

Getting the energy the body needs

Modest progress		Good progress		Excellent progress	
I can;		I can;		I can;	
Identify the main bones of the skeleton.		Describe the functions of the skeleton.		Explain how different parts of the skeleton are adapted to carry out particular functions.	
Describe the role of skeletal joints.		Identify some different joints and explain the role of tendons and ligaments in joints.		Compare the movement allowed at different joints and explain why different types of joints are needed.	
Recall that muscles contract to move bones at joints.		Identify muscles that contract to cause specific movements.		Explain how muscles work antagonistically to bring about movement and evaluate a model.	
Investigate the strengths of different muscles and draw a conclusion.		Plan and carry out an investigation to compare strengths of muscles and analyse the results using a graph.		Plan and carry out a fair investigation, analyse the data and evaluate the procedure.	
Describe some medical problems that can arise with the skeletal system.		Describe some treatments for a range of problems with the skeletal system.		Explain how diagnosis and treatment of problems with the skeletal system have changed over time.	
Describe the purpose of respiration.		Describe and explain aerobic respiration using a word equation.		Explain the role of respiration in building up complex molecules.	
Describe aerobic respiration in plants.		Identify evidence for aerobic respiration in plants and animals.		Evaluate the quality of evidence for aerobic respiration in plants and animals.	
Describe where in a cell respiration takes place.		Explain how mitochondria are adapted for respiration.		Analyse data to compare and explain the numbers of mitochondria in different cells.	
Define anaerobic respiration and give examples of sports that use anaerobic respiration.		Explain why some sports rely mainly on aerobic respiration while others require anaerobic respiration.		Describe and explain the effects on the body of anaerobic respiration and explain 'oxygen debt'.	
Identify some living things that carry out anaerobic respiration and identify some applications.		Describe and explain some evidence to show the products of anaerobic respiration and plan an investigation into fermentation.		Plan an investigation to test a hypothesis about anaerobic respiration, analyse the data and evaluate the investigation.	

Looking at plants and ecosystems

Modest progress		Good progress		Excellent progress	
I can;		I can;		I can;	
State that green plants need sunlight to grow and to make food.		Identify water and carbon dioxide as the raw materials for photosynthesis, and glucose and oxygen as the products.		Explain the chemical changes involved in photosynthesis and the roles of light and chlorophyll.	
Describe how gases enter and leave a leaf and how light energy for photosynthesis is captured.		Describe how cells in the leaf and root are adapted for their functions.		Relate and explain how the structure of palisade, mesophyll and guard cells allows them to perform their function.	
Describe how levels of light, temperature and carbon dioxide affect the rate of photosynthesis.		Explain how levels of light, temperature and carbon dioxide affect the rate of photosynthesis.		Apply learning about the factors affecting photosynthesis to solve problems.	
Name some of the nutrients needed by plants and supplied by fertilisers; state how they enter the plant dissolved in soil water.		Explain why nutrients are needed by plants, how spreading manure adds them to the soil and how water passes through the plant.		Explain how mineral deficiencies affect plants and how different factors affect the rate of transpiration.	
Describe how some bacteria produce food by chemosynthesis.		Compare chemosynthesis with photosynthesis.		Explain why some bacteria use chemosynthesis and how they support food chains.	
Describe an example of a simple food web.		Explain how energy flows through a food web and explain factors that can affect food webs, such as loss of a species or toxin accumulation.		Explain the importance of predators in an environment and evaluate changes in a food web.	
Describe an example of interdependence of organisms in an ecosystem – for example as the pollination of crops by insects.		Explain examples of interdependence of organisms in an ecosystem – for example through symbiosis, commensalism and parasitism.		Analyse an example of interdependence of organisms in an ecosystem – for example, the effects of the destruction of rainforests.	
Identify some ways in which organisms affect, and are affected by, their environment – for example through pollution or destruction of habitats.		Explain some ways in which organisms affect, and are affected by, their environment – for example, predator–prey relationships.		Analyse and evaluate the factors affecting endangered species and recommend solutions.	

Explaining physical changes

Modest progress		Good progress		Excellent progress	
I can;		I can;		I can;	
Compare the properties of solids, liquids and gases.		Draw circle diagrams to demonstrate the differences between the arrangement of particles in solids, liquids and gases, and describe their different properties.		Use particle diagrams to explain the differences in energy and forces between the particles in different states of matter, accounting for differences in their properties.	
Recognise how theories are developed.		Use observations to develop hypotheses.		Change hypotheses in the light of new evidence and use this evidence to develop theories.	
Use correct terminology and the particle model to describe changes of state, including evaporation.		Interpret and explain data relating to melting and boiling points.		Use the particle model to explain latent heat and how impurities affect melting and boiling points.	
Describe how solids, liquids and gases behave when heat is applied to them.		Describe applications and problems caused by thermal expansion.		Use the particle model to explain expansion in solids, liquids and gases.	
Describe a model that can be used to represent particles.		Apply and adapt models to make them more suitable for use.		Evaluate the strengths and limitations of particle models.	
Make predictions about floating and sinking using ideas about density.		Use the particle model to explain the density differences between gases and calculate density of solids.		Use the particle model to explain factors relating to density.	
Describe what is meant by the terms 'concentration' and 'pressure'.		Calculate concentrations of solutions.		Use ideas about particles to explain the effects of pressure.	
Describe how diffusion occurs in liquids and gases.		Explain observations relating to diffusion in terms of particles.		Make predictions, using ideas about particles, about factors affecting the rate of diffusion.	
Describe features of physical and chemical changes, recognising how mass is conserved.		Use ideas about particles to describe separation processes.		Apply the particle model to explain physical and chemical changes, taking conservation of mass into account.	
Describe different types of colloids.		Explain the properties of different colloids using the particle model.		Evaluate the particle model in its ability to explain colloids and their properties.	
Use particle models to describe different separation processes.		Use particle models to explain how the solubility of solids and gases changes with temperature.		Evaluate the effectiveness of the particle model in explaining physical changes.	

Explaining chemical changes

Modest progress		Good progress		Excellent progress	
I can;		I can;		I can;	
Identify some everyday substances that contain acids and alkalis.		Explain what all acids have in common and what all alkalis have in common.		Evaluate the hazards posed by some acids and alkalis and how these risks may be reduced.	
Give an example of an indicator and state why indicators are useful.		Explain what an indicator is and analyse results when using an indicator.		Compare the effectiveness of different indicators.	
Describe some examples of neutralisation.		Describe the changes to indicators when acids and alkalis are mixed.		Explain the changes to indicators in terms of pH when acids and alkalis are mixed.	
Recognise that water is one product of neutralisation.		Explain the formation of salt and water during neutralisation, giving some examples of common salts.		Predict the reactants or products of different neutralisation reactions.	
Describe the observations of reactions between acids and metal, and acids and carbonate, that tell us that a chemical change is taking place.		Explain the general reaction between an acid and a metal, and between an acid and a carbonate, using generic equations.		Summarise specific reactions between acids and metals and between acids and carbonates using word equations and particle drawings.	
Describe what indigestion remedies are and explain how they work.		Design an investigation to compare the effectiveness of indigestion remedies.		Analyse data about indigestion remedies to decide which remedy is the most effective.	
Summarise the reactants and products of complete combustion.		Compare the reactants and products of complete and incomplete combustion.		Explain the Law of Conservation of Mass and how it can be proven.	
Describe how combustion contributes to acid rain.		Describe the effects of acid rain.		Explain, using an equation, the effects of acid rain.	

Exploring contact and non-contact forces

Modest progress I can;		Good progress I can;		Excellent progress I can;	
Describe the attraction of unlike poles and repulsion of like poles; show how a magnetic field can be represented.		Identify magnetic attraction and repulsion as non-contact forces; explain how field lines indicate the direction and strength of forces.		Apply and evaluate the concept of magnetic fields in various contexts.	
Describe how friction between objects may cause electrostatic charge through the transfer of electrons.		Explain various examples of electrostatic charge; use ideas of electron transfer to explain different effects.		Explain why some electrostatic charge mechanisms are more effective than others.	
Describe the field around a charged object; describe some applications of static electricity.		Use the idea of fields to explain various examples and applications of static electricity.		Compare and contrast useful and dangerous instances of static charge; compare electrostatic and magnetic fields.	
Describe the variation and effects of gravity on Earth and in space.		Apply the concept of gravitational fields to explain the variation and effects of gravity on Earth and in space.		Apply the concept of gravitational fields in explaining gravitational effects on Earth and in space, including acceleration.	
Describe the causes and effects of varying pressure on and by solids.		Explain the effects of varying pressure on and by solids; calculate the pressure applied by a solid from the force applied and the contact surface area.		Explain how force and area can be varied to alter the pressure applied.	
Describe the variation of pressure in liquids with depth and the effects of this.		Explain the variation of pressure with depth in liquids.		Identify the causes and implications of variation of pressure with depth.	
Suggest why some objects float and others sink.		Use the concepts of density, displacement and upthrust in explaining floating and sinking.		Apply ideas about density and upthrust to predict the outcomes of various situations.	
Describe how atmospheric pressure varies with height; state some implications of variations in pressure.		Explain why atmospheric pressure varies with height; describe how the effects of pressure used and dealt with.		Identify some implications of pressure variation in situations such as weather patterns and high-altitude activities.	

Magnetism and electricity

Modest progress I can;	Good progress I can;	Excellent progress I can;
Describe differences between permanent and temporary magnets.	Describe and compare different methods to make permanent magnets.	Use the domain theory to explain how materials become magnetised and demagnetised.
Describe some effects of the Earth's magnetic field.	Describe the geodynamo theory.	Explain evidence for how the Earth's magnetic field works.
Describe how to test the strength of a magnet and an electromagnet.	Design investigations to compare different methods of making magnets and testing the strength of electromagnets.	Use models and analogies to explain the factors affecting the strengths of magnets and electromagnets.
Describe different applications of magnets and electromagnets.	Explain the advantages of using electromagnets.	Compare and contrast the use of magnets and electromagnets in different applications, such as a circuit breaker.
Describe and investigate different types of batteries, including fruit batteries.	Analyse and interpret data to explain how to make the most effective fruit batteries.	Explain how a battery works, using ideas about charge.
Describe what is meant by current, voltage and resistance.	Apply a range of models and analogies to describe current, voltage and resistance.	Evaluate different models and analogies for explaining current, voltage and resistance.
Describe the relationship between current, voltage and resistance in a qualitative way.	Use data to identify a pattern between current, voltage and resistance.	Use data and a mathematical relationship between current, voltage and resistance, to carry out calculations.
Make measurements of current and voltage in series and in parallel circuits.	Use models and simple calculations to explain and compare what happens to the current and voltage in series and parallel circuits.	Use calculations to make predictions about current and voltage in series and parallel circuits.
Describe different domestic uses of series and parallel circuits.	Make comparisons between components in series and parallel circuits.	Explain the advantages of using series or parallel circuits, including the domestic ring main as an example.