

Year 10, C3, Structure and bonding – Science Faculty

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:
<p><i>This unit builds on the foundations of atomic structure introduced in unit C1. Pupils look at how different types of atoms interact to form compounds and molecules and how these interactions give different substances different properties. Pupils look at the three main types of bonding: ionic, covalent and metallic and understand how the atomic structure of the chemicals that produce them lead to different types of bonds being formed. This in turn allows us to understand how the materials they form have different properties.</i></p>	<ul style="list-style-type: none"> <li>• States of matter</li> <li>• Atoms into ions</li> <li>• Ionic bonding</li> <li>• Giant ionic structures</li> <li>• Covalent binding</li> <li>• Structures of simple molecules</li> <li>• Giant covalent structures</li> <li>• Fullerenes and graphene</li> <li>• Bonding in metals</li> <li>• Giant metallic structure</li> <li>• Nanoparticles (separate science)</li> <li>• Application of nanoparticles (separate science)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Ionic</i></li> <li>• <i>Covalent</i></li> <li>• <i>Electrostatic</i></li> <li>• <i>Lattice</i></li> <li>• <i>Nano</i></li> </ul>
Challenge and Support:	World wide learning/ links to 21 <sup>st</sup> century:	Cultural capital/ Industry/ Enrichment:
<ul style="list-style-type: none"> <li>• There are a number of different challenges within this unit including drawing diagrammatic representations of the different kinds of bond (ionic, covalent and metallic).</li> <li>• These can be scaffolded to help pupil's better access material if required and more complex examples of these types of bonds will be introduced for pupils requiring additional challenge.</li> <li>• There are also literacy tasks within this unit where pupils will be required to explain, using the correct scientific terminology, why different materials have particular properties (for example why simple</li> </ul>	<ul style="list-style-type: none"> <li>• New technologies that are currently being developed are discussed in this topic, including the use of nanoparticles for medicines and the development of graphene, 100 times stronger than steel.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Fullerenes, graphene and nanoparticles are areas on ongoing development and many scientists are involved in the study of these products.</i></li> <li>• <i>Industries of the future are likely to utilise these new chemicals to produce new, innovative products.</i></li> </ul>

molecules have low boiling points or metals are good conductors of electricity).		
<b>Historical, Social, Moral, Spiritual, Cultural context:</b>	<b>Cross curricular links/ literacy/numeracy:</b>	<b>Common misconceptions:</b>
<ul style="list-style-type: none"> <li>• What might the implications of the new technologies that scientists are developing be in the near future?</li> <li>• How was graphene isolated?</li> </ul>	<ul style="list-style-type: none"> <li>• Literacy tasks explaining the properties of different substances in terms of their bonding.</li> <li>• Links to Design and technology, looking at the properties of different materials.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Chemicals on the periodic table are 'solid', 'liquid' or 'gas'.</i></li> <li>• <i>Only metals conduct electricity.</i></li> <li>• <i>Carbon (or a carbon allotrope) is a metal</i></li> </ul>
<b>Assessment timeline:</b>		
<ul style="list-style-type: none"> <li>• <i>regular EPPQs</i></li> <li>• <i>end of unit test</i></li> <li>• <i>EPPQ homework task</i></li> <li>• <i>in lesson questioning and other progress checks</i></li> </ul>		
<b>Home learning</b>		
<ul style="list-style-type: none"> <li>• <i>. EPPQ homework booklet</i></li> </ul>		
<b>Feedback</b>		
<ul style="list-style-type: none"> <li>• <i>Students self/peer mark homework booklets and set revision goals based on understanding.</i></li> <li>• <i>Feedback based on the end of the unit test.</i></li> </ul>		

**Length of unit (duration indicated in lessons)**

C3. 1	C3. 2	C3. 3	C3. 4	C3. 5	C3. 6	C3. 7	C3. 8	C3. 9	C3. 10	C3. 11	C3. 12	C3 test
<b>Unit: C3 Quantitative chemistry</b>												