

## Year 9

**Atomic Structure**  
Development Of The Atom  
Trends In The Periodic Table

**Metal Ores**  
Reactivity Of Metals  
Metal Displacement  
Extracting Metal  
Electrolysis  
Ceramic, Polymers & Composites  
Recycling

**Rates Of Reaction**  
Collision Theory  
The Effect Of Temperature,  
Concentration, Surface Area &  
Catalysts On The Rate Of  
Reaction

**Energy Reactions**  
Exothermic & Endothermic  
Combustion  
Balancing Equations



Knowledge	Attributes / Character	Skills	Experiences
<p><b>Atomic Structure with Relative Masses/Charges:</b></p> <ul style="list-style-type: none"> <li>Understanding relative atomic mass and isotopes.</li> <li>Knowledge of electronic structure, including electron configuration and valence electrons.</li> <li>Exploring the historical development of the atom and the periodic table, including key scientists and their contributions.</li> </ul> <p><b>Rates of Reaction:</b></p> <ul style="list-style-type: none"> <li>Understanding collision theory and its application to rates of reaction.</li> <li>Factors affecting reaction rates: concentration, temperature, surface area, and catalysts.</li> <li>Applying mathematical formulas to calculate reaction rates, such as using gradient calculations.</li> </ul> <p><b>Metal Ores:</b></p> <ul style="list-style-type: none"> <li>Investigating the reactivity of metals and metal displacement reactions.</li> <li>Understanding extraction methods using carbon reduction and electrolysis.</li> <li>Exploring recycling processes for ceramics, polymers, and composites, and the significance of alloys in materials science.</li> </ul>	<p><b>Confidence</b></p> <p>The Year 9 science curriculum builds confidence by deepening students' understanding of atomic structure, isotopes, and electron configurations. Mastering these advanced concepts, along with the historical development of atomic theory and the periodic table, helps students feel more capable and knowledgeable in science.</p> <p><b>Organisation</b></p> <p>Students enhance their organisational skills by conducting experiments related to reaction rates and metal extraction. They must plan procedures, manage variables like concentration and temperature, and accurately record data. Applying mathematical formulas to calculate reaction rates also requires a structured approach.</p> <p><b>Resilience</b></p> <p>The curriculum fosters resilience as students investigate factors affecting reaction rates and face challenges in experiments involving collision theory and metal displacement reactions. Persisting through these challenges and refining their approaches teaches them to view setbacks as opportunities for growth.</p> <p><b>Empathy</b></p> <p>Collaborative projects on recycling processes and the environmental impact of extracting metals encourage empathy. Group activities help students understand diverse perspectives and the importance of sustainable practices, fostering a sense of responsibility and empathy towards peers and the environment.</p>	<p><b>Analytical Skills:</b> Evaluating complex concepts like atomic structure and reaction rates fosters critical thinking.</p> <p><b>Problem-Solving:</b> Applying theories such as collision theory to real-world scenarios enhances problem-solving abilities.</p> <p><b>Experimentation:</b> Learning through practical experiments encourages resilience in overcoming challenges and interpreting results.</p> <p><b>Research Skills:</b> Investigating metal ores and recycling processes develops inquiry skills and a desire for deeper understanding.</p> <p><b>Environmental Responsibility:</b> Exploring recycling methods promotes awareness of sustainability and ethical considerations in materials science.</p> <p><b>Safety and Risk Management:</b> Understanding the hazards in chemical reactions develops ethical responsibility and safety consciousness.</p> <p><b>Written Expression:</b> Writing reports on reaction rates and metal extraction enhances clarity and precision in scientific communication.</p> <p><b>Oral Presentation:</b> Presenting findings on atomic structures and metal recycling cultivates confidence and effective oral communication skills.</p> <p><b>Teamwork:</b> Collaborating during experiments and projects builds teamwork skills and fosters respect for diverse perspectives.</p>	<ul style="list-style-type: none"> <li>Science club</li> <li>Cadbury World visit</li> <li>British Science Week</li> <li>Design and technology links</li> </ul>