

Meden School Curriculum Planning							
Subject	Chemistry	Year Group	9	Sequence No.	9	Topic	Using resources

Retrieval	Core Knowledge	Student Thinking
What do teachers need retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
<p>KS3 Y7 (Separating mixtures) and Y8 (Atomic structure). Students are introduced to the periodic table and will know that it is split into the different types of elements and will be able to name some elements.</p>	<p>L1: Properties of metals and non-metals. The periodic table can be split into two types of elements, metals and non-metals. Each type having different properties. Metals are good conductors of electricity and thermal energy where as non-metals are poor conductors. Metals are strong and tough and are shiny, non-metals have the opposite properties. They break easily, are dull and brittle. Other properties of metals include having high melting and boiling points, high densities, being malleable, sonorous and ductile. Some metals will form alloys when mixed with other metals and some are also magnetic. Non-metals have low melting and boiling points, low densities and none are magnetic.</p> <p>L2: Uses of metals. Reminder of key words introduced in previous lesson. Metals are malleable, good conductors of heat and electricity, ductile, shiny, and stiff. Pure metals are soft because the atoms can slide over each other very easily. An alloy is a mixture where one element is a metal. Alloys contain elements of different sizes, so the layers cannot slide over each other as easily. Common alloys include stainless steel, bronze, and brass. Different alloys are made for specific purposes. The amount of gold in a gold alloy is described in terms of carats. Pure gold is described as 24 carats.</p> <p>L3: Corrosion. By way of an experiment, investigate the factors required to cause iron to rust. Corrosion is when a metal is gradually destroyed by reacting with substances in the environment. Iron will only corrode in the presence of oxygen and water.</p> <p>L4: Preventing corrosion. Corrosion only happens on the surface of a metal. Rust is soft and crumbly so breaks away exposing more iron to corrode. Aluminium oxide forms a protective barrier preventing more aluminium from corroding. Metals can be protected from corrosion using a barrier, this includes painting, electroplating, oiling, or greasing the exposed metal. The sacrificial method uses a more reactive metal</p>	<p>The Forth Bridge in Scotland was opened in 1890 and was the first major structure in Britain to be built using steel.</p> <p>The golden gate bridge requires painting continuously due to its size.</p>

<p>KS3 Y7 (Reactions of metals), Y8 (Applications of chemistry, Atomic structure). Students have been introduced to word and symbol equations.</p> <p>KS2 Students have been introduced to the word fossils when they have looked at where fossils come from.</p>	<p>placed with the metal to protect, causing the substance in the environment to react with the sacrificial metal.</p> <p>L5: Earth's non-metallic resources. Clay is a soft material that is dug up from the ground, when heated at high temperature it hardens to form clay-ceramic. Ceramic is a non-metallic material with a high melting point. Ceramics are good insulators of electricity and heat. Limestone is a sedimentary rock that is made mainly of calcium carbonate. It is formed from the shells and skeletons of marine animals that lived millions of years ago. The calcium carbonate, in the limestone, breaks down when heated to produce calcium oxide. This type of reaction is known as Thermal Decomposition. Calcium oxide + water → calcium hydroxide. Calcium hydroxide + carbon dioxide → calcium carbonate + water.</p> <p>L6: Using fossil fuels. Coal is formed from plants and trees decaying in the absence of oxygen, they are compressed over millions of years. Crude oil and natural gas are formed from plankton buried in mud, they were compressed over millions of years to form oil or gas. The temperature during burial determines whether oil or gas is produced. Crude oil is used to make all plastics. Fossil fuels are examples of a finite resource. Some natural resources, such as wood, can be considered a renewable resource.</p> <p>L7: Combustion. Combustion is an exothermic reaction between fuel and oxygen. Oil and natural gas are hydrocarbons, molecules made of only hydrogen and carbon. We can test for the products given off when hydrocarbons combust. Blue cobalt paper turns pink in the presence of water. And lime water turns cloudy when carbon dioxide is bubble through it. The equation for the combustion of a hydrocarbon is: any hydrocarbon + oxygen → water + carbon dioxide. This is complete combustion, where there is plenty of oxygen available. If there is a shortage of oxygen then incomplete combustion happens, in this case carbon monoxide is formed instead of carbon dioxide. Coal contains traces of sulfur, this sulfur reacts with oxygen to form sulfur dioxide when coal is combusted. Once in the atmosphere sulfur dioxide reacts with water to form sulfuric acid, which falls to the ground as acid rain. The internal combustion engine gets very hot when fuel combusts. At these temperatures nitrogen can react with oxygen to form nitrogen oxides, in the atmosphere these nitrogen oxides react with water to form nitric acid. This then falls to the ground as acid rain.</p> <p>L8: Polymers. Small molecules called monomers, join together to form a very large molecule called a polymer. This process is called polymerization. All plastics are polymers. Two important things influence the properties of a polymer: The monomer it is made from and, the conditions under which it is made. In thermosoftening polymers the forces between individual polymers are weak, which means the polymers are flexible and can be melted and then remoulded. In thermosetting polymers there are links between</p>	<p>The rock underneath Meden School is Magnesium Limestone. It has been used to build Southwell Minster and was used as the foundation stones for the houses of parliament.</p> <p>The earliest references of coal mining come from China with a coal mine being opened over 3,000 years ago</p> <p>Meden school blazers and ties are made of a polymer called polyester.</p>
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each individual polymer chain, which means the polymer does melt when heated. They are strong, hard and rigid.

L9: Making glass. The most common compound found in the Earth's crust is silicon dioxide, SiO₂, it forms a giant covalent structure. Glass is made from melting **Silica** (silicon dioxide), **Soda Ash** (sodium carbonate, Na₂CO₃) and **Lime** (calcium oxide). Silica is the bulk material, which gives glass its transparent and durable qualities. Soda ash lowers the melting point of silica. Lime prevents the other components dissolving in water. Pyrex™ is a special type of glass called **borosilicate** glass, it does not expand when heated. In borosilicate glass all of the calcium and much of the sodium is replaced by the element **boron**. Molten glass is floated on a river of molten tin to keep it flat. Stained glass is made by adding transition metals to the glass. The process of recycling glass is: Glass is collected, Glass is separated from paper and metal, Glass is crushed and then sorted by colour, Glass chips are melted down, Glass is reformed using moulds into new product. Glass chips are melted down and reformed using moulds into new products. Recycled glass can be used to make glass-wool, which is used to insulate homes.

L10: Concrete vs cement. Cement is made from powdered limestone heated with powdered clay in a kiln to 1400°C. During this process, first water vapour is given off (**dehydration**) and then carbon dioxide is given off (**decarbonation**). Mortar is made from mixing **cement** with sand and water. The calcium hydroxide (lime) in the mortar reacts with carbon dioxide in the air to produce calcium carbonate, this is what limestone is made from. **Composites** are made from one material embedded in another. Fibres or fragments of a material (known as the **reinforcement**) are surrounded by **matrix** acting as a binder. **Concrete** is a composite made from mixing **aggregate** with cement, sand and water. The aggregate acts as the **reinforcement** and the cement is the **matrix**. Steel bars can be added as additional reinforcement, this is called **reinforced concrete**.

L11: Revision

L12: EOTT

L13: GPA