Curriculum Planning Template

Subject: Science - Chemistry Year 7 Ability ALL

Topic :	Particle model	Separating mixtures	Metals and Non-Metals	Acids and Alkalis	Earth Structure	Universe
Topic Overview	Students will learn how to relate the properties of materials in different states to the features of the particle model.	Students will how to devise ways to separate mixtures based on their properties.	Students will learn how to compare and contrast the reactions of Metals and Non-metals and use experimental results to suggest an order of reactivity of various metals.	Students will learn about acids and alkalis as classes of chemicals with distinct properties and uses; using indicators to classify solutions as acidic, alkaline or neutral and using the pH scale to compare the acidity and alkalinity of different solutions.	Students will know the three types of rocks and how they link into the rock cycle. The will understand how these can be converted over millions of years through weathering and erosion, heat and pressure, melting and cooling.	Students will be able to model how objects move through the solar system. They will be able to this information to explain the length of a day and year, seasons and the visibility of objects from the earth.
What Golden Knowledge will pupils learn and remember?	Students will learn how the particle model can be used to explain differences between solids, liquids and gases, exploring how experimental evidence relates to theories and models. Students will use drawings of particle diagrams to model solids, liquids and gases to allow visualisation of the underlying processes involved in changes of state. Students will learn the how matter changes from one stage to another. Students will be introduced to diffusion as an underlying process responsible for many familiar observations (scent, making tea etc.) Students will apply knowledge of gases as separate particles undergoing random movement to gas pressure introduces the idea of temperature changing the speed of particles/increasing KE	Students will learn how substances can be separated based on their properties including chromatography, distillation and filtration. Mixtures Students will learn to describe the particle arrangements in a mixture, to analyse experimental results to identify and pure and impure substances. and identify the properties of a mixture. Solutions Students will learn to describe dissolving using the particle model. Solubility Students will explain the solubility of different substances, analyse results of experiments to compare the solubility of different substances. Explain the factors effecting solubility Describe the solubility of a solution. Filtration	Students will describe the typical properties of metals and non-metals. Students will learn how metals and non metals react with oxygen and contrast the physical and chemical properties of their oxides. Students will learn word equations. Students will learn that acids react with metals so this can be used to make a relative reactivity series. Students will learn that metals react with oxygen and name the products of these reactions. Students will be able to state how metals react with water so this knowledge can be used to match metals to their uses. Students will learn that more reactive elements can be used to	Students will learn everyday and laboratory examples of acids and alkalis to be able to give examples of acids and alkalis and give features of them, to describe the terms concentrated and dilute in relation to acids and to give the formula for common laboratory acids and alkalis. Students recall different methods of testing a solution for it's acidity or alkalinity and perform an investigation testing solutions for their acidity and alkalinity Students will learn that pH indicators can be used to test for acidity and alkalinity so that neutralisation reactions can be observed. Students will learn the difference between strength of acid and concentration of acid.	Students will be able to describe how the earth is structured. This will enable students to relate the properties of each layer to its position i.e. hotter as you get deeper. Students will be able to explain why a rock has particular property based on how it was formed. This will enable them to apply their knowledge to examples of rocks and their properties. Students will identify the causes of weathering and erosion. They will be able to describe this occurs. This will allow students to identify where weathering has occurred in real life examples. Students will be able to construct a labelled diagram of the rock cycle to identify the processes found within it. This will allow students to collate their knowledge and understanding within this topic. This will form a big picture. Students will be able to describe similarities and differences between the rock cycle and everyday physical and chemical	Students will be able to describe the appearance of planets or moons in relation to the sun. This will enable students to identify the positions of planets, stars and satellites in the solar system. Students will be able to explain how we experience day and night. Using this information, they will be able to explain how different places experience different daylight and sunlight hours. Students will be able to understand how the exploration and observation of the universe is linked to its scale. This will help students explain the choice of particular units such as light year, for measuring distance. Students will be able to model the solar system as planets that rotate on a tilted axis and orbit the Sun. Students will be able to explain how a tilted axis leads to the seasons we experience. Students will know the time it takes light to reach us from various bodies, such as the Sun and the nearest galaxy.

		Students will describe and explain filtration. Explain where filtration is used in real world situations. Evaporation and Distillation Students will explain the process of evaporation. Student will describe the process of distillation using key words. Students will explain how distillation can be used to separate 2 liquids with different boiling points. Students will explain where distillation is used using real world examples Chromatography Students will be able to describe the process of chromatography. Students will be able to explain how chromatography can be used to separate mixtures and where chromatography is used in real world situations	displace less reactive metals so that reactions can be predicted.	Students will learn how salts are formed between reactions between acids and bases and use this knowledge to be able to select appropriate acids and bases to create desired salts.	processes. Students will be able to suggest how ceramics might be similar to some types of rock.	Students will be able to predict patterns in day length, the Sun's intensity or an object's shadow at different latitudes. Students will be able to make deductions from observation data of planets, stars and galaxies. Students will be able to compare explanations from different periods in history about the motion of objects and structure of the Universe.
What prior knowledge should pupils already know?	This unit uses ideas developed in the key stage 2 programme of study. It builds on unit 4 'Solids, liquids and how they can be separated', unit 5 'Gases around us', unit 5 'Changing state' and unit 6 'More about dissolving' in the key stage 2 scheme of work. Students may: • have experience of identifying solids, liquids and gases and describing the properties of each • know that the same material can exist as a solid, liquid and gas • have observed that melting solids and freezing liquids are the opposite of each other • have observed situations in which evaporation and condensation take place.	This unit uses ideas developed in the key stage 2 programme of study. It builds on unit 4 'Solids, liquids and how they can be separated', unit 5 'Gases around us', unit 5 'Changing state' and unit 6 'More about dissolving' in the key stage 2 scheme of work.	This unit builds on knowledge from KS2 where students learned to give reasons, based on evidence from comparative and fair tests, for the particular uses of metals and to recognise some common conductors and insulators, and associate metals with being good conductors. Within KS3 it builds upon units 'Elements' and 'Periodic Table' in Year 7 HT5. With some pupils, teachers may wish to concentrate on some of the new topics, extending activities, and with others to spend more time on revision of previous work. This unit lays the foundation for units on 'Types of reaction' in Year 9 HT3.	This unit uses ideas developed in the key stage 2 programme of study. It builds on unit 6C 'More about dissolving' and unit 6D 'Reversible and irreversible changes' in the key stage 2 scheme of work. This unit introduces pupils to chemicals, reactions and practical techniques which are likely to be new to them, through using a range of acids and alkalis encountered in familiar and laboratory contexts. Some students may know that solids can dissolve and form solutions and have experience of mixing materials and seeing that	Students should be able to compare groups of rocks based on their appearance and simple physical properties. They may have compared rocks on building to grave stones for example. Students should also know how fossils are formed as; once living things can be trapped within a rock. Students may have done some further research on this and found fossils are found in sedimentary rocks. Students should also know that soil is made of rocks and organic matter. They may do this by working scientifically to compare different soils and identifying key similarities and differences.	Students should already know how shadows are formed; when light from a light source is blocked by an opaque object. Students will already have familiarity with a model of the Earth and sun to demonstrate day and night. Students will also be aware of the planet's positions in relation to the sun. Students will be aware of the moon and Earths as approximately spherical bodies. Students should be able to describe the motion of the planets in relation to the Sun and the motion of the Sun relative to Earth.

				new materials are formed as a result of a reaction		
What skills will pupils learn and apply? (disciplinary knowledge)	Use the particle model to explore the interplay between scientific theories and evidence. Evaluate whether evidence supports or refutes explanations of phenomena. to use their existing knowledge and understanding to interpret and explain results. To work together, listening to and evaluating the contributions of others. That discussion can help clarify ideas	Decide how many measurements are needed for reliable results. Present data as graphs. Interpret and draw conclusions from observations and graphs	Describing patterns in data. Describe a reaction with a word equation. Use particle diagrams to represent 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.	Framing a question that can be investigated. How to use preliminary work to help decide what to measure or to observe. Choosing appropriate techniques and equipment. Comparing investigative methods and evidence collected with those of others. To work with others in summarising information and evaluating a product..	Students will know the processes of weathering so that the can apply their understanding to how sedimentary rocks are made and the rock cycle. Students will understand how weathering leads to the build-up of sedimentary rock. So that they can understand how fossils are found. Students will have the basic understanding of different soils and components. They will be able to link this to different types of rocks. Moving forward to KS4 student will have the knowledge and understanding of the earths structure and rocks to understand how metal ores are mined and used for the extraction of metals. They will also be able to use this to understand how fossils are made in more detail and explain how we get minerals in soil.	Students will be able to use the knowledge to understand how ideas have changed over time. They will be able to apply this moving forward to other topics and KS4. Students will understand how Scientific ideas are always changing in light of new evidence and technology to advance observations. This is applicable throughout the science curriculum going forward. Students will be able to link the chemical reactions; fusions, occurring on the surface of the sun to KS4 chemistry and chemical reactions. Students will have the basic knowledge to apply to the KS4 topic on space.
Key vocabulary pupil will know and learn	Particle Particle model Diffusion Gas pressure Density Evaporate: Boil Condense Melt Freeze Sublime	Solvent Solute Dissolve Solution Soluble Insoluble Mixture Filtration Distillation: Evaporation Chromatography	Metals Non-metals Displacement: Oxidation Reactivity	pH Indicators Base Concentration	Rock cycle Weathering Erosion Minerals Sedimentary rocks Metamorphic rocks Igneous rocks	Galaxy Light year Stars Planet Moon Orbit Exoplanet
How will pupil understanding be checked &/or assessed?	Each school in the Trust follows the same assessment cycle process. All students will complete an informal key piece assessment every half term (at least) which take a variety of formats to assess golden knowledge learnt over the previous lessons. The key piece assessments are either retrieval-based questions to help students retrieve their prior golden knowledge, scientific literacy questions where students have to practice applying their golden knowledge to exam style questions in different contexts or exam style questions using a variety of command words such as describe, explain and evaluate. Students will then complete a short improvement activity based on gaps identified in the informal key piece and teachers will check these to ensure gaps have closed. In addition to these informal key piece assessments, all students complete a formal assessment at least every term which synoptically assess their retention and application of key golden knowledge learnt in Biology, Chemistry and Physics. Teachers will then use the Science Trust QLA tracker to identify gaps in knowledge; reteach accordingly and then students will complete a range of improvement style activities to close those gaps which are then checked by the teacher either through live marking or collection of books. Further details of the Science SHARE Assessment and Feedback policy can be found here: Q of E					
Resources available	Each school has their own shared area for each year group in each key stage. Lessons are planned to follow the SHARE Science lesson structure guidance document which can be found here: SCIENCE SHARE MAT lesson structure guidance.docx In summary: 1. First 5/Do Now to retrieve prior learning needed for the foundations of new learning. 2. I do/explicit instruction/guided explanation/teacher input through expert curriculum delivery.					

	3. We do/modelling where appropriate to show students how to remember and apply the key golden knowledge to different contexts. 4. You do/Independent practice to retrieve and practice applying the key golden knowledge to a variety of contexts. 5. Final 5 to retrieve key golden knowledge learnt in the lesson. All schools have these SHARE Science curriculum plans, delivery plans which sit underneath these to guide staff on when to deliver each section of the curriculum and then schemes of learning and lesson resource folders to adapt in order to meet the unique needs of the students and classes they teach. All shared resources which are common across all schools can be found in the SHARE Science folder here: Home (click on the documents tab at the top of the page) All QA including lesson visits, work scrutiny and student voice will prioritise the SHARE Science Q of E Non-Negotiables Checklist which can be found here: SCIENCE SHARE MAT Non negotiables Q of E QA check list.docx All lesson resources are focussed on retrieval (through the Retrieve to Remember strategy) and practice, and this is built into these curriculum plan through effective sequencing of golden knowledge components. There are also KS3 and KS4 Golden Knowledge booklets for staff which outline the key golden knowledge linked to the exam specifications and National Curriculum at KS3 and KS4. These can be found here: Golden Knowledge If staff can't get access to any of the folders above, please request access through joanna.richards@sharemat.co.uk					
Notes Why this topic is important	The particle model is fundamental to explanations of diffusion, pressure, and rate of reaction. Knowledge of particle behaviour in each state is a basis for explaining mixtures, chemical reactions, separation techniques (Year 7). At KS4, this is built on further to discuss particles having sufficient kinetic energy to overcome intermolecular bonds, and that bond strength varies between substances. The application of the particle model in diffusion is a key concept for the application of diffusion in chemistry and biology after year 7. E.g. to explain gas exchange, transport in organisms etc. Movement of particles and frequency of collisions is developed in consideration of pressure in gases, chemical	This topic reinforces learning to distinguish between elements, compounds and mixtures in terms of the particles they contain. It identifies melting and boiling points as the fixed temperatures at which elements and compounds change state, and use the particle model to explain changes of state, further scaffolding understanding of this fundamental conceptualisation of our universe.	This unit highlights the key properties and reactions of metals, offering some comparison with non-metals. It contributes to the development of understanding of the periodic table and contributes to the basis for understanding the different types of bonding. Students will understand that displacement reactions involving metals may release energy, that the energy from these reactions can be used. Students may be able to link energy released in displacement reactions to differences in the reactivity of metals. Through the activities in this unit pupils will be able to understand, use and spell correctly names of compounds including salts, e.g. magnesium sulphate, recognising that the whole name is needed to specify a compound. This unit affords greater familiarity with	This unit enables the development of students' scientific enquiry skills. Students will recognise hazards and use information sources to assess risks associated with acids and alkalis. They will make and present qualitative observations, interpret qualitative observations, making comparisons and identifying simple patterns. Students investigate the effectiveness of different antacids, controlling appropriate variables	This topic will allow students to understand the process of the rock cycle. It allows the students to understand how smaller ideas can link to larger ideas and concepts, i.e. layers of the earth link to the rock cycle. Students will be able to link process and apply their knowledge to draw a big picture; 'the rock cycle'. Students will learn how to analyse and research key points in history by observing and discussing features of fossils. Students will be able to transfer knowledge from this topic to KS4 when learning about metal ores. Students will develop and gain lifelong skills with this topic, they will be able to observe identify potential causes of weathering on buildings for example. They may also be able to explain the choices of rocks for building and roads.	By studying the planet and beyond, students understand Earth in relation to the solar system, universe and galaxies. Students will be able to understand the solar systems works in orbit of the Sun. Students will also understand how Scientific theories are changing as new evidence and technology comes to light. They will be able to appreciate the on-going evolution of science and theory.

	reactions and rate of reaction at KS4		words with different meanings in scientific and everyday contexts, e.g. salt, reaction, product; and with words and phrases relating to scientific enquiry, e.g. visible change, evidence of reaction.			