

## States of Matter and Separating Substances

Opportunities for Breadth and Challenge: Pupils are challenged to use their scientific knowledge to practically demonstrate various separation methods. Breadth of topic includes how pupils can use their knowledge to choose the correct method for a given mixture.			
Links to Sequencing for Learning: This unit links to previous work on states of matter done in Y7 and 8 where we look at particle diagrams, changes of state and how to separate simple mixtures. This unit prepares pupils for work later in Y9 (types of substance) and in Y11 where it links to fractional distillation of crude oil.			
Section	Key knowledge	Key words	Assessment
1	States of matter What are particles like in substances in the solid, liquid and gas states? What changes happen to particles during the different changes of state? What happens to its particles when a solid melts?	Interconversions, Melting, Freezing, Condensing, evaporating, boiling, sublimation, deposition,	Prior knowledge of the three states of matter
2	Mixtures How do you decide what state a substance will be in at a given temperature? What is the difference between a pure substance and a mixture? How do melting points allow you to spot differences between pure substances and mixtures?	Pure, mixture, melting point, boiling point	Retrieval Qs of keywords
3	Filtration and crystallisation How can filtration be used to separate mixtures? How can crystallisation be used to separate mixtures? What are the hazards and risks when separating mixtures by filtration and crystallisation?	Filtration, crystallisation	Practical skills - filtration
4	Paper chromatography (core practical) How can chromatography be used to separate mixtures? What are differences between mixtures and pure substances on a chromatogram? How do you calculate an $R_f$ value?	Chromatography, $R_f$ value, separation, Composition	Practical skills – chromatography
5	Distillation (core practical) What is distillation? How do simple distillation and fractional distillation differ? How would you reduce risks when carrying out a distillation experiment?	Distillation, fractional distillation, still, Composition	Practical skills - distillation
6	Drinking water How is drinking water produced? Why must water used in chemical analysis be pure?	Potable, reservoir, distillation, screening, filtration, sedimentation, chlorination	
7	Revision How would you choose which method to use to separate a mixture?		Class assessment sheet
8	End of Unit Test		EUT
9	Test Feedback		Test feedback sheet

## Atomic Structure and The Periodic Table

<p>Opportunities for Breadth and Challenge:                  Pupils are challenged to use their scientific knowledge to calculate RAM given % abundances.                  Breadth of topic includes how pupils can relate the information to Physics – structure of the atom.</p>			
<p>Links to Sequencing for Learning:                  This unit links to previous work on states of matter done in Y9 where we look at particle diagrams, and modelling the atom                  This unit prepares pupils for work later in Y9 (bonding) and in Y10 (calculations involving masses) and Y11 (groups in the periodic table).</p>			
Section	Key knowledge	Key words	Assessment
1	Structure of an atom <i>How has the model of the atom changed over the last 200 years?</i> <i>How do the parts of atoms compare with each other?</i> <i>Why do atoms have no overall charge?</i> <i>Why is most of the mass of an atom found in its nucleus?</i>	Dalton, nucleus, shells, proton, electron, neutron, charge, mass	Prior knowledge of the word nucleus
2	Atomic number and the link to the periodic table <i>What does the atomic number tell you about an element?</i> <i>How can you calculate the numbers of protons, neutrons and electrons in atoms?</i>	Proton, electron, neutron, charge, mass, relative atomic mass, atomic (proton) number	Retrieval Qs of keywords
3	Isotopes <i>How can you describe and identify isotopes of elements?</i> <i>Why are the relative atomic masses for some elements not whole numbers?</i> <i>How do you calculate the relative atomic mass of an element?</i>	Isotope, relative atomic mass, atomic (proton) number, abundance	MUM – structure of the atom and Calculating RAM
4	Elements and The Periodic Table <i>What are the symbols of some common elements?</i> <i>How did Mendeleev arrange elements into a periodic table?</i> <i>How did Mendeleev use his table to predict the properties of undiscovered elements?</i> <i>Why was Mendeleev right to alter the order of some elements in his table?</i>	Mendeleev, relative atomic mass, atomic (proton) number	Recall charges of subatomic particles
5	Atomic number and the periodic table <i>What is an element's atomic number?</i> <i>How are elements arranged in the modern periodic table?</i>	Relative atomic mass, atomic (proton) number	Recall – atomic number v atomic mass
6	Electronic configuration and the periodic table <i>What information does an electronic configuration give?</i> <i>How do you work out and show the electronic configuration of an element?</i> <i>How is the electronic configuration of an element related to its position in the periodic table?</i>	Electronic configuration	Past exam Qs atomic structure
7	Revision		Class assessment sheet
8	End of Unit Test		EUT
9	Test Feedback		Test feedback sheet

Lacon Childe School Science Department – Chemistry Scheme of Work – Year 9 - **Bonding – types and models**

<p>Opportunities for Breadth and Challenge:                  Pupils are challenged to use their scientific knowledge to work out the type of substance from given data.  <b>Breadth – links to substances and their properties in materials science.</b></p>			
<p>Links to Sequencing for Learning:                  This unit links to previous work on atomic structure done in Y9 where we look at atom diagrams, and modelling the atom, electronic configuration and its link to the periodic table.                  This unit prepares pupils for work later in Y10 (metals) and Y11 (groups in the periodic table and fuels).</p>			
Section	Key knowledge	Key words	Assessment
1	Introduction to bonding – practical on properties <b>What are physical and chemical properties?</b>	Physical properties, chemical properties	Prior knowledge of physical v chemical properties
2	Ionic bonding – how ions form <b>How are ions formed?</b> <b>How can the numbers of subatomic particles in an ion be calculated?</b> <b>What is an ionic bond?</b>	Ion, gain, lose, charged particle	Retrieval Qs of keywords
3	Ionic lattices - properties of ionic substances <b>What is an ionic lattice?</b> <b>What particles and forces are present in ionic compounds?</b> <b>Why do ionic compounds have high melting points and boiling points?</b> <b>Why do ionic compounds conduct electricity when they are liquids or dissolved in water but not when solid?</b>	Lattice, properties, forces, electrostatic attraction, electrical conduction, brittle	Recall – how ions form
4	Calculating ionic formula <b>What do the endings -ide and -ate tell you about a substance?</b> <b>How do you work out the formulae of ionic compounds?</b>	Formula	Recall – how ions form
5	Calculating ionic formula (poly atomic ions) <b>How do you work out the formulae of ionic compounds?</b>	Poly atomic ion	Recall – how ions form
6	Covalent bonds – how they form <b>What are the names of some covalent molecules?</b> <b>How are covalent bonds formed?</b> <b>How can dot and cross diagrams be used to explain the formation of covalent molecules?</b>	Covalent, sharing, electrons	MUM: Past exam Qs
7	Molecular compounds - Properties of covalent substances <b>Why do simple molecular compounds have low boiling and melting points?</b> <b>Why are simple molecular compounds poor electrical conductors?</b> <b>What is a polymer?</b>	Properties, forces of attraction, covalent bonds, polymer	Past exam Qs
8	Allotropes of carbon <b>How are simple molecular structures different from giant covalent structures?</b> <b>What are the differences in structure between the different allotropes of carbon?</b> <b>How do we explain the properties and uses of graphite, diamond and fullerenes?</b>	Diamond, graphite, graphene, fullerenes, structure, bonding	Past exam Qs
9	Properties of metals <b>What are the typical physical properties of metals and non-metals?</b> <b>How are the particles arranged in metals?</b> <b>How can we explain the properties of a metal in terms of its bonding and structure?</b>	Metallic, ions, sea of delocalised electrons, conductivity, malleable, ductile	Past exam Qs
10	Bonding models <b>What different types of structure and bonding models are used to describe substances?</b> <b>What are the limitations of the models that we use to show structure and bonding?</b>	Dot and cross, displayed formula, ball and stick, space saving model	Recall types of bonding and key features
11	Revision		Class assessment sheet
12	End of Unit Test		EUT
13	Test Feedback		Test feedback sheet

