

Outcomes	Gravity	Contact Forces	Energy Costs	Energy Transfer	Electricity
Emerging	I know that mass and weight are different.	I know that when the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line.	I know that we pay for domestic electricity usage based on the amount of energy transferred.	I know that when energy is transferred, the total is conserved but some energy is always lost.	I can draw a circuit diagram to show how voltage and current can be measured.
Developing	I know that every object exerts a gravitational force on every other object and that the force increases with mass and decreases with distance	I can draw the forces acting on an object, and label their size and direction	I know that electricity is generated by a combination of resources which each have advantages and disadvantages.	I can describe how jobs get done using an energy model where energy is transferred from one store at the start to another at the end.	I know that current is a movement of electrons and is the same everywhere in a series circuit.
Secure	I can recall the formula weight = mass x gravitational field strength and use it in simple calculations.	I can explain that a single force can replace all the forces acting on an object and have the same effect.	I can calculate the cost of home energy usage using the formula cost = power x time x price.	I can describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed.	I know that resistance reduces the flow of current in a circuit and can recall and use the formula resistance = voltage / current.
Advanced	I can draw a force diagram for a problem involving gravity.	I can describe factors which affect the size of frictional and drag forces.	I can compare the energy usage and cost of running different home devices.	I can compare the percentages of energy wasted by renewable energy sources.	I can predict the effect of changing the rating of a battery or a bulb on other components in a series or parallel circuit.
Excelling	I can draw conclusions from data about orbits, based on how gravity varies with mass and distance.	I can describe the effects of drag and other forces on falling or accelerating objects as they move.	I can evaluate the social, economic and environmental consequences of using a resource to generate electricity, from data.	I can explain why processes such as swinging pendulums or bouncing balls cannot go on forever, in terms of energy.	I can compare the advantages of series and parallel circuits for particular uses.

Waves, Light and Sound

I know that light and sound both travel as waves, and can label the basic wave properties on a diagram

I can explain the difference between a transverse and longitudinal wave.

I can explain why sound does not travel in a vacuum, and construct ray diagrams to show reflection and refraction.

I can explain observations when coloured lights are mixed, and use wave diagrams to describe how sound waves change with volume or pitch.

I can compare and contrast the properties of sound and light waves