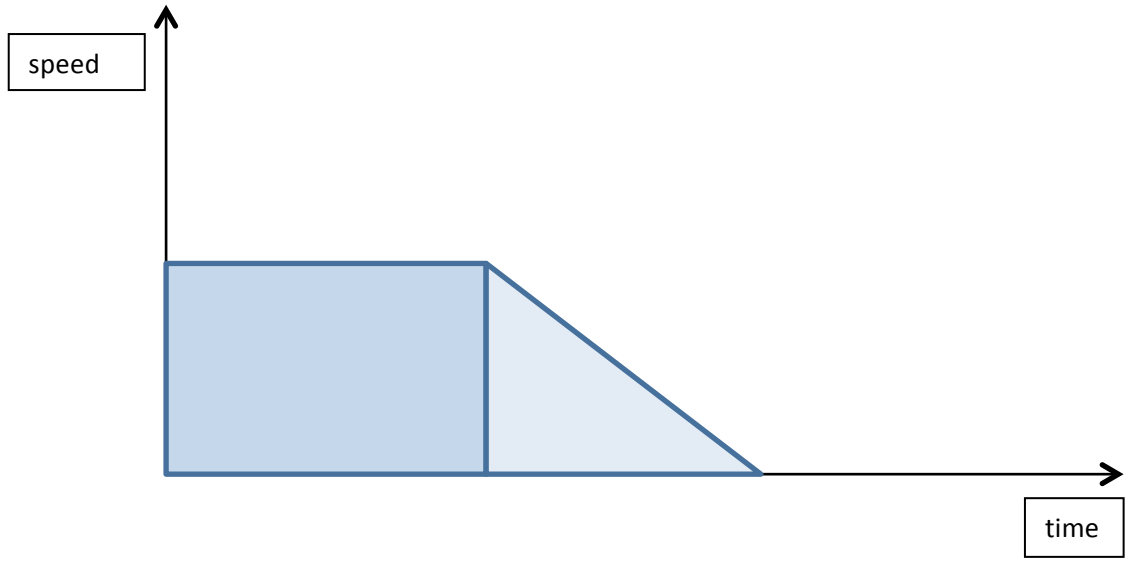
How would you work out the braking force?

Measure your reaction time and calculate your thinking distance at the following speeds:

Speed (km/h)	Speed (m/s)	Thinking distance (m)
15	4.2	
30	8.3	
45	12.5	
60	16.7	

What do you notice about thinking distance when the speed doubles?

What factors, other than speed affect thinking distance?



Sketch what happens to the speed-time graph when the start speed is doubled. Reaction time and braking force remain constant.

What happens to braking distance when the speed is doubled?

What factors, other than speed affect braking distance?