

Chemistry

	STRAND 1 Atoms, elements & compounds/the particulate nature of matter	STRAND 2 Pure and Impure substances and materials	STRAND 3 Chemical reaction and energetics	STRAND 4 The periodic table & patterns of reactivity	STRAND 5 Earth and atmosphere	STRAND 6 Working scientifically
9	All the steps below, and I can also... - explain and use Ar (relative atomic mass), Mr (relative formula mass) and moles. - use the terms relative atomic mass and the carbon-12 scale correctly. - explain what an ion is and work out the electron arrangement of simple anions and cations.	All the steps below, and I can also... - suggest how the rate of diffusion may be affected. - suggest some applications for making substances impure. - describe properties of some ‘smart materials’ and suggest uses for such materials based on their properties.	All the steps below, and I can also... - suggest methods that may be used to extract metals more reactive than carbon. - explain that during chemical reactions, energy may be released or absorbed during the making and breaking of bonds.	All the steps below, and I can also... explain the patterns of reactivity for Group 1 and Group 7 in the periodic table, in terms of atomic structure and the ease of electron transfer.	All the steps below, and I can also... - explain the carbon cycle and how life and the oceans have altered the Earth’s atmosphere from its original composition. - suggest ways that the level of carbon dioxide in the atmosphere can be reduced.	All the steps below, and I can also... - explain and use the terms accuracy precision, repeatability, reproducibility, range, interval and bias correctly and in any context. - use data to support or refute an argument or stated position.
8	All the steps below, and I can also... - explain how pressure in gases may change with changing volume and temperature. - draw accurate diagrams of electron structure of atoms and of particular elements using the periodic table. - explain the law of conservation of mass in chemical reactions and changes of state.	All the steps below, and I can also... - explain how simple techniques for separating mixtures work. - describe dissolving, with reference to particles. - identify pure and impure substances from data. - explain diffusion happens in terms of the particle model.	All the steps below, and I can also... - recognise and explain neutralisation, combustion, thermal decomposition, oxidation, displacement and reaction of metals and acids, as examples of chemical reactions. - explain the differences in properties of different materials, such as metals, diamond, graphite and sodium chloride with reference to their structure.	All the steps below, and I can also... - explain how metals and non-metals react with water using word equations. - explain some of the properties of metals and non-metals with reference to their structure. - describe how metal oxides react with water to form an alkaline solution and non-metal oxides react with water to form acidic solutions. - describe the patterns of reactivity for Group 1 and Group 7 in the periodic table.	All the steps below, and I can also... - explain the production of carbon dioxide by human activity and its impact on the climate. - name some of the molecules that contain carbon on the Earth and in its atmosphere.	All the steps below, and I can also... give reasoned explanations that link data to predictions and hypotheses (testable explanations).
7	All the steps below, and I can also... - describe how pressure occurs in gases. - know the composition of atoms of particular elements in terms of the number of protons, neutrons and electrons using the periodic table.	All the steps below, and I can also... - explain how mixtures differ from elements and compounds. - describe how to carry out simple techniques for separating mixtures. - describe diffusion in terms of the particle model.	All the steps below, and I can also... - represent chemicals reactions using balanced symbol equations. - explain changes of state with reference to the energy levels of particles. - explain neutralization, combustion, thermal decomposition, oxidation, displacement and the reaction of metals and acids as examples of chemical reactions. - describe how using catalysts, increasing temperature, increasing concentrations or increasing surface area will affect reaction rate, with reference to particles and collisions.	All the steps below, and I can also... - describe the work of Mendeleev and others in the development of the modern periodic table. - state that metal and non-metal oxides react differently with water.	All the steps below, and I can also... - explain how the three different types of rocks are formed, and describe, explain and compare the appearance of different rock types including crystal size and grain shapes. - describe how the atmosphere has altered over geological time. - discuss the importance of recycling.	All the steps below, and I can also... - use IUPAC chemical names correctly. - identify further questions arising from the results of an investigation. - apply sampling techniques.
6	All the steps below, and I can also... - explain changes of states with reference to energy levels of particles. - identify the relative masses and charges of subatomic particles. - label the subatomic particles of a simple atomic model. - recognise and understand more complicated polyatomic chemical formulae including H₂SO₄, CuSO₄, CaCO₃, Ca(OH)₂.	All the steps below, and I can also... - describe a mixture, including dissolved substances. - select appropriate simple techniques for separating given mixtures like solutions and insoluble solids from liquids. - describe how impurities may affect boiling and melting points of impure substances. - describe some properties of different materials such as ceramics, polymers and composites. - suggest uses for different materials based on their properties.	All the steps below, and I can also... - represent chemical reactions using symbol equations which do not need balancing. - describe simple displacement reactions from the order of metals and carbon in the reactivity series. - explain that during chemical reactions, energy may be absorbed or released resulting in characteristic temperature changes. - describe changes of states with reference to energy changes. - describe ways to speed up chemical reactions, such as increase temperature, increase concentrations or increase surface area and catalysts.	All the steps below, and I can also... - identify that elements in the same group of periodic table will have similar patterns in reactions. - name some groups of the periodic table including alkali metals, halogens and noble gases. - describe how properties of metals and non-metals make them suitable for different uses. - identify transition elements from their position in the periodic table.	All the steps below, and I can also... - suggest ways that the level of carbon dioxide in the atmosphere can be reduced. - describe the formation of rocks and explain the rock cycle. - suggest ways to reduce the amount of raw materials we use. - explain the impact of human activities on the climate by producing carbon dioxide.	All the steps below, and I can also... - evaluate data and explain how random and systematic errors may affect the results. - analyse data using simple statistical techniques. - recognise anomalous results (results that do not fit the pattern) in data. - calculate mean data while recognising the need to exclude anomalous results (results that do not fit the pattern) from mean calculations.

5	All the steps below, and I can also... - describe the differences between atoms, elements and compounds. - describe atoms using dalton’s simple model. - recognise a simple nuclear atomic model. - recognise that mass is conserved during changes of state and chemical reactions. - recognise and understand simple chemical formulae including H₂O, CH₄, NH₃, CO₂.	All the steps below, and I can also... - describe what a pure substance is. - recognise the differences between a mixture and pure substances. - identify and use simple techniques for separating mixtures such as filtration, evaporation, distillation and chromatography. - explain the different properties of materials.	All the steps below, and I can also... - explain that during changes of state, there are energy changes. - understand that during chemical reactions, surroundings may increase or decrease in temperature. - Simply explain neutralisation, combustion, thermal decomposition, oxidation, displacement and the reaction of metals and acids, as examples of chemical reactions - can represent chemical reactions using word equations. - know the typical acidic reactions with metals, alkalis and carbonates to form salts.	All the steps below, and I can also... - state that the modern periodic table was developed by Mendeleev with contributions by others. - understand that the periodic table can be used to predict patterns in reactions. - identify where metals and non-metals can be found on the periodic table. - state that the periodic table is arranged in periods and groups. - can describe how elements with similar physical and chemical properties are grouped together. - can list properties of metals and non-metals.	All the steps below, and I can also... - describe how the three different types of rocks are formed. - name the main elements that make up the Earth’s core and crust. - describe the carbon cycle in simple terms.	All the steps below, and I can also... - make and record observations and measurements using a range of methods for different investigations. - comment on the reliability of methods. - suggest possible improvements to an investigative technique. - suggest possible improvements to an investigative technique. - can work out appropriate axes and scales for graphs. - can draw best-fit lines for appropriate data. - know that scientific theories develop as earlier explanations are modified to take into account new evidence. - understand the importance of publishing results and peer review.
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4	All the steps below, and I can also... - represent the three states of matter with diagrams of the arrangement particles. - state the differences between atoms, elements and compounds. - describe how particles may move through a fluid by diffusion. - describe the arrangement and motion particles in the three states of matter.	All the steps below, and I can also... describe how mixtures may be separated by filtering, sieving and evaporating.	All the steps below, and I can also... - state that an indicator may be used to determine if a substance is acidic or alkaline. - use the pH scale to test substances. - understand that different acids and alkalis may have different strengths. - state that some substances are more reactive than others. - identify that during chemicals reactions reactants become products by rearranging the particles taking part in a reaction. - identify that reactants have different properties to the products they make in a reaction.	All the steps below, and I can also... - define an element as a substance that cannot be split into simpler substances. - state that all elements currently known may be found listed in the periodic table. - understand that elements have their own chemical symbol. - represent elements using chemical symbols. - recall the chemical symbols of commonly found elements including Na, Cl, O, Fe, Cu N.	All the steps below, and I can also... - describe ways that human activities impact on climate by producing carbon dioxide. - name the three different types of rocks, igneous, sedimentary and metamorphic. - describe some of the problems that might arise from using the Earth’s limited/finite resources. - name the main elements and compounds that make up the Earth’s atmosphere and describe its composition in terms of percentages. - state that carbon is present in different forms on the Earth and its atmosphere. - list human activities that influence the climate such as burning fossil fuels.	All the steps below, and I can also... - use simple equations to carry out calculations from results and interpret observations to identify simple patterns. - ask questions based on observations and make simple predictions. - plan a simple investigation and identify independent, dependent and control variables. - recognise some potential sources of error.
3	All the steps below, and I can also... - name the three states of matter. - describe the properties of the three states of matter. - name the changes of states.	All the steps below, and I can also... - compare and group together everyday materials. - state that some materials dissolve to form solutions. - identify and use key words such as soluble, insoluble, solute, solvent and dissolve and solution.	All the steps below, and I can also... - say that dissolving, mixing and changes of state are reversible changes. - identify some changes are irreversible like burning and the action of vinegar on bicarbonate of soda.	All the steps below, and I can also... understand that materials may be grouped according to their properties such as hardness, solubility, transparency, conductivity and response to magnets.	All the steps below, and I can also... - name some resources that humans use from the Earth. - state that the Earth’s resources finite. - identify the Earth’s crust, mantle, outer core and inner core.	All the steps below, and I can also... - name and use some SI units. - name some common chemicals such as water, hydrochloric acid, and sodium chloride. - identify hazards and carry out a simple risk assessment. - identify simple patterns or trends from data presented in graphs.
2	All the steps below, and I can also... compare and group materials according to whether they are solid, liquid or gases.	All the steps below, and I can also... observe that some materials change state when they are heated or cooled.	All the steps below, and I can also... find out how the shapes of solids objects made from some materials can be changed by squashing, twisting, bending and stretching.	All the steps below, and I can also... identify and name everyday materials including wood, plastic, glass, metal, water and rock.	All the steps below, and I can also... - state that there are different types of rocks. - state that humans use the Earth as a source of resources.	All the steps below, and I can also... - present findings and draw simple conclusions from experimental data. - present observations and data using simple tables and graphs where axes and scales are provided.
1	- I can... - Show I understand that different materials have different properties.	- I can... - recognise the difference between a pure substance and a mixture.	- I can... - describe the simple physical properties of a variety of everyday materials.	I can... say what an object is and the material from which it is made.	- I can... - understand that the Earth is one of the planets in the Solar System. - say how day and night lengths changes with the seasons.	- I can... - take measurements using a range of scientific equipment, including repeat readings. - draw simple, correctly-labelled scientific diagrams. - follow instructions safely.