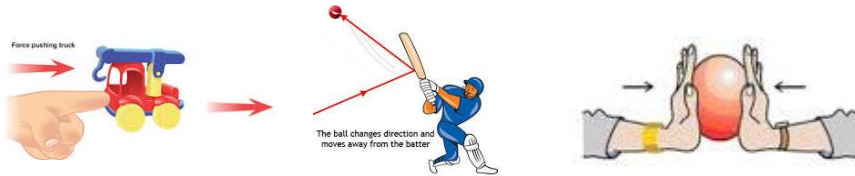


## 1. Key Words –forces

Mass	The amount of matter within an object. Measured in kilograms
Weight	The force of gravity acting on a mass. Measured in Newton's
Contact force	Contact force acts when two objects are physically touching, such as friction, drag, up-thrust
Non-contact force	Non-contact force acts when two objects are not touching, such as gravity and magnetic force
Balanced force	When forces are acting opposite each other and are equal sizes they are balanced
Unbalanced force	When forces acting opposite each other and are not equal sizes, they are unbalanced

## 2. Types of force

A force will change the speed, direction or shape of an object



Contact Forces	Non-contact forces
Elastic force	Gravity
Friction	Static electricity
Air resistance	Magnetic force
Upthrust	

## 3. Mass and weight

The weight of an object is affected by its mass and the gravitational field it is experiencing

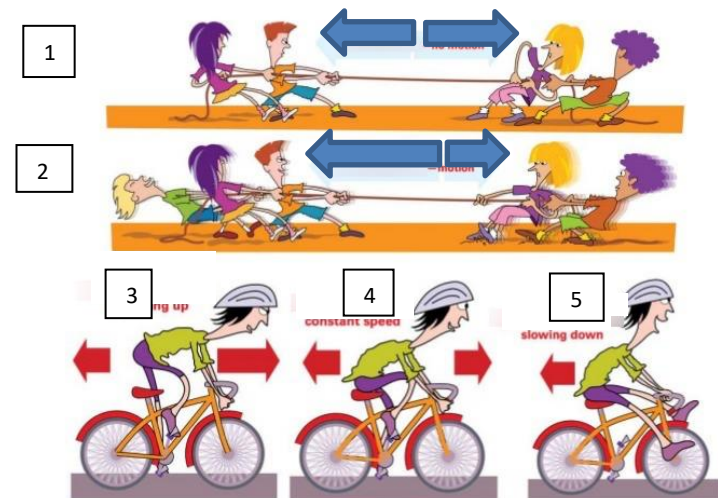
Weight can be calculated using this equation

$$W = mg$$

Weight of object = mass of object x acceleration of gravity

## 4. Balanced and unbalanced force

- 1 Forces are balanced, there is no movement in either direction
- 2 Forces are unbalanced, everyone will move in the direction of the larger force
- 3 There is more forward force so the bike speeds up
- 4 Forces are balanced, speed is constant
- 5 There is more force acting backwards so the bike slows down



## 5. Speed

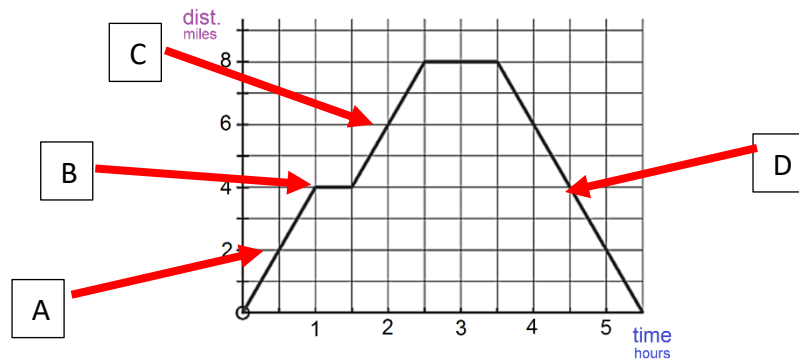
Speed is a measure of how fast or slow an object is travelling. The units for measuring speed is m/s

Speed can be calculated using this equation:

$$\text{Speed (m/s)} = \text{Distance (m)} \div \text{time (s)}$$

## 6. Distance-time graphs

A	Travelling at a constant speed from the origin
B	Stationary as the line is flat
C	Traveling at the fastest speed as the line has a steeper gradient
D	Returning to the start



The velocity is calculated by calculating the gradient of the line

The total distance travelled is calculated by adding together the distances travelled in each component of the graph

## 7. Moments

A moment is a turning effect of applying force around a pivot.

The size of a moment depends on two things:

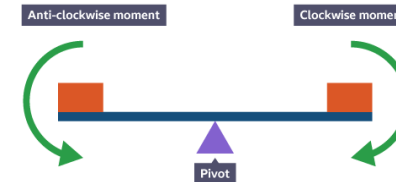
- the **size** of the force that is applied
- the **distance** the force acts from the **pivot**

It is very important to remember that the distance from the pivot is measured at a right angle, or **perpendicular**, to the line of action of the force.


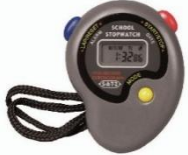
The equation for calculating moments is:

$$\text{Moment (Nm)} = \text{force (N)} \times \text{distance from pivot (m)}$$

The principle of moments states that for an object to be balanced the total clockwise moment must be equal to the total anti-clockwise moment.



## 8. Equipment

Newton meter	Stopwatch
	
Balance	Tape measure
