

## Physics

	Domestic Fuel Costs and costs	Energy Transfers	Describing Motion	Changes in Systems	Forces	Pressure	Observed Waves	Sound Waves	Light Wave	Space	Current Electricity	Static Electricity	Magnetism
<b>Band 1</b>	I can list some energy resources	I can state that energy gives the ability to do things	I can state that speed is a measurement of how fast an object is moving		I can state that a force acts as a push or a pull  I can list some forces	I can state the effects of pressure on an object	I can name some types of waves including water waves, sound waves, pressure waves and light waves	I can name some devices that can detect sound, including microphones and ear drums	I can state one function of the human eye (to see)  I can state that pinhole cameras, cameras with lenses and the human eye form images from light	I can list the seasons of the Earth in order  I can state that light travels very fast, at the speed of light  I can state that on Earth, a day is 24 hours	I can state that an electrical circuit must be complete and include a power source, wires and a component for electricity to flow  I can name some common components of electrical circuits		
<b>Band 2</b>	I can state that energy is stored in food and fuel	I can name some thermal insulators			I can state that forces occur when two objects interact		I can state that waves transfer energy	I can state that sound is produced by vibrations  I can state that frequencies of sound are measured in Hertz (Hz)	I can state the primary colours and secondary colours of light  I can list the colours of the spectrum of light in order  I can state that light waves are transverse	I can list the planets in our solar system in order  I can state that on Earth, a lunar month is 28 days  I can state that on Earth, a year is 365 days	I can state that electrical current is measured in amperes (amps)  I can give the symbol for the unit of current (A)  I can give the symbol for the unit of potential difference (V)		I can state the like poles repel and unlike poles attract  I can state that magnetism is a non-contact force that will affect magnetic materials within the magnetic field

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		I can name different energy stores							I can state that white light is a mixture of colours	I can describe celestial bodies in order of magnitude  I can state that gravity always pull towards the centre of the object  I can identify gravity as the force which exists between the Moon and the Earth and between the Sun and the Earth	I can name the component used to measure potential difference  I can name the component used to measure electrical current  I can identify some common components of electrical circuits from the circuit symbol		
	I can state that electrical appliances have power ratings (W, kW)  I can name the energy type that is stored in food and fuel	I can state that thermal energy is transferred by conduction in solids  I can state that thermal insulators reduce thermal energy transfer			I can state that forces are measured in Newtons  I can state that forces are either contact or non-contact			I can name some animals that use sound and have different auditory ranges than humans  I can state that sound waves are longitudinal	I can give some examples of when light is absorbed or reflected  I can state that convex lenses focus light	I can state that gravity is a non-contact force that will affect objects within the gravitational field	I can state that the potential difference of a battery or cell is what causing the current to flow  I can state that a battery or cell of a higher potential difference will cause more current to flow		I can draw the field lines surrounding a bar magnet  I can add arrows to show the direction of the field lines

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<b>Band 3</b>		<p>I can state that thermal energy is transferred from hotter objects to colder objects</p> <p>I can state that thermal energy is transferred by convection in fluids</p>			<p>I can state that a force may affect the speed, direction or shape of an object</p>			<p>I can state the auditory range of humans</p> <p>I can state that sound waves may be reflected and absorbed</p> <p>I can state that sound cannot travel through a vacuum</p>	<p>I can state that light waves are transverse</p>		<p>I can state that resistance is a measurement of how easy or hard it is for current to flow through an object</p> <p>I can state that resistance is measured in Ohms</p> <p>I can draw the circuit symbols of some common components of electrical circuits</p>		<p>I can label the north-seeking and south-seeking poles of a magnet, when given the field lines or details about repulsion or attraction</p>
		<p>I can state that the effect of a thermal transfer is that one object increases in temperature whilst the other decreases in temperature</p>		<p>I can state that energy is always conserved</p>	<p>I can state that a moment is the turning effect of a force</p>	<p>I can state that atmospheric pressure decreases with an increase in height, due to decrease in weight of air</p>	<p>I can state that different types of waves can travel through matter and vacuums</p>	<p>I can describe the reflection of a sound wave as an echo</p>	<p>I can state that light waves may be absorbed, reflected (diffuse and specular), refracted and diffused</p>	<p>I can state that light and heat energy travels to earth from the Sun as an electromagnetic wave (link to Light unit)</p>	<p>I can identify series and parallel circuits</p>	<p>I can state that when two materials are rubbed together electrons will be transferred</p>	<p>I can state that a flow of electric current will produce a magnetic field</p>

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Band 4	I can calculate energy values of different foods in kJ (using food labels)	<p>I can state that thermal energy is transferred by radiation in transparent objects and vacuums</p> <p>I can state that thermal energy is transferred between objects until thermal equilibrium is reached</p>				I can state that pressure in liquids increases with a depth		I can recognise a longitudinal wave from a diagram	<p>I can label the main parts of the human eye, cornea, pupil, iris, lens, retina, optic nerve</p> <p>I can state the functions of the main parts of the human eye, cornea, pupil, iris, lens, retina, optic nerve</p> <p>I can state that during specular reflection in a plane mirror, the angle of incidence is always equal to the angle of reflection</p> <p>I can state that light waves are able to travel through a vacuum</p>	<p>I can state that all objects have a gravitational field, some will be stronger than others</p> <p>I can state that the gravitational field strength of the Earth is 10 N/kg</p> <p>I can state that the Earth is tilted on its axis</p>	<p>I can state that electrical current is the same in all parts of a series circuit</p> <p>I can state that potential difference is measured in volts</p> <p>I can identify and use the symbol for an Ohm</p> <p>I can describe how a bulb of an increased potential difference will be brighter</p>		<p>I can name the three magnetic materials</p> <p>I can state that magnets may be temporary or permanent</p> <p>I can list some uses of electromagnets</p>

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			I can calculate the average speed of an object						I can state that in a vacuum, light waves have a maximum speed, the speed of light				
Band 5	I can compare energy values of different foods in kJ (using food labels)			I can calculate energy efficiency	I can identify if a particular force is contact or non-contact		I can state that some waves may be reflected, experience superposition, absorbed, refracted and dispersed	I can label a diagram of a longitudinal wave, including compressions, rarefactions	I can describe how light behaves in relation to different materials using the words, transparent, translucent and opaque	I can describe a day as the time taken for the Earth to spin once on its axis	I can state that potential difference is the shared between the component in a series circuit	I can describe the force between two charged objects as electrostatic force	
	I can calculate the energy transferred when given power and time	I can describe situations where energy is transferred	I can describe changes in motion		I can calculate resultant force	I can calculate resultant force		I can describe some applications of absorbing sound, including sound proofing and ear	I can describe what is meant by absorbing and reflecting light	I can describe a lunar month as the time taken for the Moon to orbit the Earth	I can calculate current when given charge and time	I can describe electrostatic force as either repulsion or attraction	
					I can describe forces using force arrows diagrams	I can describe the effect of changing pressure on an object	I can describe some applications of absorbing sound, including sound proofing and ear I can describe some applications of echoes, including sonar, ultrasound and	I can describe the formation of an image from specular reflection in a plane I can describe refraction using a ray model diagram	I can describe a year as the time taken for the Earth to orbit the Sun I can calculate weight when given mass and gravitational field strength	I can calculate resistance, when given potential difference and current I can describe electrical current as the flow of charge in a circuit			

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	I can describe how the energy in different energy resources can be				I can describe the effect of friction between surfaces	I can describe ways to increase or decrease pressure					I can describe that objects of increased resistance allow less current to flow		
	<p>I can calculate electrical power when given current and potential difference</p> <p>I can describe what a higher power rating means in terms of energy transferred (J, kJ, kW hour)</p> <p>I can calculate energy transferred in terms of work done</p> <p>I can explain how almost all energy on Earth comes from the Sun</p>	<p>I can describe some uses and applications of thermal insulators</p> <p>I can describe how thermal energy is transferred by conduction</p> <p>I can describe how materials which are heated will expand</p>		I can describe how energy may be wasted and/or dissipated	<p>I can calculate moments</p> <p>I can describe forces in terms of deforming objects</p> <p>I can describe objects in terms of stretching objects</p> <p>I can describe levers as uses of moments</p>	<p>I can calculate pressure</p> <p>I can calculate density</p> <p>I can describe how floating or sinking is dependent on density</p>	<p>I can describe the reflection of an observed wave in water.</p> <p>I can describe the superposition of observed waves in water</p>	<p>I can describe how sound requires matter to travel</p> <p>I can describe what frequency is</p>	<p>I can describe how the human eye forms and image using I can describe how combination s of the primary colours of light result in the</p> <p>I can describe how convex lenses focus light using a ray diagram</p> <p>I can describe the difference between a virtual and real image</p>	<p>I can describe a solar system as a collection of planets and other objects orbiting a star</p> <p>I can describe how the seasons are due to the orbit of the Earth around the Sun and the fact the Earth is tilted on its axis</p> <p>I can describe weight as the force a object experiences due to a gravitational field pulling on it</p> <p>I can describe how the gravitational field strength of an object changes due to the size (mass) of the object</p>	<p>I can describe how to correctly connect an ammeter to a circuit</p> <p>I can describe how electrical current splits up at a branch in a series circuit and add together when branches join</p> <p>I can describe how in a parallel circuit the potential difference is the same for each branch as the battery or cell</p> <p>I can describe how to correctly connect an voltmeter to a circuit</p>	<p>I can describe electrostatic force as a non-contact force where objects are affecting if there are inside the electric field of a charged</p> <p>I can describe how the movement of electrons can result in objects becoming charged with static electricity</p>	<p>I can describe how to make an electromagnet</p> <p>I can describe how to increase the strength of an electromagnet</p> <p>I can describe the Earth and compasses as examples of magnets</p> <p>I can describe the relationship between distance between field lines and strength</p>

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Band 6	I can calculate cost of electricity when given energy transferred and cost per unit	<p>I can describe how thermal energy is transferred by convection</p> <p>I can describe how thermal energy is transferred by radiation</p> <p>I can explain how thermal energy is transferred by conduction, in terms of particles</p> <p>I can explain how thermal energy is transferred by radiation in terms of particles</p>		I can explain situations that may change the amounts of energy that is wasted	<p>I can describe how to increase or decrease a moment</p> <p>I can describe resultant force</p> <p>I can describe Hooke's Law</p> <p>I can describe the effects of air or water resistance</p>	I can explain how pressure in liquids results in upthrust, allowing some objects to float		I can describe how sound waves can be used to transfer information if they are converted to electrical signals	<p>I can describe how a pinhole camera works using a ray diagram</p> <p>I can describe how white light is a mixture of colours with reference to frequency</p> <p>I can explain why refraction occurs, with reference to particle and the speed of light</p>	<p>I can describe how the movement of light is measured in light years, and that this is a measurement of astronomical distance and not time</p> <p>I can explain that a light year is how far light travels in one year</p>	I can identify electrical current as flowing from positive to negative in a solution or circuit		<p>I can describe temporary and permanent magnets in terms of hard and soft magnetic materials</p> <p>I can describe how a bar magnet inside an electromagnet field can be made to move</p> <p>I can describe how to find the shape of a magnetic field using a compass</p> <p>I can describe and explain attraction and repulsion in terms of the direction of field lines</p>

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		<p>I can explain how thermal energy is transferred by convection, in terms of particles</p> <p>I can explain the expansion of heated materials, with reference to energy levels of particles</p>	<p>I can explain factors that may affect an objects speed</p>		<p>I can explain ways to reduce or increase friction as necessary</p> <p>I can explain when a force is balanced or unbalanced</p>	<p>I can explain some applications of increasing or decreasing pressure</p>		<p>I can explain what it means to describe sound as a longitudinal wave, with reference to the direction of vibrations and energy</p>	<p>I can describe that we see different colours due to the different absorption and reflection of light by objects</p> <p>I can explain how a prism may be used to diffuse the different colours of light, with reference to refraction and wave speed</p>	<p>I can explain how the different seasons occur in the northern hemisphere, with reference to the tilt of the Earth and proximity to the Sun</p> <p>I can explain that our Sun is a star, that there are other stars and solar systems in our galaxy and other galaxies in the Universe</p>		<p>I can explain when objects will attract or repel each other due to electrostatic force</p> <p>I can discuss some examples and applications of static electricity</p>	<p>I can describe how magnetism may be induced</p> <p>I can describe how to make a simple motor using electromagnetism and a bar magnet</p>
	<p>I can explain the effect of a higher power rating on the cost of running an appliance</p>						<p>I can explain how superposition may result in a rogue wave.</p>	<p>I can explain which material sound will travel fastest through, with reference to particle arrangement</p>			<p>I can suggest some applications for materials of higher or lower resistance</p>		<p>I can explain why the geographical north pole of the Earth is actually a magnetic south pole</p>

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<b>Band 7</b>	<p>I can compare and contrast energy resources</p> <p>I can suggest which energy resources may be most suitable</p>	<p>I can suggest how thermal energy transfer by convection may be changed</p> <p>I can suggest how thermal energy transfer by conduction may be changed</p> <p>I can suggest how thermal energy transfer by radiation may be changed</p> <p>I can suggest why thermal insulators reduce thermal energy transfer</p>	<p>I can interpret distance-time graphs to describe changes in motion</p> <p>I can interpret distance-time graphs to calculate speed</p>	<p>I can compare and contrast energy efficiencies</p>	<p>I can explain ways to reduce or increase air or water resistance as necessary</p> <p>I can calculate extension of springs using Hooke's Law</p>	<p>I can explain the effects of pressure on an object in terms of particles</p> <p>I can use calculations of density to predict whether an object will float or sink</p>		<p>I can relate the equation for speed, to the application of sound waves</p>	<p>I can explain some applications of convex lenses, in cameras and the eye</p> <p>I can compare and contrast light waves and waves in matter</p> <p>I can compare and contrast the human eye and a camera</p> <p>I can explain how we see different colours, with reference to the colour of the object and the colour the light available</p>	<p>I can explain the difference between a calendar and a lunar month</p> <p>I can explain the existence of a leap year, with reference to the fact that an earth year is actually 365.25 days</p>	<p>I can discuss resistance in terms of electrical conductors and insulators</p> <p>I can link electric current as the flow of charge with the structure of atoms</p> <p>I can link electric current as the flow of charge with the structure of atoms</p>	<p>I can explain how electrostatic force may attract a non-charged object through the induction of charge</p>	

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				<p>I can evaluate appliances in terms of their energy efficiency</p>	<p>I can discuss applications of friction</p>	<p>I can discuss applications of changing pressure</p>			<p>I can describe transverse waves, with reference to oscillations and energy</p> <p>I can explain how colour blindness occurs, with reference to rod and cones</p>				
<p><b>Band 8</b></p>	<p>I can justify suggestions about which energy resources may be most suitable</p>	<p>I can discuss how all materials have a store of energy inside them</p>			<p>I can explain how levers work to multiply force</p> <p>I can calculate resultant moments</p> <p>I can apply Hooke's Law to the measurement of forces using a force meter</p>				<p>I can explain light as a transverse electromagnetic wave, with reference to magnetic and electric fields</p>	<p>I can apply knowledge of the seasons in the northern hemisphere to explain why the southern hemisphere experiences seasons differently</p>	<p>I can explain the difference and reason for electrical current and electron flow</p> <p>I can link electrical conduction and insulation with the structure of atoms</p>		

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Band 9					I can interpret resultant forces to predict the effect on an objects motion  I can explain the resultant effect of two opposite moments								