

**Progression Model – Year 9 Chemistry**

<b>Module Title:</b>  Separating Mixtures	<b>Module Title:</b>  Atoms and the Periodic Table	<b>Module Title:</b>  Bonding
<b>Learning Intent for this module:</b> In Year 7 work on the particle model developed the idea of atoms, elements, mixtures and compounds. This concept is expanded in year 9 as atomic theory is fundamental to students acquiring a deeper knowledge and understanding of chemical reaction and interactions of substances. Students are introduced to further separation techniques with the introduction of crystallisation and chromatography. The ideas about solubility and crystallisation are essential to salt preparation techniques later in the curriculum. <ul style="list-style-type: none"> <li>• Atomic structure</li> <li>• Elements, mixtures and compounds</li> <li>• Displayed formula</li> <li>• Word equations</li> <li>• Filtration and crystallisation</li> <li>• Distillation</li> <li>• Chromatography</li> </ul>	<b>Learning Intent for this module:</b> The electronic configuration of an atom is fundamental to an understanding of bonding, which is taught in module 3. This model is also used to explain reactivity which is looked at across Years 10 and 11. This module also discusses the historical development of the periodic table and the way that elements are placed in periods or groups. <ul style="list-style-type: none"> <li>• Periodic table</li> <li>• History of the periodic table</li> <li>• History of the atom</li> <li>• Group 1</li> <li>• Group 7</li> </ul>	<b>Learning Intent for this Module:</b> Bonding is fundamental to the understanding of GCSE Chemistry. Prior learning about atoms is deepened by exploring the different types of bonds within substances and the properties of different types of bonding. This provides theory to explain further topics such as energy changes, acids, and fuels. <ul style="list-style-type: none"> <li>• Ions</li> <li>• Ionic bonding</li> <li>• Ionic compounds</li> <li>• Covalent bonding</li> <li>• Simple covalent properties</li> <li>• Giant covalent structures</li> <li>• Metallic bonding</li> <li>• States of matter</li> </ul>

<p><b>Key Content to be learned:</b></p> <p>Students will learn about the structure of the atom in terms of protons, neutrons and electrons. They will expand on their knowledge of compounds and be able to understand displayed formula and construct word equations. Finally, students will learn about mixtures and ways to separate them.</p>	<p><b>Key content to be learned:</b></p> <p>Students will learn about the periodic table and how it is organised into groups and periods. They will learn about the history of the periodic table and the atom and how scientists have developed and refined their ideas over time. Students will identify and explain trends in the periodic table relating to Group 1 and 7 elements.</p>	<p><b>Key Content to be learned:</b></p> <p>In this module students will learn about different types of bonding. They will first learn about ionic bonding and ionic compounds and their properties. They will then move onto covalent bonding and the properties of simple covalent molecules and giant covalent structures. Students will then learn about metallic bonding and how this affects the properties of metals. Finally, students will revisit the concept of states of matter and learn how bonds and intermolecular forces affect solids, liquids and gases.</p>
<p><b>Prior knowledge:</b></p> <ul style="list-style-type: none"> <li>• The concept of a pure substance</li> <li>• Mixtures, including dissolving</li> <li>• Diffusion in terms of the particle model</li> <li>• Simple techniques for separating mixtures:</li> </ul>	<p><b>Prior knowledge:</b></p> <ul style="list-style-type: none"> <li>• The varying physical and chemical properties of different elements</li> <li>• The principles underpinning the Mendeleev periodic table</li> <li>• The periodic table: periods and groups; metals and non-metals</li> <li>• The properties of metals and non-metals</li> </ul>	<p><b>Prior knowledge:</b></p> <ul style="list-style-type: none"> <li>• A simple model of the atom consisting of the nucleus and electrons</li> <li>• The modern Periodic Table, showing elements arranged in order of atomic number</li> <li>• Position of elements in the Periodic Table in relation to their atomic structure and arrangement of outer electrons</li> <li>• Properties and trends in properties of elements in the same group</li> <li>• Characteristic properties of metals and non-metals</li> <li>• Chemical reactivity of elements in relation to their position in the Periodic Table</li> </ul>
<p><b>Key tasks for this module:</b></p> <ul style="list-style-type: none"> <li>• Elements, compounds and mixtures</li> <li>• Separating mixtures</li> </ul>	<p><b>Key tasks for this module:</b></p> <ul style="list-style-type: none"> <li>• History of the atom</li> <li>• Comparison of Group 1 and 7 elements</li> </ul>	<p><b>Key tasks for this module:</b></p> <ul style="list-style-type: none"> <li>• Ionic bonding and properties of ionic compounds</li> <li>• End of year test</li> </ul>