Meden School Curriculum Planning							
Subject	Chemistry	**Year Group**	7	**Sequence No.**	3	**Topic**	Separating mixtures

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!'
KS2 Years 5/6 Separating mixtures. Different processes can be used to separate mixtures such as filtering, sieving, dissolving and evaporation. Year 7: Evaporation, condensation, filtration and boiling points in States of matter topic	**L1: Elements, compounds and mixtures.** Everything is made up from tiny particles called **atoms**. An **element** is made up of only **one type** of atom. All known elements in the universe can be found on the **periodic table**. Each element has its own **symbol**, for example O for oxygen, C for carbon. **Compounds** are substances that are made up of **one or more different types of atoms chemically joined together**. **Mixtures** are substances that are made up from elements or compounds that are **not chemically joined**. **L2: Naming compounds.** The periodic table can be split into two types of elements, **metals and non-metals**. Only elements can be found on the periodic table. Compounds occur from the **chemical reaction** between two or more elements. We use symbols to show what elements a compound is made up from. There are rules when it comes to naming compounds. Rule 1: If there is a metal, the **metal always comes first**. Rule 2: After the first metal or non-metal, the ending of the second non-metal needs to change to ***-ide*.** Rule 3: If there is a metal, a non-metal and oxygen, the ending of the non-metal changes to ***-ate*.** Rule 4: Sometimes there is more than 1 atom and a prefix is used to tell you how many of these atoms are in the compound. **L3: Filtration.** Mixtures can be separated using **physical methods**. Filtration is the process of removing **solid particles** from liquids and gases. Filtration works by using a **semi-permeable membrane** such as filter paper or a sieve. The grains of **the insoluble substance** do not split up into individual particles and therefore **cannot fit through the holes** of the semi-permeable membrane. The grains of **the soluble** substances **split up into individual particles** and can fit through the holes. There are several keywords involved in filtration; **solute** (the solid that dissolves in a liquid/solvent to make a solution), **solvent** (the liquid in which another substance can be dissolved into), **filtrate** (the liquid that passes through the filter), **solution** (a mixture made up of one substance dissolved in another) and **saturated** (a liquid that cannot dissolve any more solid).	

	L4: Evaporation. Evaporation can be used to separate solids from a solution. Evaporation involves heating a solution to its **boiling point**. The solvent will then turn into a **gas** (evaporation) leaving behind **soluble solid particles**. Four factors affect the rate of evaporation; **wind speed, temperature, surface area and the solvent used.** **L5: Distillation.** Two liquids can be separated using distillation. In simple distillation, the two liquids need to have very **different boiling points**. Distillation involves two changes of state; **evaporation and condensation**. First the solution mixture is heated and when one of the liquids reaches its boiling point, it evaporates and turns into a gas. It is then cooled by the cold water in the condenser and will then condense back into a liquid. This liquid is then collected. The remining liquid (or solid) is left behind in the original flask. **Melting and boiling points** can be used to determine if a substance is **pure**. A pure substance has **fixed melting and boiling points** and any **impurities** will cause the melting and boiling points to **change**. **L6: Distillation in careers – brewing.** Distillation is used in a variety of everyday applications such as the manufacture of plastics, whisky, alcohols, petrol, diesel and cosmetics. **Fractional distillation** is a process used to separate a mixture of liquids that have **very similar boiling points**. Fractional distillation is very similar to simple distillation but uses a **fractionating column** instead. This fractionating column has a **temperature gradient** where it is cooler at the top and hotter at the bottom. The column ensures that each liquid evaporates at its correct boiling point and any 'wrong' liquids travel back down the column until they reach their boiling point which corresponds to the temperature reached on the thermometer. **Steam distillation** is a process used to manufacture perfumes from essential oils. **L7: Water purification.** In order for us to have water that is safe to drink, there are three main stages involved. These include **sedimentation, filtration and disinfection**. Sedimentation is the process where **solids are removed from water**. Extra **oxygen** is added to the water which allows **bacteria** to **decompose any organic matter** that has entered the sedimentation tank. Any suspended particles that remain after the sedimentation step are then removed during the filtration step. The water is passed through a layer of **charcoal or coal** and further filtered by **sand** which acts as a **microfilter**. Air is again trapped which increases the amount of oxygen available for decomposition (this is called **microbial respiration**). Any solids are trapped in pore spaces or stick to the sand particles and relatively clean water leaves the filtration bed. During the disinfection stage, **chlorine gas** is added to the water. This is called **chlorination**. The chlorine **kills microbes**, it is used as it is easy to use, inexpensive and reliable. **L8: Potable water.** Potable water is the term given to water that is **safe to drink**. The average person in the UK uses about 150 litres of water a day but only 5 litres of that is used for drinking. Humans produce large	L7: Why do some countries still have water that is unsafe to drink when we have technology which has advanced so far from previous times when diseases such as cholera, dysentery and polio were common place? L8: Fluoride is added to our water in order to fight against tooth decay. It has both

	amounts of **waste water** every day alongside **industry and agriculture**. This waste water will have to have harmful chemicals, sewage, microbes and organic matter removed from it. This happens in a sewage treatment works. We can create a simple water filtration system using a plastic bottle, filter paper, gravel, rocks and sand. **Tooth decay** is a problem where bacteria from **plaque** produces acid. This acid then causes calcium and phosphates in the **enamel to dissolve**. This is called **demineralisation**. The **saliva** in our mouths **neutralises** the acid. **Remineralisation** occurs when calcium and phosphates re-enter the enamel. **Fluoride ions** are added to our water supplies in order to prevent tooth decay by these two processes. There are advantages and disadvantages to this. **L9 and 10: Chromatography.** Chromatography is used to **separate dissolved substances**. There are different types of chromatography and applications include drug testing, beverage/water testing, food testing, arson sites, identifying blood samples and looking for contaminants in pharmaceutical drugs. Chromatography works on the principal that **different substances travel at different rates** through a medium. In this lesson, we are looking at the different dyes that make up felt tip pens. The different colours will be carried via the **mobile phase (water) up the stationary phase (the paper).** Chromatography compares the **distances** travelled by substances in a sample with known reference samples to identify unknown substances. **Pencil** is used as a starting point for the samples as it **is insoluble** and will not dissolve into the solvent. A **chromatogram** is produced showing the separated dissolved substances. If there is **1 spot**, then the substance was **pure**, if there are two spots then the original sample contained two substances. 3 spots showed the sample contained three substances etc. Students learn to interpret chromatograms. **L11/12:** Revision, assessment and development task.	advantages and disadvantages – should water supply companies be making this decision for us?