

Science

Year 9: Chemical reactions

Assessment Opportunities	Literacy/Reading opportunities	CEIAG Links
<ul style="list-style-type: none">Regular low stakes quizzing of AO1- self marked.Extended writing is teacher marked with personalised feedback provided.End of unit assessment self & teacher marked with collective feedback provided.	<p>Reciprocal reading: Fire is a chemical reaction</p> <p>Key vocab is highlighted in the SOL</p>	<p>Spotlight on careers: Chemical Engineer</p> <p>Other careers:</p> <ul style="list-style-type: none">PharmacistFood scientistAnalytical chemistEnvironmental scientist

Curriculum vision:

“Our aim is to deliver a curriculum that is inclusive, relevant and progressive for all learners.”

KS3 Chemical reactions

Big Picture:

Learning about chemical reactions provides a foundational understanding of how matter behaves and transforms, empowering individuals to engage critically with scientific concepts and apply them in diverse contexts for innovation and improvement.

Lesson sequence	Learning outcomes / Key knowledge (including NC KS3) SEND scaffold	Skills development: Reading / writing / data / numeracy / graph work	Spec / book reference
1. TBAT: Describe what happens to particles during a chemical reaction	<p>Particles that react together are called reactants Particles that are produced are called products An Arrow is represented in a chemical equation Bonds are broken, atoms rearrange and new bonds are made</p> <ul style="list-style-type: none"> ○ Use visual aids like diagrams and videos. ○ Provide knowledge organisers / key vocab with definitions ○ Use molymods to help visual bonds 	<ul style="list-style-type: none"> • Identify: Reactants and products in an equation • Write: Chemical equations from text 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>
2. TBAT: Identify physical and chemical reactions	<ul style="list-style-type: none"> • Students will be able to write down observations of a chemical reaction • Students will be able to identify chemical and physical reactions • Physical reactions are reversible and no new products are formed • Chemical reactions are irreversible and make new products <ul style="list-style-type: none"> ○ Circus of physical and chemical reactions for students to observe 	<ul style="list-style-type: none"> • Identify: Chemical and physical reactions • Describe: The difference between chemical and physical reactions 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>
3. TBAT: Describe how metals react with oxygen	<ul style="list-style-type: none"> • Students will be able to describe how metals react with oxygen to form metal oxides, recognizing this reaction as an example of oxidation. • Students will predict the general formula of metal oxides formed when specific metals react with oxygen based on their position in the periodic table. • Students will understand and explain trends in the reactivity of metals with oxygen, correlating the ease of oxidation with their position in the reactivity series or periodic table. 	<ul style="list-style-type: none"> • Write: Chemical equations for metals reacting with oxygen • Describe: Observations for metals reacting with oxygen • Compare: The reactivity of the different metals when reacting with oxygen 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>

	<ul style="list-style-type: none"> ○ Burn magnesium, iron and copper for visual aid 		
4. TBAT: Write word equations for metals reacting with water	<ul style="list-style-type: none"> ● Students will be able to write word equations to describe the reaction of metals with water, identifying the metal hydroxide and hydrogen gas as products. ● Students will be able to use chemical symbols to represent metals and their respective hydroxides accurately in the word equations. ● Students will predict the reactivity of metals with water based on their position in the reactivity series or periodic table, and write appropriate word equations that reflect the observed reactions. <ul style="list-style-type: none"> ○ Demo: Group 1 elements with water for visual aid ○ Students to react: magnesium, calcium and copper with water 	<ul style="list-style-type: none"> ● Identify: Reactants and products in equations ● Represent: Chemical elements as symbols in equations ● Predict: The reactivity for metals with water using trends 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63 3</p>
5. TBAT: Write word equations for metals reacting with water	<ul style="list-style-type: none"> ○ Students will be able to identify particle diagrams that represent elements by recognizing single types of atoms grouped together. ○ Students will be able to distinguish particle diagrams that represent compounds by recognizing groups of different types of atoms bonded together. ○ Students will be able to interpret the arrangement of particles in diagrams to determine whether a substance is an element or a compound. <ul style="list-style-type: none"> ○ Demo: Group 1 elements with water for visual aid ○ Students to react: magnesium, calcium and copper with water 	<ul style="list-style-type: none"> ● Describe: What a compound is ● Identify: Elements and compounds from particle diagrams 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>
6. TBAT: Write balanced symbol equations	<ul style="list-style-type: none"> ● Students will demonstrate the ability to balance symbol equations by ensuring that the number of atoms of each element is the same on both sides of the equation. ● Students will use chemical symbols correctly to represent elements and compounds in symbol equations, ensuring accuracy in their representations. ● Students will understand and apply the law of conservation of mass in balancing symbol equations, ensuring that mass is conserved before and after a chemical reaction. <p>□</p>	<ul style="list-style-type: none"> ● Write: Balanced symbol equations ● Identify: Elements and their symbols ● Explain: The conservation of mass law 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63 3</p>

	<ul style="list-style-type: none"> ○ Use Molymods for visual aid ○ Demo: Burning magnesium to show conservation of energy as visual aid 		
7. TBAT: Compare the products of complete and incomplete combustion	<ul style="list-style-type: none"> ○ Students will be able to compare and contrast the products of complete combustion (carbon dioxide and water) with those of incomplete combustion (carbon monoxide, carbon dioxide, water, and potentially soot or carbon particles). ○ Students will understand and explain the environmental implications of complete versus incomplete combustion, including the production of pollutants such as carbon monoxide and particulate matter in incomplete combustion. ○ Use Heat water using blue flame (complete) and orange flame (incomplete) as demo or practical 	<ul style="list-style-type: none"> ● Identify: Reactants and products ● Compare: The products for complete and Incomplete combustion ● Explain: The environmental impact for the products of combustion 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63 3</p>
8. TBAT: Describe a thermal decomposition reaction	<ul style="list-style-type: none"> ○ Students will be able to describe thermal decomposition reactions by identifying the reactants and products involved, recognising that a single compound breaks down into two or more simpler substances when heated. ○ will understand and explain the conditions under which thermal decomposition reactions occur, such as high temperatures or the presence of catalysts, and how these conditions influence the rate and extent of decomposition. ○ Students will apply their understanding of thermal decomposition reactions to specific examples, including common compounds like metal carbonates ○ Demo: Thermal decomposition of copper oxide 	<ul style="list-style-type: none"> ● Identify: Reactants and products ● Write: Chemical equations ● Explain: How they know thermal decomposition is a chemical reaction 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>
9. TBAT: Comparing exothermic and endothermic reactions	<ul style="list-style-type: none"> ● Students will be able to differentiate between exothermic and endothermic reactions by identifying whether heat is released (exothermic) or absorbed (endothermic) during the reaction. ● Students will explain how exothermic reactions result in temperature increases in their surroundings, while endothermic reactions result in temperature decreases. ● Students will apply their understanding of exothermic and endothermic reactions to real-world examples, such as combustion (exothermic) and 	<ul style="list-style-type: none"> ● Identify: Endothermic and exothermic reactions ● Write: How these reactions result in a temperature increase or decrease ● Apply: Real-world examples of each reaction 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>

	<p>photosynthesis (endothermic), and describe the energy changes involved in each process.</p> <ul style="list-style-type: none"> ○ Circus of endothermic and exothermic reactions for students to complete 		
10. TBAT: engage with a scientific article	<ul style="list-style-type: none"> ○ Students will be able to identify and summarize the main objectives and conclusions of a scientific article, demonstrating an understanding of the structure and content typical of scientific papers. ○ Identify any words not understood and write a glossary ○ Use images with dual coding ○ Read with reading rulers with class 	<ul style="list-style-type: none"> • Reciprocal reading • Identify: Unusual words • Summarise: The article in two sentences 	<p>Spec NC pos pg 8 here</p> <p>Boost book 2 pg 63</p>
11. Extend writing skills	<ul style="list-style-type: none"> • Explain the Chemistry behind cooking an egg ○ Key words to use provided ○ Hints provided ○ Watch video for visual aid 	<ul style="list-style-type: none"> • ASTN writing • Identify: Key words in your writing 	
Vocab		Links to previous learning / interleaving	Assessment & homework

<p>L3 Vocab Exothermic Endothermic Catalyst Oxidation Photosynthesis Hydroxide Universal indicator</p>	<p>L2 Vocab Reactant Product Combustion Reaction Rate Thermal Decomposition Equation Chemical Physical</p>	<p>Command words focus Label Plot Measure Predict Identify Estimate Observe Justify Evaluate Compare construct</p>	<p>KS3 atoms, elements and compounds</p> <ul style="list-style-type: none"> ○ Solid, liquids and gases ○ The periodic table ○ Common reactions <p>KS2</p> <ul style="list-style-type: none"> ○ Solid, liquid and gases ○ Metals and non-metals ○ Common elements 	<ul style="list-style-type: none"> • Regular low stakes quizzing of AO1 • In class assessment of AO1, AO2, AO3 using past paper questions where appropriate • Written word is assessed with personalised feedback provided. • End of unit assessment marked with collective feedback provided. <p>Homework is set weekly and is outlined in the half-termly homework booklet. Homework includes</p> <ul style="list-style-type: none"> • online quizzes on Carousel • Learning of content for in-class quizzes • Completion of written questions.
<p>Independent learning</p> <p>BBC Bitesize KS3 – Chemical reactions Chemical reactions - KS3 Chemistry - BBC Bitesize</p> <p>YouTube revision monkey KS3 Chemical reactions: Let Me Show You How - Woman 43sec (youtube.com) Exothermic and endothermic reactions: Exothermic and Endothermic Reactions (youtube.com) Burning fuels: Burning Fuels (youtube.com) Conservation of mass: Conservation of mass (youtube.com) Thermal decomposition: Thermal Decomposition - YouTube</p>				<p>Misconceptions / common errors</p> <ul style="list-style-type: none"> ○ All reactions happen instantly. ○ All chemical reactions involve visible changes, such as colour changes or fizzing. ○ All reactions involve gases or liquids. ○ Chemical reactions only occur when substances are mixed together. ○ Reactions always proceed in one direction and never revert back to reactants. ○ All chemical reactions involve changes in temperature.