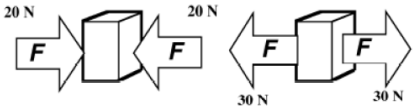
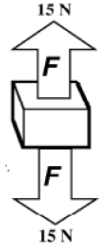
1. Newton's 1st Law

Newton's first law of motion can be written as,

"When forces on an object are balanced it will remain stationary or move with a constant velocity."

Example of Balanced Forces



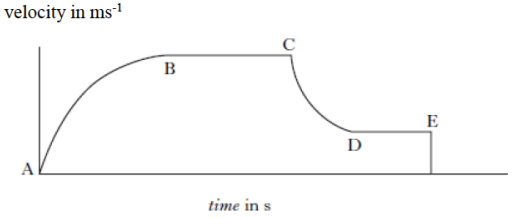


Friction and Terminal Velocity

Friction is a force that acts in the opposite direction to the motion of the object. Friction acts between any two surfaces in contact. e.g. a rough surface will give a lot of friction.

When the friction is due to air it is usually called **air resistance**. Air resistance increases as the velocity of the object increases.

As the skydiver leaves the aircraft he is in **free fall** and his velocity will increase. This will cause the air resistance acting against him to increase. Eventually his downward force (weight) will be the same as his upward force (air resistance). As the forces acting on the skydiver are now balanced he will be travelling with a constant velocity known as a **terminal velocity.**



If the sky diver was to open his parachute the air resistance acting against him would increase. Eventually, his downward force (weight) and his upward force (air resistance) will balance again and the skydiver will now have a reduced terminal velocity.

2. Newton's 2nd Law

This law deals with situations when there is an unbalanced force acting on an object as a result the car is accelerating.

As the unbalanced force is increased, assuming mass remains constant, the acceleration of the car will increase. If the mass of the car if increased, assuming the unbalanced force remains constant, the acceleration will decrease.

- F is the unbalanced force measured in Newtons(N)
- m is the mass measured in kilograms(kg)
- a is the acceleration measured in metres per second per second(ms^{-2})

Unbalanced force = mass x acceleration

F = m x a

This equation also allows the Newton to be defined as the force, which makes a 1kg mass accelerate at 1ms^{-2}.

Weight

Weight is a **force**. Weight is measured in **Newtons**. g = 9.8 Newtons per kilogram (9.8Nkg-1) on planet Earth. **Weight = mass x gravitational field strength W = m x g**

4. FORCES

N5 Past Paper HW
2014 – Sec 2 Q11, 12
2015 – MC Q17,18
2016 – MC Q17 Sec 2 Q12

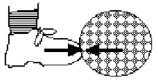
3. Newton's 3rd Law

Newton's 3rd Law of Motion can be written as,

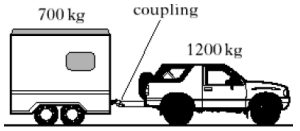
"For every action there is an equal and opposite reaction force"

Examples:

1. When the player strikes the ball, his foot exerts a force to the right on the ball. At the same time, the ball exerts a force to the left on the player's foot.



2. When the car exerts a force on the coupling, the coupling exerts a force on the car in the opposite direction.



3. At take-off for a space shuttle, when the launch rocket pushes the gases backwards, the gases push the launch rocket forwards.