



Subject: Year 9 C.2 Bonding, Structure and the Properties of Matter

Overarching Topic: Bonding, Structure and the Properties of Matter			
<p>Why is this topic being studied at this time?</p> <p>How does it fit into the wider subject curriculum?</p>	<p>Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. Theories of bonding explain how atoms are held together in these structures. Scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. The properties of these materials may offer new applications in a range of different technologies.</p>		
	Critical	Core	Pinnacle
<p>The Big Questions (What questions will students be able to answer upon mastery of the topic?)</p>	<ul style="list-style-type: none"> How are ions formed? What holds ions together in metallic bonding? How are two non-metals bonded together? Why is the boiling point of metallic bonded compounds high? Why can metals conduct electricity? 	<ul style="list-style-type: none"> How do electrons transfer to form ionic bonds? How is the charge of ions related to their group number? How does the properties of covalently bonded compounds differ to ionically bonded compounds? What are the allotropes of carbon? Why can ionic compounds conduct electricity? Why are metals malleable and ductile? 	<ul style="list-style-type: none"> Why do elements not exist on their own? How does giant structure change the properties of a compound? How are the properties of each allotrope of carbon different? Why? What is graphene and why is it useful? Why might scientists suggest there may be silicon based life forms in space?
	<p>TRIPLE ONLY QUESTIONS</p> <ul style="list-style-type: none"> How is the bonding in polymers related to simple covalent bonding? 	<p>TRIPLE ONLY QUESTIONS</p> <ul style="list-style-type: none"> How do the properties of polymers relate to its structure? What are the benefits and issues of nanotechnologies? 	<p>TRIPLE ONLY QUESTIONS</p> <ul style="list-style-type: none"> Why could this era be described as the polymer age? Why do polymer's properties lead to problems?
<p>The Key Skills/ Techniques</p>	<p>The sophistication and application of skills will become more advanced as students' progress through the critical, core and pinnacle knowledge.</p>		
	<p>Skill/Technique</p>	<p>How will this skill be developed?</p>	
	1. Graphing & Drawing	Draw graphs with suitable scales, axes and units. Correct line of best fit. Appreciation of anomalies and processed data. Scientific drawing of cells, concepts and scientific equipment.	
	2. Variables	Identify independent, dependent and control variables and devise experiments to include these to ensure valid results. Appreciation of uncertainty.	
	3. Data Analysis	Describe, explain and predict trends. Graph and table data interpretation. Identify links and patterns within and between topics. Statistical analysis of data to include mode/median/mean/range determination. Drawing justified conclusions from presented data.	
	4. Application	Apply known and taught theory in unfamiliar contexts. Making links to taught theory and extracting key ideas. Communicating using correct scientific terminology.	
5. Working Scientifically	Identify hazards and planning to limit risk. Describe how to improve accuracy/precision/repeatability/reproducibility/validity. Evaluate reliability of methods and investigations, taking in to account data analysis.		

