Year 8 Science Programme of Study

1. **Elements, Compounds and Mixtures 3.5.4 Elements 3.5.3 Periodic table 3.6.1 Metals and non-metals**

Know	Apply	Skills	Key Words
Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain. **Fact** The symbols of hydrogen, oxygen, nitrogen, carbon, hydrogen, iron, zinc, copper, sulfur, aluminium, iodine, bromine, chlorine, sodium, potassium and magnesium. The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties. **Facts** Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals.	Name compounds using their chemical formulae. Given chemical formulae, name the elements present and their relative proportions. Represent atoms, molecules and elements, mixtures and compounds using particle diagrams. Use observations from chemical reactions to decide if an unknown substance is an element or a compound. Use data to describe a trend in physical properties. Describe the reaction of an unfamiliar Group 1 or 7 element. Use data showing a pattern in physical properties to estimate a missing value for an element. Use observations of a pattern in chemical reactions to predict the behaviour of an element in a group. Describe an oxidation, displacement, or metal acid reaction with a word equation. Use particle diagrams to represent oxidation,	Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms. Name simple compounds using rules: change non-metal to –ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate.	Elements: What all substances are made up of, and which contain only one type of atom. Atom: The smallest particle of an element that can exist. Molecules: Two to thousands of atoms joined together. Most non-metals exist either as small or giant molecules. Compound: Pure substances made up of two or more elements strongly joined together. Chemical formula: Shows the elements present in a compound and their relative proportions. Polymer: A molecule made of thousands of smaller molecules in a repeating pattern. Plastics are man-made polymers, starch is a natural polymer. Periodic table: Shows all the elements arranged in rows and columns. Physical properties: Features of a substance that can be observed without changing the substance itself. Chemical properties: Features of the way a

Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases. Metals and non-metals react with oxygen to form oxides which are either bases or acids. Metals can be arranged as a reactivity series in order of how readily they react with other substances. Some metals react with acids to produce salts and hydrogen. **Facts** Iron, nickel and cobalt are magnetic elements. Mercury is a metal that is liquid at room temperature. Bromine is a non-metal that is liquid at room temperature.	displacement and metal-acid reactions. Identify an unknown element from its physical and chemical properties. Place an unfamiliar metal into the reactivity series based on information about its reactions.		substance reacts with other substances. Groups: Columns of the periodic table. Periods: Rows of the periodic table. **Keywords** Metals: Shiny, good conductors of electricity and heat, malleable and ductile, and usually solid at room temperature. Non-metals: Dull, poor conductors of electricity and heat, brittle and usually solid or gaseous at room temperature. Displacement: Reaction where a more reactive metal takes the place of a less reactive metal in a compound. Oxidation: Reaction in which a substance combines with oxygen. Reactivity: The tendency of a substance to undergo a chemical reaction.

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Extend Use particle diagrams to predict physical properties of elements and compounds. Deduce a pattern in the formula of similar compounds and use it to suggest formulae for unfamiliar ones. Compare and contrast the properties of elements and compounds and give a reason for their differences. Describe and explain the properties of ceramics and composites. Predict the position of an element in the periodic table based on information about its physical and chemical properties. Choose elements for different uses from their position in the periodic table. Use data about the properties of elements to find similarities, patterns and anomalies. Deduce the physical or chemical changes a metal has undergone from its appearance. Justify the use of specific metals and non-metals for different applications, using data provided. Deduce a rule from data about which reactions will occur or not, based on the reactivity series.	**Literacy** 1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	**Numeracy** 1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story behind a graph.	

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1	**Elements - construct explanations, examine consequences**
2-3	**Periodic Table – interrogate sources, communicate ideas**
4	**Naming Compounds –draw conclusions**
5	**Chemical Equations – communicate ideas**
6 -7	**AT Heating Magnesium– assess risks**
8.	**What makes up compounds – communicate ideas**
9.	**Adaptations of the digestive system**
9.	**Alloys – Analyse patterns**
10.	**Metals in the periodic table – construct explanations**
11.	**Metals in water and air –assess risks, present data, draw conclusions**
12	**Comparing Reactivity – Communicate ideas**
13 & 14.	**Displacement reactions– Devise questions plan variable**

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2. Digestion and Respiration – 3.8.4 Digestion Breathing Respiration

Know	Apply	Skills	Key Words
The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes. **Facts** Iron is a mineral important for red blood cells. Calcium is a mineral needed for strong teeth and bones. Vitamins and minerals are needed in small amounts to keep the body healthy. In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles	Describe possible health effects of unbalanced diets from data provided. Calculate food requirements for a healthy diet, using information provided. Describe how organs and tissues involved in digestion are adapted for their role. Describe the events that take place in order to turn a meal into simple food molecules inside a cell. Explain how exercise, smoking and asthma affect the gas exchange system. Explain how the parts of the gas exchange system are adapted to their function. Explain observations about changes to breathing rate and volume. Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.		Enzymes: Substances that speed up the chemical reactions of digestion. Dietary fibre: Parts of plants that cannot be digested, which helps the body eliminate waste. Carbohydrates: The body's main source of energy. There are two types: simple (sugars) and complex (starch). Lipids (fats and oils): A source of energy. Found in butter, milk, eggs, nuts. Protein: Nutrient your body uses to build new tissue for growth and repair. Sources are meat, fish, eggs, dairy products, beans, nuts and seeds. Stomach: A sac where food is mixed with acidic juices to start the digestion of protein and kill microorganisms. Small intestine: Upper part of the intestine where digestion is completed and nutrients are absorbed by the blood. Large intestine: Lower part of the intestine from which water is absorbed and where faeces are formed. Gut bacteria: Microorganisms that naturally live in the intestine and

in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing. Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable. **Fact** Yeast fermentation is used in brewing and breadmaking.			help food break down. Breathing: The movement of air in and out of the lungs. Trachea (windpipe): Carries air from the mouth and nose to the lungs. Bronchi: Two tubes which carry air to the lungs. Bronchioles: Small tubes in the lung. Alveoli: Small air sacs found at the end of each bronchiole. Ribs: Bones which surround the lungs to form the ribcage. Diaphragm: A sheet of muscle found underneath the lungs. Lung volume: Measure of the amount of air breathed in or out. Aerobic respiration: Breaking down glucose with oxygen to release energy and producing carbon dioxide and water. Anaerobic respiration (fermentation): Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).

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Extend Design a diet for a person with specific dietary needs. Critique claims for a food product or diet by analysing nutritional information. Make deductions from medical symptoms showing problems with the digestive system. Evaluate a possible treatment for a lung disease. Predict how a change in the gas exchange system could affect other processes in the body. Evaluate a model for showing the mechanism of breathing. Suggest how organisms living in different conditions use respiration to get their energy. Describe similarities and differences between aerobic and anaerobic respiration.	**Literacy** 1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	**Numeracy** 1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story behind a graph.	

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1 -2	**Breathing - construct explanations, examine consequences**
3	**Nutrition – communicate ideas**
4	**Testing foods – present data, draw conclusions**
5	**The Digestive System – communicate ideas**
6	**Breaking Down Food – test hypotheses**
7.	**Enzymes -limitations**
8.	**Adaptations of the digestive system – communicate ideas**
9.	**AT**
10.	**Respiration – construct explanations**
11.	**Measuring respiration – Present data, draw conclusions**
12	**Oxygen pathways – Communicate ideas**
13	**William Harvey – Review theories**
14	**Anaerobic respiration – communicate ideas**

3. **Light, Sound and Waves** 3.4.1 Sound 3.4.2 Light 3.4.3 Wave effects 3.4.4 Wave properties

Know	Apply	Skills	Key Words
Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch. **Facts** Sound does not travel through a vacuum. The speed of sound in air is 330 m/s, a million times slower than light. When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model. **Facts**	Explain observations where sound is reflected, transmitted or absorbed by different media. Explain observations of how sound travels using the idea of a longitudinal wave. Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. Use drawings of waves to describe how sound waves change with volume or pitch. Use ray diagrams of eclipses to describe what is seen by observers in different places. Explain observations where coloured lights are mixed or objects are viewed in different lights. Use ray diagrams to describe how light passes through lenses and transparent materials. Describe how lenses may be used to correct vision. Explain differences in the damage done to living cells by light and other waves, in terms of their frequency. Describe the properties of different longitudinal and transverse waves.	Construct ray diagrams to show how light reflects off mirrors, forms images and refracts.	Vibration: A back and forth motion that repeats. Longitudinal wave: Where the direction of vibration is the same as that of the wave. Volume: How loud or quiet a sound is, in decibels (dB). Pitch: How low or high a sound is. A low (high) pitch sound has a low (high) frequency. Amplitude: The maximum amount of vibration, measured from the middle position of the wave, in metres. Wavelength: Distance between two corresponding points on a wave, in metres. Frequency: The number of waves produced in one second, in hertz. Vacuum: A space with no particles of matter in it. Oscilloscope: Device able to view patterns of sound waves that have been turned into electrical signals. Absorption: When energy is transferred from sound to a material. Auditory range: The lowest and highest frequencies that a type of animal can hear. Echo: Reflection of sound waves from a surface back to the listener.

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Light travels at 300 million metres per second in a vacuum. Different colours of light have different frequencies. When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection. .	Use the wave model to explain observations of the reflection, absorption and transmission of a wave. Explain how audio equipment converts sound into a changing pattern of electric current.		**Keywords** Incident ray: The incoming ray. Reflected ray: The outgoing ray. Normal line: From which angles are measured, at right angles to the surface. Angle of reflection: Between the normal and reflected ray. Angle of incidence: Between the normal and incident ray. Refraction: Change in the direction of light going from one material into another. Absorption: When energy is transferred from light to a material. Scattering: When light bounces off an object in all directions. Transparent: A material that allows all light to pass through it. Translucent: A material that allows some light to pass through it. Opaque: A material that allows no light to pass through it. Convex lens: A lens that is thicker in the middle which bends light rays towards each other. Concave lens: A lens that is thinner in the middle which spreads out light rays. Retina: Layer at the back of the eye with light detecting cells and where an image is formed. Ultrasound: Sound waves with frequencies higher than the human auditory range.

			Ultraviolet (UV): Waves with frequencies higher than light, which human eyes cannot detect. Microphone: Turns the pressure wave of sound hitting it into an electrical signal. Loudspeaker: Turns an electrical signal into a pressure wave of sound. Pressure wave: An example is sound, which has repeating patterns of high-pressure and low-pressure regions. Waves: Vibrations that transport energy from place to place without transporting matter. Transverse wave: Where the direction of vibration is perpendicular to that of the wave. Transmission: Where waves travel through a medium rather than be absorbed or reflected

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Extend	**Literacy**	**Numeracy**	
Suggest the effects of particular ear problems on a person's hearing. Evaluate the data behind a claim for a sound creation or blocking device, using the properties of sound waves. Use diagrams to compare the waveforms a musical instrument makes when playing different pitches or volumes. Use a ray diagram to predict how an image will change in different situations. Predict whether light will reflect, refract or scatter when it hits the surface of a given material. Use ray diagrams to explain how a device with multiple mirrors works. Suggest reasons why sound waves can agitate a liquid for cleaning objects, or massage muscles for physiotherapy. Evaluate electricity production by wave energy using data for different locations and weather conditions. Compare and contrast the properties of sound and light waves. Suggest what happens when two waves combine.	1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story behind a graph.	
1. Shadows - Review theories, 2. Eyes - Communicate ideas, 3. Reflection – draw conclusions 4. Refraction - analyse patterns 5. Refraction – new situations 6. Ban the Beds - Analyse, 7 Colour and filters - construct information, 8. AT 9. Travelling waves – Review theories 10. Sound and hearing – communicate ideas, 11. Pitch and Volume – discuss limitations 12. What Does the Fox Say? – Critique Claims 13 & 14. AT Noise pollution – Analyse and present data15. Echoes and Ultrasound – Communicate ideas			

4. Earth Science 3.7.1 Earth structure 3.7.3 Climate 3.7.4 Earth resources

Know	Apply	Skills	Key Words
Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling. **Fact** The three rock layers inside Earth are the crust, the mantle and the core. Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate. **Facts** Methane and carbon dioxide are greenhouse gases.	Explain why a rock has a particular property based on how it was formed. Identify the causes of weathering and erosion and describe how they occur. Construct a labelled diagram to identify the processes of the rock cycle. Explain why recycling of some materials is particularly important. Describe how Earth's resources are turned into useful materials or recycled. Justify the choice of extraction method for a metal, given data about reactivity. Suggest factors to take into account when deciding whether extraction of a metal is practical.		Rock cycle: Sequence of processes where rocks change from one type to another. Weathering: The wearing down of rock by physical, chemical or biological processes. Erosion: Movement of rock by water, ice or wind (transportation). Minerals: Chemicals that rocks are made from. Sedimentary rocks: Formed from layers of sediment, and which can contain fossils. Examples are limestone, chalk and sandstone. Igneous rocks: Formed from cooled magma, with minerals arranged in crystals. Examples are granite, basalt and obsidian. Metamorphic rocks: Formed from existing rocks exposed to heat and pressure over a long time. Examples are marble, slate and schist. Strata: Layers of sedimentary rock. Global warming: The gradual increase in surface temperature of the Earth. Fossil fuels: Remains of dead organisms that are burned as fuels, releasing carbon dioxide.

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Earth's atmosphere contains around 78 % nitrogen, 21 % oxygen, <1 % carbon dioxide, plus small amounts of other gases. There is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out. Recycling reduces the need to extract resources. Most metals are found combined with other elements, as a compound, in ores. The more reactive a metal, the more difficult it is to separate it from its compound. Carbon displaces less reactive metals, while electrolysis is needed for more reactive metals.			Carbon sink: Areas of vegetation, the ocean or the soil, which absorb and store carbon. Greenhouse effect: When energy from the sun is transferred to the thermal energy store of gases in Earth's atmosphere. Natural resources: Materials from the Earth which act as raw materials for making a variety of products. Mineral: Naturally occurring metal or metal compound. Ore: Naturally occurring rock containing sufficient minerals for extraction. Extraction: Separation of a metal from a metal compound. Recycling: Processing a material so that it can be used again. Electrolysis: Using electricity to split up a compound into its elements.

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Extend	**Literacy**	**Numeracy**	
Identify circumstances that indicate fast processes of change on Earth and those that indicate slower processes. Predict planetary conditions from descriptions of rocks on other planets. Describe similarities and differences between the rock cycle and everyday physical and chemical processes. Suggest how ceramics might be similar to some types of rock. Evaluate the implications of a proposal to reduce carbon emissions. Evaluate claims that human activity is causing global warming or climate change. Compare the relative effects of human-produced and natural global warming. Suggest ways in which changes in behaviour and the use of alternative materials may limit the consumption of natural resources. Suggest ways in which waste products from industrial processes could be reduced. Use data to evaluate proposals for recycling materials.	1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story behind a graph.	
1. Classifying rocks – plan variables & justify opinions, 2. Sedimentary rocks – collect data, 3. Igneous rocks – test hypotheses, 4. Metamorphic rock 5. Fossils – review theories, 6. Weathering – examining consequences, 7. Water shaping – devise questions, 8. Rock cycle – construct explanations 9. AT, 10. Carbonates - plan variables, 11. acid rain – interrogate sources, 12. Global Dimming – analyse data,, 13. Global warming Two degrees activity – examine consequences include ozone? 14. Useful displacement reactions – examine consequences – justify opinion 15. Reactivity and Extraction			

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5 Further Energy and Electricity 3.3.2 Energy transfer 3.1 Energy costs 3.2.4 Magnetism 3.2.3 Electromagnets

Know	Apply	Skills	Key Words
We 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. When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy. We pay for our domestic electricity usage based on the amount of energy transferred. Electricity is generated by a combination of resources which each have advantages and disadvantages. Calculate the cost of home energy usage, using the formula: cost = power (kW) x time (hours) x price (per kWh). **Fact** Food labels list the energy content of food in kilojoules (kJ).Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences. **Facts** Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract.	Describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed. Show how energy is transferred between energy stores in a range of real-life examples. Calculate the useful energy and the amount dissipated, given values of input and output energy. Explain how energy is dissipated in a range of situations. Compare the amounts of energy transferred by different foods and activities. Compare the energy usage and cost of running different home devices. Explain the advantages and disadvantages of different energy resources. Represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home. Use the idea of field lines to show how the direction or strength of the field around a magnet varies. Explain observations about navigation using Earth's magnetic field. Use a diagram to explain how an electromagnet can be made and how to change its strength.		Thermal energy store: Filled when an object is warmed up. Chemical energy store: Emptied during chemical reactions when energy is transferred to the surroundings. Kinetic energy store: Filled when an object speeds up. Gravitational potential energy store: Filled when an object is raised. Elastic energy store: Filled when a material is stretched or compressed. Dissipated: Become spread out wastefully. Power: How quickly energy is transferred by a device (watts). Energy resource: Something with stored energy that can be released in a useful way. Non-renewable: An energy resource that cannot be replaced and will be used up. Renewable: An energy resource that can be replaced and will not run out. Examples are solar, wind, waves, geothermal and biomass. Fossil fuels: Non-renewable energy resources formed from the remains of ancient plants or animals. Examples are coal, crude oil and natural gas. Compare the amounts of energy transferred by different foods and activities. Compare the energy usage and cost of running different home devices.

Field lines flow from the north-seeking pole to the south-seeking pole. An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid. **Fact** The magnetic field of an electromagnet decreases in strength with distance.	Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.		Explain the advantages and disadvantages of different energy resources. Represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home. Magnetic force: Non-contact force from a magnet on a magnetic material. Permanent magnet: An object that is magnetic all of the time. Magnetic poles: The ends of a magnetic field, called north-seeking (N) and south-seeking poles (S). Electromagnet: A non-permanent magnet turned on and off by controlling the current through it. Solenoid: Wire wound into a tight coil, part of an electromagnet. Core: Soft iron metal which the solenoid is wrapped around.

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Extend	Literacy	Numeracy	
Compare the percentages of energy wasted by renewable energy sources. Explain why processes such as swinging pendulums or bouncing balls cannot go on forever, in terms of energy. Evaluate analogies and explanations for the transfer of energy. Evaluate the social, economic and environmental consequences of using a resource to generate electricity, from data. Suggest actions a government or communities could take in response to rising energy demand. Suggest ways to reduce costs, by examining data on a home energy bill. Predict the pattern of field lines and the force around two magnets placed near each other.	1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story	

1 Temperature and Heat - construct explanations

2 Conduction – communicate ideas

3 Convection – construct explanations

4 Radiation – Discuss limitations

5 - 7 AT Investigating insulators- devise questions, plan variables, collect data, estimate risks 8-

10 Electricity generation - Plan variables, estimate risk, collect data, examine consequences 11-

12 Calculating the cost of electricity – analysis and evaluation – drawing conclusions

13 Magnetism – Construct explanations

14 – 16 Electromagnetism - devise questions, plan variables, collect data, estimate risks, discuss limitations

17 Uses of electromagnets - communicate ideas

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6. Plants and Photosynthesis 3.9.4 Photosynthesis

Know	Apply	Skills	Key Words
Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use. Plants have specially-adapted organs that allow them to obtain resources needed for photosynthesis. **Fact** Iodine is used to test for the presence of starch.	Describe ways in which plants obtain resources for photosynthesis.		Fertilisers: Chemicals containing minerals that plants need to build new tissues. Photosynthesis: A process where plants and algae turn carbon dioxide and water into glucose and release oxygen. Chlorophyll: Green pigment in plants and algae which absorbs light energy. Stomata: Pores in the bottom of a leaf which open and close to let gases in and out.

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Extend	**Literacy**	**Numeracy**	
Suggest how particular conditions could affect plant growth. Suggest reasons for particular adaptations of leaves, roots and stems. Compare the movement of carbon dioxide and oxygen through stomata at different times of day.	1. Speaking and listening 2. Reading strategies - note taking / making; skimming; scanning; close reading; darts. 3. Writing: - key words, use of connectives, writing for a purpose, examples of good practice, scaffolding long written answers.	1. Calculations. 2. Estimating and checking answers. 3. Reasoning & problem solving. 4. Measurement. 5. Algebra. 6. Data handling. 7. Graphicacy, eg: the presentation of work or developing ability to tell the story behind a graph.	

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1.The Importance of plants - construct explanations

2 & 3Photosynthesis and light – communicate ideas

4. Is chlorophyll needed – plan variables

5 - 6 AT Is CO_2 needed for photosynthesis? - plan variables, collect data, estimate risks

7. Leaf Adaptation – construct explanations

8. Adaptations of roots – construct explanations

9. 10.11 Limiting Factors- Analyses data, draw conclusions

12. Minerals in plants- communicate ideas

13. The Model Greenhouse – interrogate sources

Assessment: Mid-unit task & investigation skills. End of autumn term test, end of spring term test & end of year test.