

Keyword	Definition
Balanced	Two forces are equal and opposite so resultant force = 0N.
Resultant Force	Overall force acting on an object
Drag	A force that opposes the motion of a moving object.
Friction	A force that resists motion through the air.
Lift	A force that uses motion to make objects rise up.
Upthrust	An upwards force pushing on an object in fluids.
Reaction or Normal Force	A force that stops you falling through the floor.
Attraction	When two or more things come together, Eg the north pole of a magnet is attracted to the south pole of a magnet.
Magnetic Field	Area surrounding a magnet that can exert a force on magnetic materials.
Repulsion	When two or more things are forced apart, Eg the north pole of a magnet is repelled by the north pole of another magnet.

Contact & Non-Contact Forces

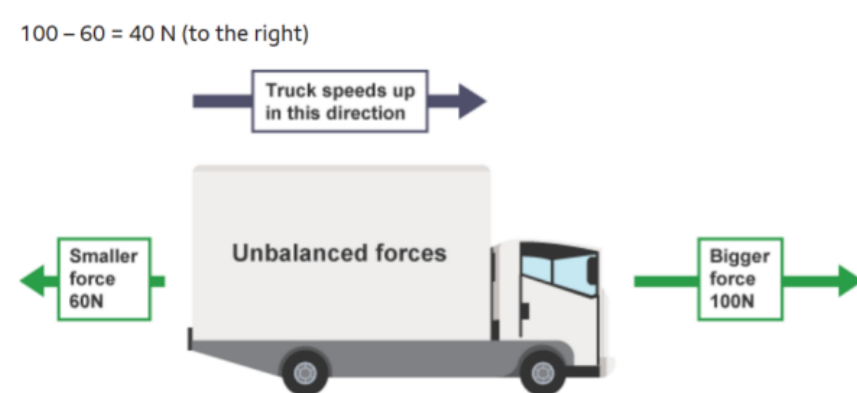
All forces between objects are either:
 Contact Forces –The objects are physically touching
 Non-Contact Forces –The objects are physically separated.

Contact: Friction, Air Resistance, Tension, Normal

Non-Contact: Gravitational, Electrostatic, Magnetic

Unbalanced Forces

If more than one force act along a straight line, the resultant force can be found by adding (acting in the same direction) or subtracting (acting in opposite direction) them.



Speed

The speed of an object tells you how fast or slow it is moving. You can find the average speed of an object if you know the distance it has travelled and the time taken to travel that distance.

The equation is:
 $Speed(m/s) = Distance(m) \div Time(s)$

E.g. A car travels 200m in 20s. Calculate the speed of the car.

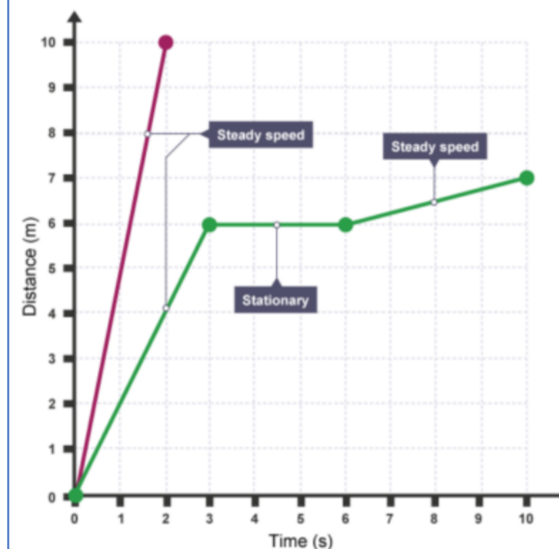
Speed = Distance \div Time

Speed = 200m \div 20s

Speed = 10 m/s

Distance Time Graphs

A distance time graph is a useful way to represent the motion of an object. It shows how the distance moved from a starting point changes over time.



E.g. Calculate the speed of the green line for the first 3s.

Speed = Distance \div Time

Speed = 6m \div 3s

Speed = 2m/s

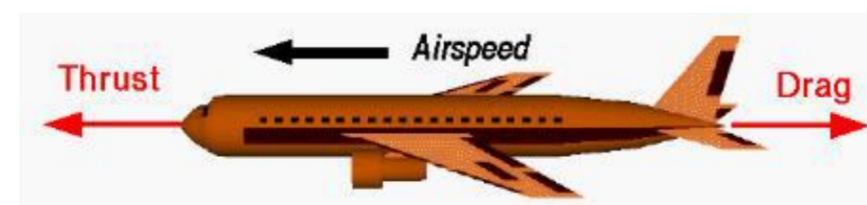
If the line is horizontal, the object is stationary (because the distance stays the same).

If the line is a straight diagonal, the object is moving at a constant speed.

The steeper the line, the greater the gradient and the greater the speed.

Newton's First Law

An object has a constant velocity unless acted on by a resultant force
 Thrust = Drag. Zero resultant force and the plane moves at a constant velocity.



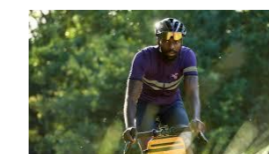
Average Speed



Average walking speed 1.5m/s



Average running speed 3 m/s



Average cycling speed 6m/s



Car speed at 30mph is 13m/s

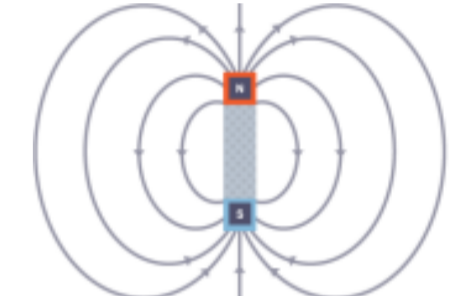
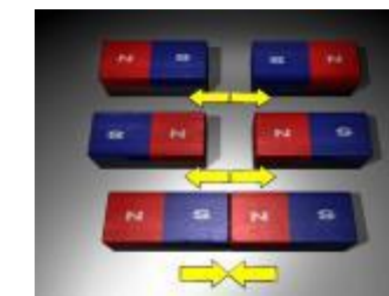
Further Reading:

<https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/zs3896f>
<https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/zw9qwnb>
<https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/z6s4r2p>
<https://www.bbc.co.uk/bitesize/topics/zrvbkqt>

Magnets

Magnetic material can be magnetised or will be attracted to a magnet. These metals are magnetic: iron, cobalt, nickel and steel.

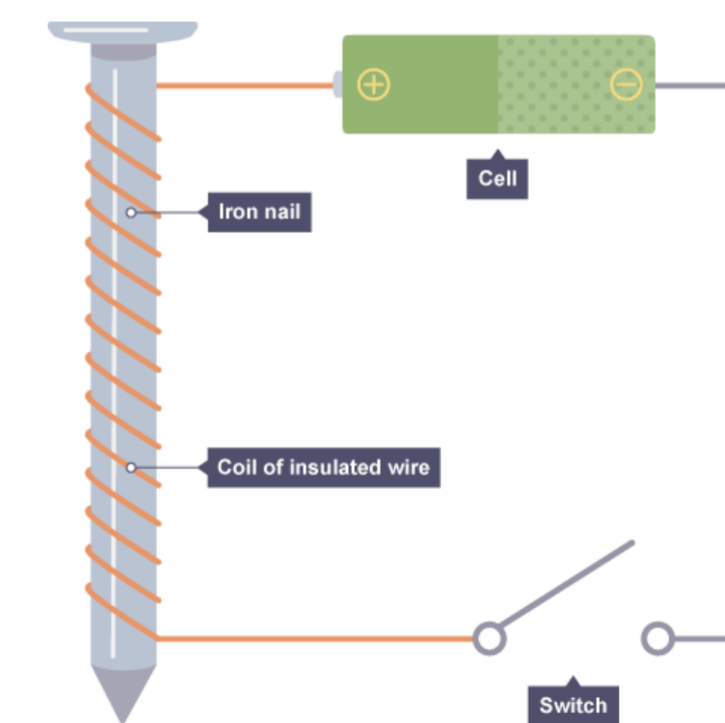
A magnet creates a magnetic field around it. The magnetic field is strongest at the poles, where the field lines are most concentrated.



Unlike poles will attract.
 Like poles will repel.

The Earth behaves as if it contains a giant magnet.

Temporary magnetic fields can be generated using an electromagnet. Electromagnets can be made stronger by increasing the current, inserting an iron core or increasing the number of turns



P2 Energy

Clever Kids Enjoy Getting Taught Ways For Hacking Energy

Chemical Kinetic Elastic Gravitational Thermal Waves Forces Heating Electric current

Stores of energy

Transfers of energy

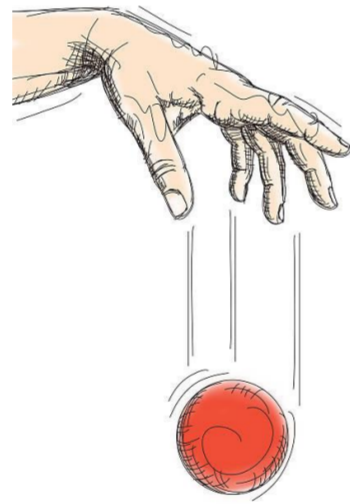


Hot cup of tea

The cup of tea has a higher temperature than the surroundings (greater thermal energy store).

There is a difference between the thermal energy of the tea and the surroundings.

As the tea cools the surroundings heat up, its thermal store decreases and the thermal store of the surroundings increase.



Falling ball

The ball is attracted towards the Earth by the force of gravity.

There is a difference between the energy of the ball when you drop it and when it hits the floor.

When you drop the ball, it has more energy in the Gravitational store.
When the ball hits the floor, it has more energy in the Kinetic store.

As the ball falls its gravitational store decreases and its kinetic energy store increases

Power

The power of a device tells us how quickly energy can be shifted from one store to another.

Power is measured in units called Watts (W)

The more Watts of power something has the quicker it transfers energy.

A 100W bulb can transfer energy quicker than a 16W bulb, so the 100W bulb is brighter.

Further Reading:

<https://www.bbc.co.uk/bitesize/topics/zc3g87h/articles/zg2sn9q#zif4cmn2>
<https://www.bbc.co.uk/bitesize/topics/zc3g87h/articles/zdyrcr2p>

Keyword	Definition
Chemical Energy	Energy that is stored in chemicals is in the Chemical store.
Kinetic Energy	If an object is moving, then there is energy in the Kinetic store.
Elastic Potential Energy	Energy stored in squashed, stretched or twisted materials.
Gravitational Potential Energy	The energy stored by an object lifted up against the force of gravity. Also known as GPE.
Wave Energy Transfer	Energy transferred by light or sound
Forces Energy Transfer	Energy transferred by forces such as pushes, pulls, friction, magnets, electrostatic
Heating Energy Transfer	Energy transferred between thermal stores by heating
Electric Current Energy Transfer	Energy transferred by electric current in a circuit
Conservation of Energy	Energy cannot be created or destroyed It can be stored, dissipated or transferred from one form into another.
Thermal Energy Store	All objects have a Thermal store, the hotter the object the bigger the store is.
Power	The energy transferred per second.
Fossil Fuel	Natural, finite fuel formed from the remains of living organisms, e.g. oil, coal and natural gas.
Non Renewable	A resource that cannot be replaced when it is used up, such as natural gas or coal.
Renewable	An energy resource that will not run out, e.g. solar energy and wind energy
Conduction	The transfer of heat through a material by transferring kinetic energy from one particle to another.
Convection	The transfer of thermal energy through a moving liquid or gas.
Infrared Radiation	Electromagnetic radiation emitted from a hot object.

Prefixes

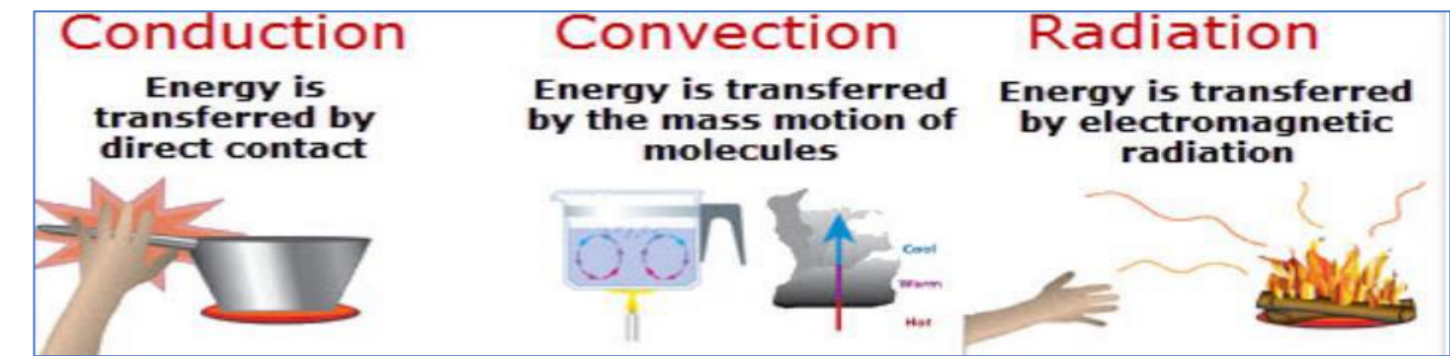
k (kilo) -> x 1,000

M (Mega) -> x 1,000,000

e.g.

1km = 1,000m

1MJ = 1,000,000J

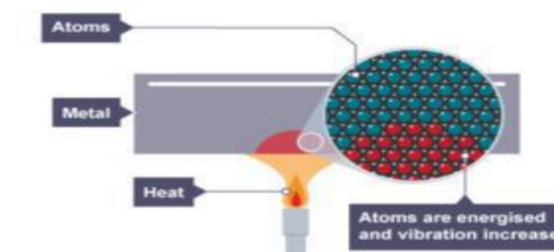


Conduction

A Bunsen burner flame heats up the metal rod

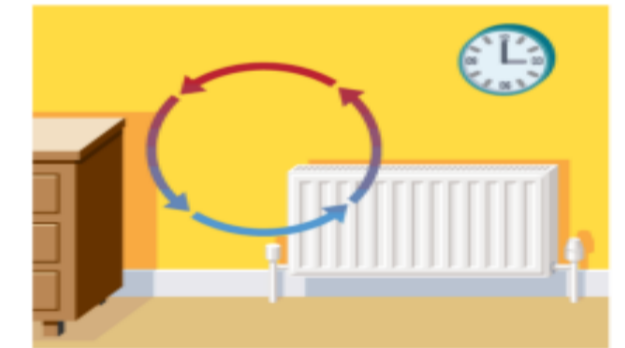
The atoms of the rod increase in energy and vibrate more

The increased vibrations spread from one atom to the next, eventually increasing the temperature of the whole rod.

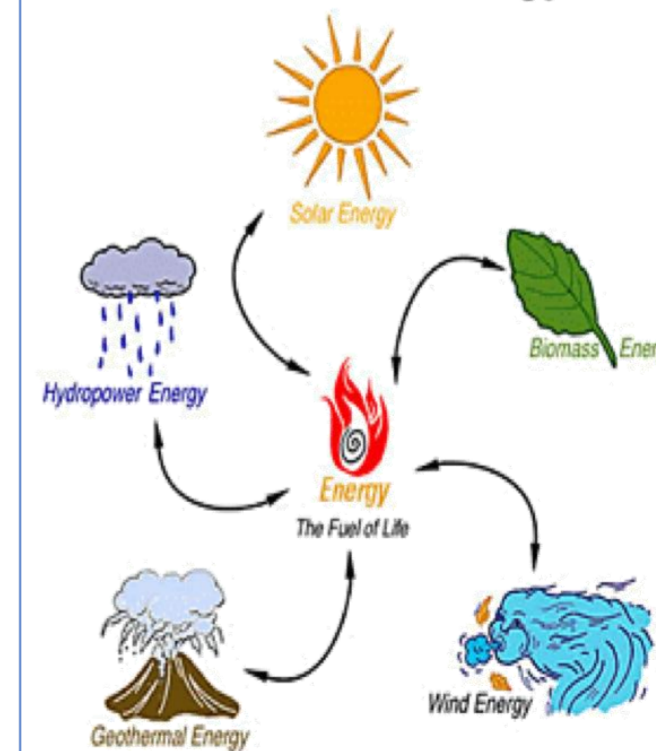


Convection

Liquids and gases are fluids because they can be made to flow. Liquids and gases expand when they're heated. The fluids in hot areas are less dense than in cold areas, so the particles. The fluids then cool, and become more dense. Therefore, the cold fluids fall. In this way, convection currents that transfer heat from place to place are set up.



Renewable Energy



Non-Renewable Energy

