

SUBJECT: Science

UNIT: Y7 Speed



Key Vocabulary

Speed – the amount of distance covered in a specific time.

Mass – the amount of matter an object is made of

Weight – the force of gravity acting on a certain mass

Acceleration – an increase in speed over time

Deceleration – a decrease in speed over time.

Velocity – speed in a direction

Key Equations

Speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Units and Quantities

Speed = metres per second (m/s)

Distance = metres (m)

Time = seconds (s)

Weight

$$\text{weight} = \text{mass} \times \text{gravitational field}$$

Units and Quantities

Weight = newtons (N)

Mass = kilograms (kg)

Gravitational field = newtons per kilogram (N/kg)

What is speed?

Speed is how quickly a certain distance is covered. This can be calculated using the speed equation.

Investigating Speed

Apparatus: Ramp, trolley/car, ruler, stopwatch, wooden blocks

Independent variable: The height of the ramp is changed by adding wooden blocks.

Dependent variable: The speed of the trolley will be calculated using measurements of time taken using the stopwatch, and the distance travelled by the trolley using the ruler.

Control variable: The mass of the trolley must remain the same so each measurement is not affected by different masses. The material of the ramp must remain the same so that the force of friction is not affecting the results of the experiment

Accuracy: The trolley must be released and not pushed so no extra force is added during the experiment. The same person must measure the time for each test so that the reaction time of the person is not affected.

Calculation: Speed is calculated using the equation $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$.

Mass

Mass is the amount of matter an object is made of. Mass is measured in kilograms (kg). The value of mass will stay the same when the location changes.

Weight

Weight is the total amount of force acting on an object due to gravity. Weight is measured in newtons.

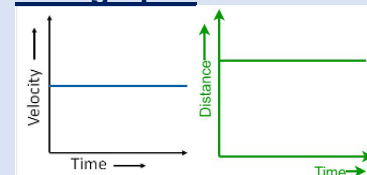
The value of weight will change depending on the gravitational field acting on the object.

Ambitious Vocabulary

Acceleration Velocity

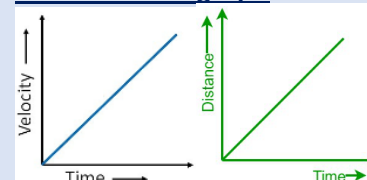
Speed, Distance

Distance-time and Velocity-time graphs



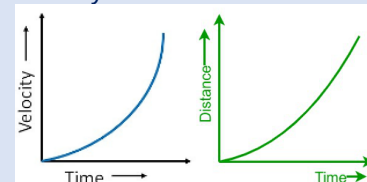
Velocity time graph – constant speed

Distance time graph - stationary



Velocity time graph – constant acceleration

Distance time graph – constant velocity



Velocity time graph – changing acceleration

Distance time graph - acceleration

Changing speed

If the driving force on an object is bigger than the resistive forces then an object will speed up – accelerate. Example: when a driver presses the accelerator in a car, the driving force increases so the car speeds up.

If the resistive forces on the object are greater than the driving forces then the object will slow down. Example: when a person releases their parachute, the force of air resistance is greater than their weight so they will slow down.