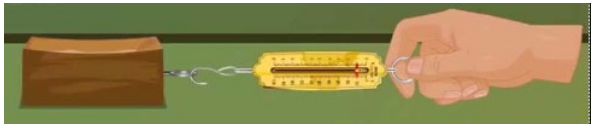
**KNOWLEDGE ORGANISER**
**BIG IDEA:** FORCES
**TOPIC:** SPEED

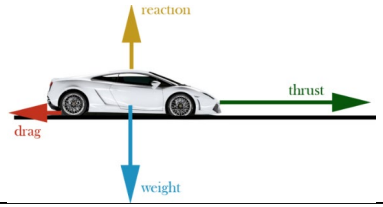
| Key Word | Definition |
|---|---|
| **speed** | How much distance is covered in how much time. |
| **average speed** | The overall distance travelled divided by overall time for a journey. |
| **velocity** | Speed in a direction. |
| **acceleration** | How quickly speed increases or decrease. |
| **stationary** | Not moving |

## Introduction to Forces

Forces can be a push or pull. They act in pairs. Forces are measured with a Newtonmeter. All forces are measured in Newtons (N)



You can't see forces but you can see the effect of them. When you draw a diagram you add arrows to show the forces that are acting.

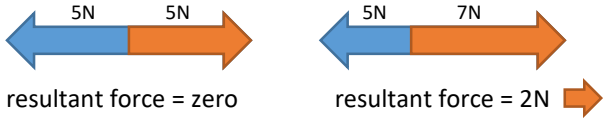



## Resultant Forces and Balanced Forces

The resultant force is the single force that can replace all the other forces acting on an object.

When the forces acting on an object are the same size but act in opposite directions we say:
- The resultant force is zero
- The forces are balanced
- The object is in equilibrium

Unbalanced forces are not the same size so they don't cancel each other out. The resultant force is not zero. Unbalanced forces can change the speed or direction of a moving object.

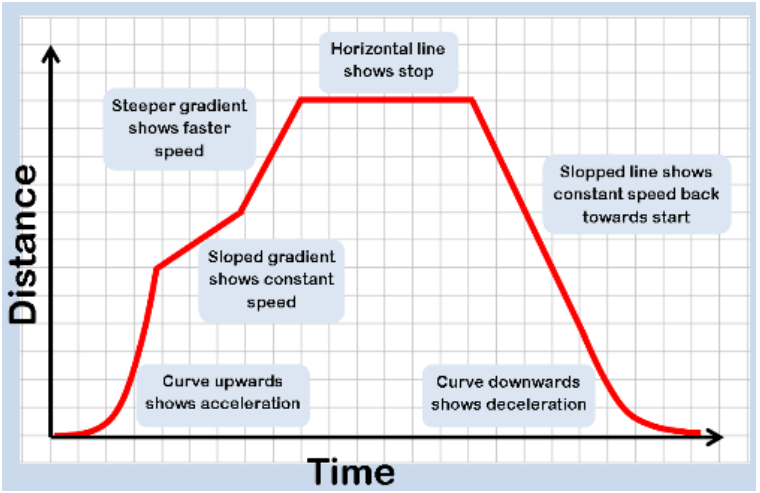



## Distance-Time Graphs

Distance-time graphs show how something moves.

**Working out speed from distance-time graphs**

$$\text{average speed (m/s)} = \frac{\text{total distance (m)}}{\text{total time (s)}}$$




## Speed

Speed is calculated using this formula:

$$\text{Speed (m/s)} = \frac{\text{distance travelled (m)}}{\text{time taken (s)}}$$

## Relative Motion

The speed of an object is always relative to the speed of the observer. If you are in a car traveling at 30 mph behind a truck travelling at 20 mph, then the speed of the car relative to the truck is 10 mph.