Energy

What is a system?

Energy stores and systems

Energy

Describe 5 examples which demonstrate how the way energy is stored changes when a system changes.

Energy stores and systems

Energy

Name eight energy stores.

Energy stores and systems

Energy

Name 4 ways energy can be transferred between stores.

Energy stores and systems

Energy

What type of energy is associated with a stretched or compressed spring?

Changes in energy

Energy

What type of energy is associated with a moving object?

Changes in energy

Energy

What type of energy is associated with an object lifted above ground level?

Changes in energy

Energy

What is the equation for kinetic energy?

Changes in energy

Energy

What is the equation for potential energy?

Changes in energy

Energy

What are the units for energy?

Changes in energy

An object projected upwards, a moving object hitting an obstacle, an object accelerated by a constant force, a vehicle slowing down and bringing water to the boil in an electric heater.

An object or group of objects.

Mechanically, electrically, heating and radiation.

Kinetic, electrostatic, gravitational potential, magnetic, internal, nuclear, chemical and elastic potential.

Kinetic energy.

Elastic potential energy.

$E_k = 1/2 \times m \times v^2$ (kinetic energy = 1/2 x mass x velocity^2).

Gravitational potential energy.

Joules (J).

$E_p = m \times g \times h$ (gravitational potential energy = mass x gravitational field strength x height).

Energy

What are the units for mass?

Changes in energy

Energy

What are the units for velocity?

Changes in energy

Energy

What are the units for the spring constant?

Changes in energy

Energy

What are the units for extension?

Changes in energy

Energy

What are the units for height?

Changes in energy

Energy

What are the units for gravitational field strength?

Changes in energy

Energy

What is the specific heat capacity of a substance?

Energy changes in systems

Energy

What are the units for specific heat capacity?

Energy changes in systems

Energy

What are the units for temperature?

Energy changes in systems

Energy

What does this symbol represent Δ?

Energy changes in systems

Metres per second (m/s).

Kilograms (kg).

Metres (m).

Newtons per metre (N/m).

Newtons per kilogram (N/kg).

Metres (m).

Joules per kilogram per degree Celsius (j /kg/°C).

The amount of energy required to raise the temperature of 1kg of a substance by 1°C.

Change (delta).

Degrees Celsius (°C).

Energy

How is $\Delta\theta$ calculated?

Energy changes in systems

Energy

What is power?

Power

Energy

What is the unit of power?

Power

Energy

What is the equation which links power and energy transferred?

Power

Energy

What is the equation which links power and work done?

Power

Energy

What is the unit of work done?

Power

Energy

What is the energy transfer of 1 joule per second equal to in watts?

Power

Energy

Name three ways energy can change.

Energy transfers in a system

Energy

What 2 outcomes cannot happen to energy?

Energy transfers in a system

Energy

What is meant by wasted energy?

Energy transfers in a system

The rate at which energy is transferred.

Δv = final temperature - initial temperature

P = E / t (Power = energy transferred x time).

Watts (W).

Joules (J)

P = W / t (Power = work done / time).

Transferred usefully, stored or dissipated.

1 watt = 1 joules / second

Energy is transferred to less useful stores.

Energy cannot be created or destroyed.

Energy

Describe, using two examples, how energy can be dissipated in a system.

Energy transfers in a system

Energy

Describe two ways of reducing unwanted energy transfers.

Energy transfers in a system

Energy

Describe how the thermal conductivity of a material is related to energy transfer.

Energy transfers in a system

Energy

What factors will affect the rate of cooling of a building.

Energy transfers in a system

Energy

Describe three ways to insulate a house.

Energy transfers in a system

Energy

What formula is used to calculate the efficiency of an energy transfer?

Efficiency

Energy

What formula is used to calculate efficiency from power?

Efficiency

Energy

Name three ways of increasing the efficiency of an energy transfer (HT)

Efficiency

Energy

Name the 4 main non-renewable energy resources available on Earth.

National and global energy resources

Energy

Name the 7 main renewable energy resources available on Earth.

National and global energy resources

Lubrication and thermal insulation.

Friction and thermal.

The thickness and thermal conductivity of the walls.

The higher the thermal conductivity of a material, the higher the rate of energy transfer by conduction.

Efficiency = (useful output energy transfer/total input energy transfer) x 100

Cavity wall insulation, loft insulation and double-glazing.

Insulation, lubrication and streamlining.

Efficiency = (useful power output /total power input)

Solar, wind, waves, hydro-electricity, biofuel, tides and geothermal.

Oil, coal, gas and uranium.

Energy

What is a finite resource?

National and global energy resources

Energy

Define renewable energy.

National and global energy resources

Energy

Name the three main uses of energy resources.

National and global energy resources

Energy

Describe how energy resources are used for transport.

National and global energy resources

Energy

Describe how energy resources are used for heating.

National and global energy resources

Energy

What are the advantages of wind power?

National and global energy resources

Energy

What are the disadvantages of wind power?

National and global energy resources

Energy

What is the environmental impact of wind power?

National and global energy resources

Energy

What are the advantages of solar cells?

National and global energy resources

Energy

What are the disadvantages of solar cells?

National and global energy resources

A resource that can be replenished after use.

A resource that cannot be renewed and will run out.

Petrol and diesel are used for vehicles. Some vehicles run on biofuels which are renewable.

Power production, transport and heating.

There are no fuel costs and minimal running costs.

Natural gas is used for heating in most homes in the UK. Geothermal energy is a renewable energy resource which can be used for heating.

No pollution. Spoils the view. Noisy.

Start up costs are high. Electrical production stops when wind speed is too low or too high.

High start up costs. A reliable source in sunny countries, but less reliable in cloudy countries. Usually generates electricity on a small scale.

There are no fuel costs and minimal running costs.

Energy

What is the environmental impact of solar cells?

National and global energy resources

Energy

What are the advantages of geothermal energy?

National and global energy resources

Energy

What are the disadvantages of geothermal energy?

National and global energy resources

Energy

What is the environmental impact of geothermal energy?

National and global energy resources

Energy

What are the advantages of hydro-electric power?

National and global energy resources

Energy

What are the disadvantages of hydro-electric power?

National and global energy resources

Energy

What is the environmental impact of hydro-electric power?

National and global energy resources

Energy

What are the advantages of wave power?

National and global energy resources

Energy

What are the disadvantages of wave power?

National and global energy resources

Energy

What is the environmental impact of wave power?

National and global energy resources

Free, reliable energy.

No pollution,

No pollution, little damage to the environment.

Not many suitable locations (volcanic area).

High initial set up costs.

Immediate electrical production in response to a surge in demand.

Useful for coastal locations and islands.

No pollution, damage to the environment when building the dam, loss of habitat.

No pollution, disturbs marine habitats, can be a hazard to boats.

Unreliable energy production as waves are reduced when wind drops.

Energy

What are the advantages of tidal barrages?

National and global energy resources

Energy

What are the disadvantages of tidal barrages?

National and global energy resources

Energy

What is the environmental impact of tidal barrages?

National and global energy resources

Energy

What are the advantages of biofuels?

National and global energy resources

Energy

What are the disadvantages of biofuels?

National and global energy resources

Energy

What is the environmental impact of biofuels?

National and global energy resources

Energy

What are the advantages of nuclear power?

National and global energy resources

Energy

What are the disadvantages of nuclear power?

National and global energy resources

Energy

What is the environmental impact of nuclear power?

National and global energy resources

Energy

What are the advantages of fossil fuels?

National and global energy resources

Initial costs are high, limited to estuaries and coastal areas.

No fuel costs and low running costs, a reliable source of energy.

Renewable and carbon neutral.

No pollution. The damming of estuaries disturbs habitats and prevents access by boats.

Natural habitats cleared to make plantations of biofuels.

Cost to refine is very high.

Very high start up and running costs.

No greenhouse gases. Large amounts of energy produced on one site.

Cost effective production of energy.

Radioactive waste needs to be stored for thousands of years before it is safe. Potential for radioactive contamination from waste.

Energy

What are the disadvantages of fossil fuels?

National and global energy resources

Energy

What is the environmental impact of fossil fuels?

National and global energy resources

Energy

Describe the pattern of electrical consumption in the UK since 2000.

National and global energy resources

Energy

Describe how electricity in the UK is mainly produced?

National and global energy resources

Energy

Explain why the UK is trying to reduce fossil fuel powered power stations.

National and global energy resources

Energy

Explain why scientists cannot deal directly with the environmental issues on non-renewable energy.

National and global energy resources

Energy

What issues may prevent the building of a wind farm to provide clean energy for a city?

National and global energy resources

Energy

What issues may prevent an individual using renewable energy in their day to day lives?

National and global energy resources

Electricity

What is required for electrical charge to flow through a closed circuit?

Electrical charge and current

Electricity

What is electric current?

Electrical charge and current

Produce greenhouse gases and pollution.

Non-renewable.

Fossil fuels and nuclear power.

Electrical consumption in the UK has fallen.

Scientists can give advice to governments about how to tackle environmental issues, but political will is required to enforce legislation that will reduce fossil fuel use.

To reduce greenhouse emissions and become less reliant on non-renewable fuels.

Renewable energy choices are generally more expensive. The location of a home may make it unfeasible to install solar panels (e.g. in a flat)

Local residents complaining about the noise and spoiling the view.

The flow of electrical charge

The circuit must include a source of potential difference.

Electricity

How is the size of electric current defined?

Electrical charge and current

Electricity

What is the equation which links charge flow, current and time?

Electrical charge and current

Electricity

What is the unit of charge flow?

Electrical charge and current

Electricity

What is the unit of current?

Electrical charge and current

Electricity

Describe the current at any point in a single closed loop.

Electrical charge and current

Electricity

What does the current through a component depend upon?

Current, resistance and potential difference

Electricity

What is resistance?

Current, resistance and potential difference

Electricity

What is the unit for resistance?

Current, resistance and potential difference

Electricity

Describe the relationship between current and resistance of a component given a fixed potential difference.

Current, resistance and potential difference

Electricity

What is the equation that links potential difference, current and resistance?

Current, resistance and potential difference

Q = I x t (Charge flow = current x time).

The rate of flow of electrical charge.

Ampere (amps) (A)

Coulomb (C)

The resistance of the component and the potential difference across the component.

The current has the same value at any point in a single closed loop.

Ohms (Ω)

It is a measure of how easy or hard it is for current to flow through a component.

V = I x R (potential difference = current x resistance)

The greater the resistance the smaller the current.

Electricity

Describe resistance in an ohmic resistor at a constant temperature.

Current, resistance and potential difference

Electricity

Describe resistance in a diode.

Current, resistance and potential difference

Electricity

Describe resistance in a filament lamp.

Current, resistance and potential difference

Electricity

Describe the resistance in a thermistor as the temperature increases.

Current, resistance and potential difference

Electricity

Suggest an application for a thermistor?

Current, resistance and potential difference

Electricity

Describe the resistance in a LDR as light intensity increases.

Current, resistance and potential difference

Electricity

Suggest an application for a LDR.

Current, resistance and potential difference

Electricity

Name the two ways of joining electrical components in a circuit.

Series and parallel circuits

Electricity

Describe the current through components in a series circuit.

Series and parallel circuits

Electricity

Describe potential difference in a series circuit with components.

Series and parallel circuits

Current flows through a diode in one direction only. The diode has a very high resistance in the reverse direction.

The current is directly proportional to the potential difference. This means the resistance is constant as the current changes.

The resistance of a thermistor decreases as the temperature increases.

The resistance of a filament lamp increases as the temperature of the filament increases.

The resistance of a LDR decreases as the light intensity increases.

A thermostat.

A series circuit or parallel circuit.

A control circuit to switch on lights when it starts to get dark.

The total potential difference of the power supply is shared between the components.

The components each have the same current.

Electricity

Describe the resistance in a series circuit with two components.

Series and parallel circuits

Electricity

What is the formula to calculate resistance in a series circuit with two components.

Series and parallel circuits

Electricity

Describe the current through components in a parallel circuit.

Series and parallel circuits

Electricity

Describe the potential difference in a parallel circuit with components.

Series and parallel circuits

Electricity

Describe the resistance in a parallel circuit with two components.

Series and parallel circuits

Electricity

Explain why adding resistors in series increases resistance, but adding resistors in parallel decreases resistance.

Series and parallel circuits

Electricity

What type of supply is mains electricity?

Direct and alternating potential difference

Electricity

What is the frequency of the UK mains supply?

Direct and alternating potential difference

Electricity

What is the potential difference of the UK mains supply?

Direct and alternating potential difference

Electricity

Describe alternating current.

Direct and alternating potential difference

$R_{Sum} = R_1 + R_2$

The total resistance of two components is the sum of the resistance of each component.

The potential difference across each component is the same.

The total current is equal to the sum of the currents through the circuit.

Circuits in parallel, for a given potential difference, have more current for each loop added. Using $R = V/I$, an increase in current will lead to a decrease in resistance.

The total resistance of two components is less than the resistance of the smallest individual resistor.

50 Hz.

AC.

The current constantly changes direction (50 times per second).

230 V.

Electricity

Describe direct current.

Direct and alternating potential difference

Electricity

Describe direct potential difference.

Direct and alternating potential difference

Electricity

Describe alternating potential difference.

Direct and alternating potential difference

Electricity

Which wire in a plug or cable is brown?

Mains electricity

Electricity

Which wire in a plug or cable is blue?

Mains electricity

Electricity

Which wire in a plug or cable has green and yellow stripes?

Mains electricity

Electricity

Describe the route electricity takes from the supply through the plug and its return?

Mains electricity

Electricity

Name two safety features found in plugs.

Mains electricity

Electricity

What safety feature in the plug protects the appliance?

Mains electricity

Electricity

What safety feature in the plug prevents electrocution?

Mains electricity

A constant voltage.	The current flows in a constant direction.
Live	A voltage which keeps alternating between positive and negative values.
Earth	Neutral
Fuse and earth wire	supply → live wire → fuse → appliance → neutral wire → supply
Earth wire	Fuse

Electricity

What is the potential difference between the live wire and the earth?

Mains electricity

Electricity

What is the potential difference of the neutral wire.

Mains electricity

Electricity

Why is the live wire dangerous even is the switch is closed?

Mains electricity

Electricity

What is the equation linking power, current and resistance. P = I2R (power = current2 x resistance).

Power

Electricity

What is the equation linking power, potential difference and current? P = V x I (power = voltage x current).

Power

Electricity

Name the unit of power.

Power

Electricity

Name the unit of energy.

Power

Electricity

What is 1 watt equivalent to?

Power

Electricity

What are everyday appliances designed to do?

Energy transfers in everyday appliances

Electricity

What does the amount of energy transferred depend on?

Energy transfers in everyday appliances

0V	230V
$P = I^2R$ (power = current^2 x resistance).	There is a potential difference in the live wire. If your body provide a bridge between the live wire and earth a current would flow through you.
Watts.	P = V x I (power = voltage x current).
1 joule per second.	Joules.
How long the appliance is switched on for and the power of the appliance.	Bring about energy transfers.

Electricity

Describe energy is transferred from a battery to an electric motor?

Energy transfers in everyday appliances

Electricity

Describe how energy is transferred from mains electricity to a heating device?

Energy transfers in everyday appliances

Electricity

What occurs when charge flows in a circuit?

Energy transfers in everyday appliances

Electricity

What formula links energy transferred, power and time?

Energy transfers in everyday appliances

Electricity

What formula links energy transferred, charge flow and potential difference.

Energy transfers in everyday appliances

Electricity

Describe the relationship between domestic appliance power ratings and the changes in stored energy when they are in use.

Energy transfers in everyday appliances

Electricity

What is the National Grid?

The National Grid

Electricity

What do transformers do?

The National Grid

Electricity

Why is the National Grid efficient?

The National Grid

Electricity

What is the potential difference of electricity produced by power stations?

The National Grid

Chemical energy stores (in fossil fuel) are transferred electrically to the internal energy store of the heating element.

Chemical energy stores in a battery are transferred electrically to the kinetic energy of the motor.

E = P x t (energy transferred = power x time).

Work is done.

The power rating indicates the maximum amount of energy transferred per second. The lower the power rating the less energy is used, so the cheaper it is to run.

energy transferred = charge flow x potential difference
E = Q x V

Transformers step up potential difference at the start of the National Grid and step down potential difference at the end of the Grid.

A system of cables and transformers.

25000V

High voltage and low current decreases energy loss along the cables.

Electricity

What is the potential difference of electricity carried by cables of the National Grid?

The National Grid

Electricity

What is the potential difference of electricity carried to industrial workplaces?

The National Grid

Electricity

What is the potential difference of electricity supplied to domestic homes?

The National Grid

Particle model of matter

What is the equation to calculate density?

Density of materials.

Particle model of matter

What is the unit of density?

Density of materials.

Particle model of matter

What can the particle model be used to explain?

Density of materials.

Particle model of matter

Explain the difference in density between the three states of matter.

Density of materials.

Particle model of matter

Name the six ways substance can change state.

Changes of state.

Particle model of matter

What happens to the mass when a substance changes state?

Changes of state.

Particle model of matter

State whether state changes are chemical or physical changes.

Changes of state.

11000V	400000V
Density = mass / volume.	230V
The behaviour of solids, liquids and gases.	Kg/m^3.
Melt, freeze, boil, evaporate, condense and sublimate.	Solids are usually denser than liquids because the particles in a solid are more closely packed. Liquids are usually denser than gases because the particles in a liquid are more closely packed.
Physical change.	No change in mass.

Particle model of matter

What is internal energy.

Internal energy.

Particle model of matter

What is the total internal energy the sum of?

Internal energy.

Particle model of matter

What is the effect of heating on a system?

Internal energy.

Particle model of matter

What are the two possible results of heating a system?

Internal energy.

Particle model of matter

What does the increase in temperature of a system depend upon?

Temperature changes in a system

Particle model of matter

What is specific heat capacity?

Temperature changes in a system

Particle model of matter

What is the unit of specific heat capacity?

Temperature changes in a system

Particle model of matter

What is latent heat?

Specific latent heat

Particle model of matter

What happens to the energy during a change of state?

Specific latent heat

Particle model of matter

Define specific latent heat.

Specific latent heat

Total kinetic energy + total potential energy of the particles.

The energy stored inside a system by the particles that make up the system.

The temperature is raised or there is a change of state.

Heating changes the energy stored within the system by increasing the energy of the particles that make up the system.

The amount of energy required to raise the temperature of one kilogram of a the substance by 1oC.

The increase in temperature depends the mass, the type of material and the energy input into the system.

The energy needed by a substance to change its state.

Joules per kilogram per degree Celsius (J/kg/oC).

The amount of energy required to change the state of one kilogram of a substance with no change in temperature (e.g. 1kg of water at 100°C becomes 1kg of steam at 100°C).

The energy supplied changes the energy stored (internal energy) but does not change the temperature.

Particle model of matter

What is the unit for specific latent heat?

Specific latent heat

Particle model of matter

What is the specific latent heat of fusion?

Specific latent heat

Particle model of matter

What is the specific latent heat of vaporisation?

Specific latent heat

Particle model of matter

Describe the movement of molecules in a gas.

Particle motion in gases.

Particle model of matter

What is the temperature of a gas related to?

Particle motion in gases.

Particle model of matter

Describe what happens to the pressure of a constant volume of gas if the temperature is increased.

Particle motion in gases.

Particle model of matter

Describe what happens to the pressure of a constant volume of gas if the temperature is decreased.

Particle motion in gases.

Particle model of matter

Explain how the motion of molecules in the gas is related to both temperature and pressure.

Particle motion in gases.

Particle model of matter

What is the approximate radius of an atom?

The structure of an atom.

Particle model of matter

Describe the basic structure of an atom.

The structure of an atom.

The energy required to change the state from a solid to a liquid.

Joules per kilogram (J/kg).

Molecules are in constant random motion.

The energy required to change the state from a liquid to a vapour (gas).

The pressure increases.

The average kinetic energy of the molecules.

As the temperature increases the speed of the molecules increase. As a result they collide with the sides of the container more often. This results in an increase in the pressure.

The pressure decreases.

A positively charged nucleus composed of protons and neutrons surrounded by negatively charged electrons.

1×10^{-10}m.

Particle model of matter

What is the ratio between the radius of the nucleus and the radius of an atom?

The structure of an atom.

Particle model of matter

Where is most of the mass of an atom found?

The structure of an atom.

Particle model of matter

Describe how electrons are organised in an atom.

The structure of an atom.

Particle model of matter

What happens to an electron if it absorbs electromagnetic radiation?

The structure of an atom.

Particle model of matter

What happens to an electron if it emits electromagnetic radiation?

The structure of an atom.

Particle model of matter

How are the number of protons and the number of electrons related in an atom?

Mass number, atomic number and isotopes.

Particle model of matter

What is the overall charge of an atom?

Mass number, atomic number and isotopes.

Particle model of matter

What do atoms of the same element have the same number of?

Mass number, atomic number and isotopes.

Particle model of matter

What is the atomic number?

Mass number, atomic number and isotopes.

Particle model of matter

What is the mass number?

Mass number, atomic number and isotopes.

The nucleus.

1:10000

The electrons moves further from the nucleus to a higher energy level.

The electrons are found at different distances from the nucleus at different energy levels.

The number of protons is equal to the number of electrons.

Moves closer to the nucleus to a lower energy level.

Protons.

They have no overall charge.

The sum of the protons and neutrons.

The number of protons in the atom.

Particle model of matter

What is an isotope?

Mass number, atomic number and isotopes.

Particle model of matter

What do atoms form if they lose one or more outer electrons.

Mass number, atomic number and isotopes.

Particle model of matter

Why might a scientific model be changed or replaced?

Model of the atom

Particle model of matter

How did Democritus describe the atom?

Model of the atom

Particle model of matter

What did J.J. Thomson discover and what model did he suggest as a result?

Model of the atom

Particle model of matter

Describe Thomson's model.

Model of the atom

Particle model of matter

Describe the alpha particle scattering experiment.

Model of the atom

Particle model of matter

What were the results of the alpha particle scattering experiment.

Model of the atom

Particle model of matter

What conclusion did Rutherford make from the results of the alpha particle scattering experiment.

Model of the atom

Particle model of matter

How did Bohr adapt Rutherford's model.

Model of the atom

Ions.	Atoms of the same element with different numbers of neutrons.
Tiny spheres that could not be divided.	New experimental evidence.
Negative electrons embedded in a ball of positive charge	He discovered the electron and suggested the plum pudding model.
Many of the alpha particles passed straight through the gold leaf or were deflected slightly (as expected). However some particles bounced of the gold leaf (not expected)	Alpha particles were fired at a thin sheet of gold leaf. The particles where detected using a screen to see how they had been deflected.
He suggested that electrons orbited the nucleus at specific distances.	The mass of the atom was concentrated in a small central nucleus.

Particle model of matter

What sub-atomic particle did Rutherford discover in 1920 to explain the positive charge in an atom?

Model of the atom

Particle model of matter

What sub-atomic particle did James Chadwick discover which explained isotopes?

Model of the atom

Particle model of matter

What is radioactive decay?

Radioactive decay and nuclear radiation

Particle model of matter

What is activity?

Radioactive decay and nuclear radiation

Particle model of matter

What are the units of activity?

Radioactive decay and nuclear radiation

Particle model of matter

What is the count-rate?

Radioactive decay and nuclear radiation

Particle model of matter

Give an example of a detector of radioactive decay.

Radioactive decay and nuclear radiation

Particle model of matter

Name the four types of nuclear radiation.

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear radiation emits a particle with no charge?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear radiation emits electromagnetic radiation?

Radioactive decay and nuclear radiation

Neutron.

Proton.

The rate at which a source of unstable nuclei decays.

The random process of an unstable atom releasing radiation to become more stable.

The number of decays recorded each second by a detector.

Becquerel (bq).

Alpha particle (α), beta particle (β), gamma ray (γ) and neutron (n).

A Geiger-Muller tube.

Gamma rays.

Neutron.

Particle model of matter

What type of nuclear radiation emits a particle consisting of two neutrons and two protons?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear radiation emits a particle consisting of one electron?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear emission emits a particle the same as a helium nucleus?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear emission emits a negatively charged particle?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear emission emits a positively charged particle?

Radioactive decay and nuclear radiation

Particle model of matter

What type of nuclear emission causes a neutron to turn into a proton?

Radioactive decay and nuclear radiation

Particle model of matter

What do nuclear equations represent?

Nuclear equations

Particle model of matter

What are the symbols for alpha particles and beta particles?

Nuclear equations

Particle model of matter

What can the emission of different types of nuclear radiation change?

Nuclear equations

Particle model of matter

What does alpha decay change?

Nuclear equations

Beta particle.

Alpha particle.

Beta particle.

Alpha particle.

Beta particle.

Alpha particle

Alpha particle (α), beta particle (β)

Radioactive decay.

Alpha particle emission cause the mass and charge of the of the nucleus to decrease (more negative).

They may cause the change in mass and/or charge of the nucleus

Particle model of matter

What does beta decay change?

Nuclear equations

Particle model of matter

What does gamma decay change?

Nuclear equations

Particle model of matter

What does neutron decay change?

Nuclear equations

Particle model of matter

Describe the nature of radioactive decay.

Half-lives and the random nature of radioactive decay.

Particle model of matter

What is the half-life of a radioactive isotope?

Half-lives and the random nature of radioactive decay.

Particle model of matter

Explain how half-life is related to the random nature of radioactive decay.

Half-lives and the random nature of radioactive decay.

Particle model of matter

A 50g sample of radioactive isotope has a half-life of 3 years. What mass of isotope would remain after 9 years?

Half-lives and the random nature of radioactive decay.

Particle model of matter

The activity of a sample is 1200Bq. After 10 days the activity is 300Bq. What is the half-life of the sample?

Half-lives and the random nature of radioactive decay.

Particle model of matter

What is the net decline of an isotope that has been through 3 half-lives?

Half-lives and the random nature of radioactive decay.

Particle model of matter

What is radioactive contamination?

Radioactive contamination.

Gamma ray emission does not change the mass or charge of the nucleus.

Beta particle emission does not change the mass but does increase the charge of the nucleus (more positive).

Random.

Neutron emission changes the mass but not the charge of a nucleus.

It cannot be predicted which radioactive atom in a sample will decay, you can calculate how long it would take for half the sample to decay.

The time it takes for the number of nuclei in a sample to halve, or the time it takes for the activity from an isotope to fall to half its initial level.

1200Bq decays to 600Bq which decays to 300Bq. Which is 2 half-lives. So one half-life = 5 days (10 days / 2)

After 3 years 25g remain, after 6 years 12.5g remain, after 9 years 6.25g would remain.

The unwanted presence of radioactive materials on other materials.

12.5%.

Particle model of matter

What causes the hazard from contamination?

Radioactive contamination.

Particle model of matter

What affects the level of hazard?

Radioactive contamination.

Particle model of matter

What is irradiation?

Radioactive contamination.

Particle model of matter

Compare the hazards of contamination and irradiation of an alpha source.

Radioactive contamination.

Particle model of matter

Compare the hazards of contamination and irradiation of a beta source.

Radioactive contamination.

Particle model of matter

Compare the hazards of contamination and irradiation of a gamma source.

Radioactive contamination.

Particle model of matter

Explain why it is important for scientists to publish findings on the effect of radiation.

Radioactive contamination.

Forces

Define the term scalar quantity.

Scalar and vector quantities

Forces

Define the term vector quantity.

Scalar and vector quantities

Forces

Give four examples of scalar quantities.

Scalar and vector quantities

The type of radiation emitted.	The decaying atoms in the radioactive contamination.
Contamination inside the body is very dangerous. Irradiation is less hazardous because of low penetration.	The process of exposing an object to nuclear radiation.
Contamination carries a low risk but irradiation by gamma rays is highly hazardous.	Less damaging inside the body due to less ionising. Irradiation can be dangerous especially at higher doses.
A quantity with magnitude only.	So the findings can be shared with other scientists and checked by peer review.
Mass, distance, speed and temperature.	A quantity with both magnitude and direction.

Forces

Give four examples of vector quantities.

Scalar and vector quantities

Forces

Explain how a vector quantity can be represented by an arrow.

Scalar and vector quantities

Forces

What is a contact force?

Contact and non-contact forces

Forces

What is a non-contact force.

Contact and non-contact forces

Forces

Give two examples of contact forces.

Contact and non-contact forces

Forces

Give two examples of non-contact forces.

Contact and non-contact forces

Forces

What type of quantity is force?

Contact and non-contact forces

Forces

What is weight?

Gravity

Forces

What is the cause of the force of gravity close to the Earth?

Gravity

Forces

What does the weight of an object depend on?

Gravity

The direction of the arrow represents the direction of the vector quantity and the length of the arrow represents the magnitude.

Acceleration, force, velocity and displacement.

An interaction between two objects which are physically separated.

An interaction between two objects which are physically touching.

Gravitational force, magnetic force and electrostatic force.

Friction, air resistance, tension and normal contact force.

The force acting on an object due to gravity.

Vector

The gravitational field strength where the object is.

The gravitational field around the Earth.

Forces

What is the equation to calculate the weight of an object?

Gravity

Forces

What is the unit of weight?

Gravity

Forces

What is the unit of gravitational field strength?

Gravity

Forces

Where is the weight of an object considered to act?

Gravity

Forces

How are the weight and mass of an object linked?

Gravity

Forces

How can the weight of an object be measured?

Gravity

Forces

What is a resultant force?

Resultant forces

Forces

Explain how you would calculate the resultant force of two forces that act in a straight line?

Resultant forces

Forces

When is work done?

Work done and energy transfer

Forces

What is the equation to calculate work?

Work done and energy transfer

N (newtons).

W = m x g (weight = mass x gravitational field strength.

The centre of mass.

N/kg (newtons per kilogram).

Using a calibrated spring-balance (newtonmeter).

They are directly proportional.

Take one force away from the other to calculate the overall resultant force.

A single force that can be used to replace a number forces acting upon an object. The resultant force has the same effect as all the other forces acting together.

W = F x s (work done = Force x distance)

When a force causes an object to move through a distance (e.g. pushing a pram).

Forces

What is the unit of work?

Work done and energy transfer

Forces

What is a newton-metre?

Work done and energy transfer

Forces

What is 1 newton-metre equal to?

Work done and energy transfer

Forces

Describe the energy transfer when a person walks up a flight of stairs.

Work done and energy transfer

Forces

What is the result of work done against frictional forces acting upon an object.

Work done and energy transfer

Forces

State three ways the shape of an object can be changed.

Forces and elasticity

Forces

Explain why when changing the shape of an object more than one force needs to be applied.

Forces and elasticity

Forces

What is elastic deformation?

Forces and elasticity

Forces

What is inelastic deformation?

Forces and elasticity

Forces

How is extension of an elastic object related to the force applied?

Forces and elasticity

When a force of one newton causes a displacement of 1 metre.

Joules

The higher the person gets the greater the gravitational potential energy they store.

1 joule.

Stretching, bending and compression.

This causes a rise in the temperature of the object.

This is when an object that has been deformed returns to its original length and shape.

If only one force was applied the object would simply move in the direction of the applied force.

The extension of an object is directly proportional to the force applied (provided the limit of proportionality is not exceeded.

This is when an object that has been deformed does not return to its original length and shape.

Forces

What is the limit of proportionality?

Forces and elasticity

Forces

What is the formula that combines force, spring constant and extension?

Forces and elasticity

Forces

What is the unit for the spring constant?

Forces and elasticity

Forces

What is the unit for extension?

Forces and elasticity

Forces

Explain the energy transfer when a force is applied to a spring.

Forces and elasticity

Forces

Explain why you would see a linear relationship between force and extension.

Forces and elasticity

Forces

Explain why you would see a non-linear relationship between force and extension.

Forces and elasticity

Forces

Describe how you would calculate the spring constant from a graph if the force and extension have a linear relationship.

Forces and elasticity

Forces

What equation would you use to calculate the work done by a spring?

Forces and elasticity

Forces

Define distance.

Distance and displacement.

$F = k \times e$ (force = spring constant x extension).

This is the point at which the extension is no longer proportional to the force. On a force against extension graph, the line starts to curve after this point.

Metres.

N/m (newtons per metre).

A linear relationship shows that the force is directly proportional to the extension.

A force that deforms a spring does work. Elastic potential energy is then stored in the spring. The work done is equal to the elastic potential energy stored (unless the spring is inelastically deformed).

The gradient of the graph (force / extension) is equal to the spring constant.

A non-linear relationship shows the limit of proportionality has been exceeded.

Distance is how far an object moves.

$E_e = 1/2 \times k \times e^2$ (elastic potential energy = 1/2 x spring constant x $(\text{extension})^2$

Forces

What type of quantity is distance?

Distance and displacement.

Forces

Define displacement.

Distance and displacement.

Forces

What type of quantity is displacement?

Distance and displacement.

Forces

How should displacement be expressed?

Distance and displacement.

Forces

What type of quantity is speed?

Speed

Forces

What four factors may affect the speed at which a person can walk, run or cycle.

Speed

Forces

What are typical values for the speed of walking, running and cycling?

Speed

Forces

What are typical values for the speed of a car, a train and an aeroplane?

Speed

Forces

What is the typical speed of sound in air?

Speed

Forces

What equation links distance travelled, speed and time.

Speed

Displacement is the distance an object moves and the direction it travels.	Scalar.
Magnitude and direction e.g. 30m, North.	Vector.
Age, terrain, fitness and distance travelled.	Scalar
Car: 25m/s, train: 30m/s and aeroplane: 250m/s	1.5 m/s, 3 m/s, 6 m/s.
s=v x t (distance travelled = speed x time).	330 m/s.

Forces

What are the units for speed?

Speed

Forces

What is velocity?

Velocity

Forces

What type of quantity is velocity?

Velocity

Forces

Explain why does motion of an object in a circle involves constant speed but changing velocity? (HT)

Velocity

Forces

How is the speed of an object calculated in a distance-time graph?

The distance-time relationship

Forces

How do you measure the speed of an object that is accelerating using a distance-time graph?

The distance-time relationship

Forces

What equation is used to calculate the average acceleration of an object?

Acceleration

Forces

What is the unit of acceleration?

Acceleration

Forces

What type of quantity is acceleration?

Acceleration

Forces

How is change in velocity (Δv) calculated?

Acceleration

ρ= m x v (momentum = mass x velocity)

A property of moving objects.

The total momentum before a collision (or explosion) is equal to the total momentum after a collision (or explosion).

Kg m/s (kilogram metres per second)

Calculate the momentum of each each individual vehicle and add them together to get the total momentum before the collision. Calculate the individual momentum of each of the vehicles after the collision. Use the total momentum before the collision to help calculate an unknown variable after the collision.

A system where neither energy nor matter can leave.

Waves transfer energy from one place to another without transferring matter.

An explosion is a special case where the momentum before the explosion is equal to zero. This means the momentum after the explosion must also equal zero. This is achieved by one of the components (e.g. bullet) having a positive velocity and one of the components (e.g. the rifle) having a negative velocity.

The oscillations are parallel to the movement of travel.

The oscillations are perpendicular to the movement of travel.

Forces

What term is used to denote slowing down?

Acceleration

Forces

How is acceleration calculated from a velocity-time graph?

Acceleration

Forces

How is the displacement calculated from a velocity-time graph? (HT)

Acceleration

Forces

What equation applies to objects with uniform acceleration?

Acceleration

Forces

What is the acceleration due to gravity of an object falling near the Earth's surface?

Acceleration

Forces

Describe what happens to an object that is falling through a fluid?

Acceleration

Forces

What is Newton's First Law?

Newton's First Law.

Forces

Describe the effect of Newton's First Law on a vehicle driving at steady speed.

Newton's First Law.

Forces

According to Newton's First Law when will the velocity (the speed or direction) of an object change?

Newton's First Law.

Forces

What is inertia? (HT)

Newton's First Law.

Gradient (velocity / time)

Deceleration

$V^2 - U^2 = 2 \times a \times s$ (final velocity^2 - initial velocity^2 = 2 x acceleration x distance)

Area under the curve.

An object falling through a fluid (liquid or gas) will initially accelerate due to gravity. As the velocity increases so will drag as more particles hit the falling object. Eventually the **drag will equal velocity** and the resultant force will be zero. The object will then move at a constant speed called the **terminal velocity.**

About 9.8 m/s^2.

When a vehicle is travelled get at a steady speed the resistive forces (air resistance and friction) will be equal to driving force.

If the resultant force acting on an object is zero then the object will remain stationary or will continue to move at the same velocity.

The tendency of objects to remain at rest or continue with uniform motion.

The velocity of an object will change if a resultant force acts upon the object.

Forces

What is Newton's Second Law?

Newton,s Second Law.

Forces

What equation is used to calculate the resultant force on an object?

Newton's Second Law.

Forces

What is inertial mass a measure of? (HT)

Newton's Second Law.

Forces

Define inertial mass. (HT)

Newton's Second Law.

Forces

What symbol would be used if a question asks for an estimated value?

Newton's Second Law.

Forces

What symbol represents proportionality?

Newton's Second Law.

Forces

What is Newton's Third Law?

Newton's Third Law.

Forces

What is the stopping distance of a vehicle?

Stopping distances.

Forces

What is the thinking distance.

Stopping distances.

Forces

What is braking distance.

Stopping distances.

The speed of an object in a given direction.

m/s.

An object travelling in s circle is constantly changing direction. As a result its velocity will change constantly due to the change in direction.

Vector.

Draw a tangent and calculate the gradient of the tangent.

The gradient of the line

m/s^2.

$a = \Delta v / t$ (acceleration = change in velocity / time taken)

Final velocity - initial velocity.

Vector.

Forces

What is the typical reaction time of person?

Reaction time

Forces

Name four factors which could affect a driver's reaction time.

Reaction time

Forces

Describe two methods to calculate the reaction time of a person.

Reaction time

Forces

Name two road conditions which could affect the braking distance of a car?

Factors affecting braking distance I

Forces

Name two ways in which a car in poor condition could affect the braking distance?

Factors affecting braking distance I

Forces

Describe what happens when a force is applied to the brakes of a vehicle in relation to energy transfer and work done.

Factors affecting braking distance II

Forces

How is speed related to braking force if a vehicle needs to stop in a certain distance?

Factors affecting braking distance II

Forces

How is the braking force linked to deceleration?

Factors affecting braking distance II

Forces

What are the consequences of large decelerations?

Factors affecting braking distance II

Forces

What equation can be used to estimate the uniform deceleration of a vehicle? (HT)

Factors affecting braking distance II

F = m x a (force = mass x acceleration).

The acceleration of an object is proportional to the resultant force acting upon the object. It is inversely proportional to the mass of the object.

The ratio of force over acceleration

The difficulty of changing the velocity of an object.

$\propto$

$\sim$

The sum of the thinking distance and the braking distance.

Whenever two objects interact, the forces they exert on each other are equal and opposite.

The distance travelled under braking force.

The distance travelled during the drivers reaction time.

Forces

What is momentum a property of?

Momentum. (HT)

Forces

What is the formula for momentum?

Momentum. (HT)

Forces

What is the unit for momentum?

Momentum. (HT)

Forces

What is the law of conservation of momentum?

Conservation of momentum. (HT)

Forces

What is a closed system?

Conservation of momentum. (HT)

Forces

Describe how the conservation of momentum is applied to a collision between two vehicles.

Conservation of momentum. (HT)

Forces

Describe how conservation of momentum is applied to an explosion.

Conservation of momentum. (HT)

Waves

What are waves?

Transverse and longitudinal waves.

Waves

Describe the motion of a transverse wave.

Transverse and longitudinal waves.

Waves

Describe the motion of a longitudinal wave.

Transverse and longitudinal waves.

Tiredness, drugs, alcohol and distractions.

0.2s to 0.9s

Wet and icy.

Using the drop ruler test, using a digital reaction timer.

The work done by the friction force between the brakes and the wheel transfers kinetic energy (the cars slows down) to thermal energy in the brakes and tyres (the brakes get hot).

Worn brakes and worn tyres

The greater the braking force the greater the deceleration of the vehicle.

The greater the speed, the greater the braking force required.

$V^2 - U^2 = 2 \times a \times s$ (final velocity^2 - initial velocity^2 = 2 x acceleration x distance)

Overheating of the brakes and loss of control.

Waves

Give an example of a transverse wave.

Transverse and longitudinal waves.

Waves

Give an example of a longitudinal wave.

Transverse and longitudinal waves.

Waves

What does rarefaction mean?

Transverse and longitudinal waves.

Waves

Give evidence for ripples of water waves to show that it is the wave that travels and not the water.

Transverse and longitudinal waves.

Waves

What is amplitude?

Properties of waves.

Waves

What is wavelength?

Properties of waves.

Waves

What is frequency?

Properties of waves.

Waves

What is the unit for frequency?

Properties of waves.

Waves

What is the unit for wavelength?

Properties of waves.

Waves

What is the unit for period?

Properties of waves.

Sound waves	Ripples on water, all electromagnetic waves and waves on a string.
An object floating on water will move up and down as a wave passes underneath. Although the wave will move in one direction the floating object does not move with the wave.	An uncompressed section of a longitudinal wave.
Wavelength is the distance from one point on a wave to the equivalent point on an adjacent wave.	Amplitude is the maximum displacement of a point on a wave away from its undisturbed position.
Hertz (Hz).	Frequency is the number of waves that pass a point each second.
Seconds (s).	Metres (m).

Waves

What is wave speed?

Properties of waves.

Waves

What is the formula for wave speed (the wave equation).

Properties of waves.

Waves

What is the unit for wave speed?

Properties of waves.

Waves

Which waves obey the wave equation?

Properties of waves.

Waves

What are electromagnetic waves?

Types of electromagnetic waves.

Waves

What type of spectrum do electromagnetic waves form?

Types of electromagnetic waves.

Waves

What property do all electromagnetic waves share in a vacuum?

Types of electromagnetic waves.

Waves

How are waves in the electromagnetic spectrum grouped?

Types of electromagnetic waves.

Waves

List the 7 groups of the electromagnetic spectrum from long wavelength to short wavelength.

Types of electromagnetic waves.

Waves

List the 7 groups of the electromagnetic spectrum from high frequency to low frequency.

Types of electromagnetic waves.

Wave speed = frequency x wavelength ($v = f\lambda$).

Wave speed is the speed at which the energy is transferred (or the waves move) through the medium.

All waves obey the wave equation.

Metres per second (m/s).

A continuous spectrum.

Transverse waves that transfer energy from a source to an absorber.

They are grouped by wavelength and frequency.

They all move at the same velocity

gamma rays - x-rays - ultraviolet - visible light - infrared - microwaves - radio waves.

radio waves - microwaves - infrared - visible light - ultraviolet - x-rays - gamma rays.

Waves

Which part the electromagnetic spectrum do eyes detect?

Types of electromagnetic waves.

Waves

Describe the energy transfer of radio waves.

Types of electromagnetic waves.

Waves

Describe the energy transfer of microwaves.

Types of electromagnetic waves.

Waves

Describe the energy transfer of infrared waves.

Types of electromagnetic waves.

Waves

Name 4 ways substances can affect electromagnetic waves (HT).

Properties of electromagnetic waves 1.

Waves

What happens when waves are absorbed by a substance?(HT)

Properties of electromagnetic waves 1.

Waves

What happens when waves are transmitted by a substance?(HT)

Properties of electromagnetic waves 1.

Waves

What happens when waves are refracted by a substance? (HT)

Properties of electromagnetic waves 1.

Waves

What happens when waves are reflected by a substance? (HT)

Properties of electromagnetic waves 1.

Waves

Explain why refraction changes in different substances (HT).

Properties of electromagnetic waves 1.

Radio waves transfer energy to the kinetic energy stores of electrons in radio receivers.

Visible light.

A campfire emits infrared radiation. These are absorbed by objects and transferred to an objects internal energy store.

Microwaves transfer energy to the kinetic energy stores of water molecules in the food.

The waves transfers energy to the substances internal energy stores.

Substances may absorb, transmit, refract or reflect waves.

The wave will change speed as it crosses the boundary between one substance and another.

The wave carries on travelling through the substance.

Different substance cause the waves to move at different velocities.

The wave is neither absorbed or transmitted but its path is changed away from the substance.

Waves

Describe an experiment to investigate the amount of infrared radiation absorbed or radiated by a different surfaces.

Properties of electromagnetic waves 1.

Waves

How are radio waves produced? (HT)

Properties of electromagnetic waves 2.

Waves

Describe what happens when radio waves are absorbed (HT)?

Properties of electromagnetic waves 2.

Waves

Describe the result when changes occur in atoms or nuclei.

Properties of electromagnetic waves 2.

Waves

Describe the origin of gamma rays.

Properties of electromagnetic waves 2.

Waves

Name three waves of the electromagnetic spectrum that can be hazardous to human body tissue.

Properties of electromagnetic waves 2.

Waves

What do the effects of these hazardous waves depend upon?

Properties of electromagnetic waves 2.

Waves

What is the unit of radiation dose?

Properties of electromagnetic waves 2.

Waves

What is the effect of ultraviolet radiation on human tissue?

Properties of electromagnetic waves 2.

Waves

What type of radiation are X-rays and gamma rays?

Properties of electromagnetic waves 2.

Radio waves are produced by oscillations in electrical circuits (e.g alternating current).	Use a Leslie cube
Electromagnetic waves can be absorbed or generated by the atom or nuclei, over a wide frequency range.	They create an alternating current with the same frequency as the radio wave itself.
Gamma rays, x-rays and ultraviolet light.	Changes in the nuclei of a unstable radioisotope leads to the emission of gamma rays.
Sievert	The effect depends on the the type of radiation and the size of the dose.
Ionising radiation.	Ultraviolet light causes skin to age prematurely and increase the risk of skin cancer.

Waves

What is the effect of X-rays and gamma rays on human tissue?

Properties of electromagnetic waves 2.

Waves

Name 2 applications of radio waves.

Uses and applications of electromagnetic waves.

Waves

Name 2 applications of microwaves.

Uses and applications of electromagnetic waves.

Waves

Name 3 applications of infrared.

Uses and applications of electromagnetic waves.

Waves

Name an application of visible light.

Uses and applications of electromagnetic waves.

Waves

Name 2 applications of ultraviolet.

Uses and applications of electromagnetic waves.

Waves

Name two applications for X-rays and gamma rays.

Uses and applications of electromagnetic waves.

Waves

Explain briefly why radio waves are suitable for communication (HT).

Uses and applications of electromagnetic waves.

Waves

Explain briefly why microwaves are used by satellites (HT).

Uses and applications of electromagnetic waves.

Waves

Explain briefly why infrared is suitable for heating rooms (HT).

Uses and applications of electromagnetic waves.

Television and radio.

They can cause mutation of genes and cancer.

Electrical heaters, cooking food and infrared cameras.

Satellite communication and cooking food.

Energy efficient lamps and suntanning.

Fibre optic communications.

Long wave signals can be transmitted and recieved without being in line of sight. Short wave signals can be bounced of the atmosphere to travel long distances.

Medical imaging and treatment.

Infrared radiation from a heater is absorbed by an object and increases its internal energy stores.

Microwaves used for communication are able to pass through the atmosphere to be picked up by satellites.

Waves

Explain briefly why light is suitable for fibre optic cables (HT).

Uses and applications of electromagnetic waves.

Waves

Explain briefly why ultraviolet radiation is useful for security marking (HT).

Uses and applications of electromagnetic waves.

Waves

Explain briefly why X-rays and gamma rays are used in medicine (HT).

Uses and applications of electromagnetic waves.

Waves

What are the poles of a magnet?

Poles of a magnet.

Waves

What happens when two magnets are brought close together?

Poles of a magnet.

Waves

What force occurs when two like poles are brought close together?

Poles of a magnet.

Waves

What force occurs when two unlike poles are brought close together?

Poles of a magnet.

Waves

What is a permanent magnet?

Poles of a magnet.

Waves

What is an induced magnet?

Poles of a magnet.

Waves

What type of force does an induced magnet always cause?

Poles of a magnet.

Under normal light the security mark will be invisible to thieves.

Visible light is refracted which allows it to travel along long lengths of cable. It is not absorbed or scattered as it travels along.

These are the places where the magnetic forces are the strongest.

X-rays are transmitted through flesh but are absorbed by denser material such as bone.

The magnets repel each other.

They exert a force on each other.

A magnet that produces its own magnetic field.

The magnets are attracted to each other.

Attraction.

A material that becomes a magnet when it is placed in a magnetic field.

Waves

What happens when an induced magnet is removed from the magnetic field?

Poles of a magnet.

Waves

Name four types of magnetic material.

Magnetic fields.

Waves

What is a magnetic field.

Magnetic fields.

Waves

What force occurs between a magnet and a magnetic material?

Magnetic fields.

Waves

What does the strength of the magnetic field depend upon?

Magnetic fields.

Waves

Where is the magnetic field strongest?

Magnetic fields.

Waves

What is the direction of the magnetic field at any point?

Magnetic fields.

Waves

What is the direction of the magnetic field line from pole to pole?

Magnetic fields.

Waves

What does a magnetic compass contain?

Magnetic fields.

Waves

In what direction does the compass needle point?

Magnetic fields.

Iron, steel, cobalt and nickel.	It loses most of its magnetism quickly.
Attraction.	The region around the magnet where a force acts on magnetic material.
At the poles.	The distance from the magnet.
From the north pole to the south pole.	The direction is given the direction of the force that would act on a north pole placed at that point.
The needle points in the direction of the earth's magnetic field.	A small bar magnet.

Waves

Describe how to plot the magnet field pattern of a magnet using a compass.

Magnetic fields.

Waves

Evaluate the idea that the core of the Earth must be magnetic.

Magnetic fields.

Waves

What happens when a current flows through a conducting wire?

Electromagnetism

Waves

What does the strength of of the magnetic field in a conducting wire depend upon?

Electromagnetism

Waves

What is a solenoid?

Electromagnetism

Waves

Describe the magnetic field inside a solenoid.

Electromagnetism

Waves

Describe the magnetic field around a solenoid.

Electromagnetism

Waves

How can the strength of a solenoid be increased?

Electromagnetism

Waves

What is an electromagnet.

Electromagnetism

Waves

Describe the motor effect.

Fleming's left-hand rule (HT)

The behaviour of a bar magnet in a magnetic field shows that on earth they are affect by large magnetic field. As a result a compass can be used to point in a northern direction.

Move a compass around a magnet and plot the direction of the compass, using arrows, to build up a picture of the magnetic field.

The strength of the magnetic field depends upon the current through the wire and the distance from the wire.

A magnetic field is produce around the wire.

The magnetic field is strong and uniform.

A coil of wire.

Adding an iron core to the solenoid.

The magnetic field has a similar shape to a bar magnet.

When a conductor is placed in a magnetic field, the magnet producing the field and the conductor exert a force on each other called the motor effect.

An electromagnet is a solenoid with an iron core.

Waves

What does the thumb represent in Fleming's left-hand rule?

Fleming's left-hand rule (HT)

Waves

What does the first finger represent in Fleming's left-hand rule?

Fleming's left-hand rule (HT)

Waves

What does the second finger represent in Fleming's left-hand rule?

Fleming's left-hand rule (HT)

Waves

What is the unit of magnetic flux density?

Fleming's left-hand rule (HT)

Waves

What is the symbol for magnetic flux density?

Fleming's left-hand rule (HT)

Waves

What does a current carrying coil of wire in a magnetic field tend to do?

Electric motors (HT)

Waves

What are the directions of the forces on the coil in a motor?

Electric motors (HT)

Waves

What swaps the contact every half turn in a motor?

Electric motors (HT)

Waves

Name two ways the direction of of the motor can be reversed.

Electric motors (HT)

Waves

Name three ways the speed of the motor can be increased.

Electric motors (HT)

Direction of magnetic field.

Direction of motion.

Tesla (T).

Direction of current.

Rotate.

B

Split ring commutator.

One force acts up the other acts down.

Increasing the current, adding more turns to the coil or increasing the magnetic flux density.

Swapping the polarity of the dc supply or swapping the magnetic poles.