

KNOWLEDGE



How does a crumple zone save your life?

ORGANISER

Speed	
Units of speed	mph, km/h, m/s
Speed	The distance an object travels in a certain time.
Acceleration	The change of an object's speed per second .
Deceleration	A negative acceleration, the object is slowing down.
Gradient	The slope of a line.

Distance-time graphs

A distance-time graph **shows** the **distance** of an object from a starting point (plotted on y-axis) **against** the **time** taken (plotted on the x-axis.)

Constant speed - **straight line** that slopes **upwards**.

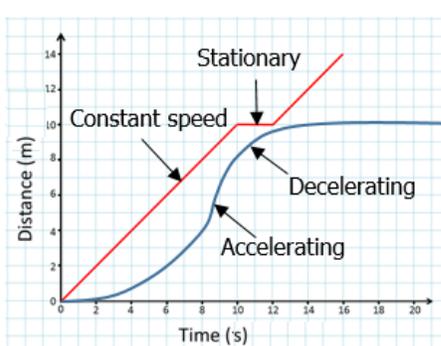
Accelerating - **curved line** getting **steeper**.

Decelerating - curved line getting **less steep**.

Stationary - **horizontal line**, the **gradient is zero**.

The **gradient** represents the object's **speed**.

The **steeper** the gradient, the **greater** the speed.



Slopes of distance-time graphs



Speed-time graphs
A Speed-time graph **shows** the **speed** of an object (plotted on y-axis) **against** the **time** taken (plotted on the x-axis.) A **motion sensor** linked to a computer can be used to **measure speed changes**.

Constant speed (zero acceleration)- **horizontal line**

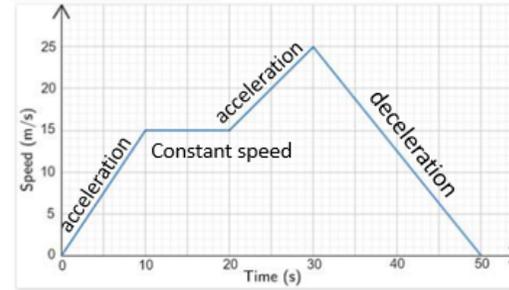
Constant acceleration - **straight line** with speed **increasing**

Constant deceleration - **straight line** with speed **decreasing**

Stationary - **horizontal line on x-axis** (velocity = 0)

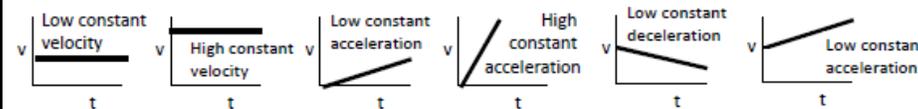
The **steeper** the **gradient** the **greater** the **acceleration**.

A **positive gradient** represents **acceleration**, a negative gradient represents deceleration.



Area under the graph represents **distance** travelled.

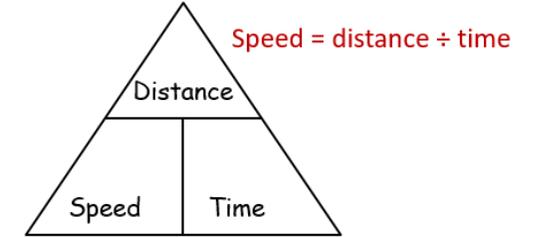
Slopes of speed-time graphs



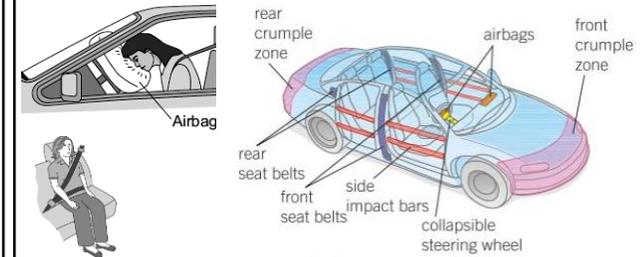
Stopping distance



Equation for speed



Car safety



Stopping distance

Stopping distance The **sum** of the **thinking distance** and **braking distance**.

Thinking distance The **distance a car travels** while the **driver reacts**.

- Factors affecting thinking distance
1. Tiredness
 2. Drugs
 3. Alcohol
 4. Distractions (e.g. mobile phones)

Braking distance The **distance a car travels** while the car is **stopped** by the **brakes**.

- Factors affecting braking distance
1. How fast you are going
 2. Road conditions (weather e.g. Water or ice)
 3. Conditions of tyres and brakes.
 4. Type of road surface
 5. Mass of vehicle