

Reactions 2

What's the science story?

This topic follows on from Reactions 1 and Particles in year 7. As well as continuing to model the behaviour of substances using the term 'particle' they develop the idea of atoms and elements, mainly through learning about the Periodic Table. This also provides the context for revisiting learning on chemical reactions during year 7.

Previous knowledge:

Y7 Reactions 1

Pure and impure substances

- the concept of a pure substance
- mixtures, including dissolving
- diffusion in terms of the particle model
- simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
- the identification of pure substances

Chemical reactions

- chemical reactions as the rearrangement of atoms
- representing chemical reactions using formulae and using equations
- defining acids and alkalis in terms of neutralisation reactions
- the pH scale for measuring acidity/alkalinity; and indicators
- reactions of acids with metals to produce a salt plus hydrogen
- reactions of acids with alkalis to produce a salt plus water

y7 Particles

The particulate nature of matter

- the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
- changes of state in terms of the particle model

Energetics

- energy changes on changes of state (qualitative)

Next steps...

Y9 reactions 3

Atoms, elements and compounds

- conservation of mass changes of state and chemical reactions

Chemical reactions

- chemical reactions as the rearrangement of atoms
- representing chemical reactions using formulae and using equations
- combustion, thermal decomposition, oxidation and displacement reactions

Energetics

- exothermic and endothermic chemical reactions (qualitative)

Materials

- the order of metals and carbon in the reactivity series
- the use of carbon in obtaining metals from metal oxides
- properties of ceramics, polymers and composites (qualitative)

missing from ks3 chemistry

- what catalysts do
- the chemical properties of metal and non-metal oxides with respect to acidity



Working scientifically skills:			Assessments:		
WS1	Scientific methods		End of unit test (summative)		
WS2	Draw/Interpret diagrams		Exit tickets x 2/3 (formative)		
WS3	Make predictions		<ul style="list-style-type: none">• 1 – elements• 2 – compounds• 3 – Periodic Table• 4 – compounds and formulae		
Keywords:	Symbol	Compound	Particles	Shiny	Metal
Atom	Name	Property	Formula	Conductor	Non-metal
Element		Mixture	Patterns	Malleable	Physical
Particle diagrams		Molecule		Ductile	Periodic table
Model				Reactivity	Groups
Property				Brittle	Periods
					Melting point
Trends	Hazard		Noble		Reaction
Chemical	Displacement		Unreactive		Oxygen
Physical			Inert		

Lesson No. and Title	Learning objectives	National Curriculum	Practical equipment
1. Atoms	ARE - State what atoms are AGD - Link the behaviour of atoms within substances to explain why elements exhibit certain properties.	Atoms, elements and compounds <ul style="list-style-type: none"> a simple (Dalton) atomic model 	

2. Elements	<p>ARE - State what an element is.</p> <p>AGD - Explain why certain elements have specific uses in terms of their properties</p>	<ul style="list-style-type: none"> • differences between atoms, elements and compounds • the varying physical and chemical properties of different elements 	
3. Compounds	<p>ARE - State what a compound is.</p> <p>AGD - Differentiate elements from compounds when given names and properties.</p>	<ul style="list-style-type: none"> • differences between atoms, elements and compounds <ul style="list-style-type: none"> • the varying physical and chemical properties of different elements 	<p>see activate sheet 5.3.3 PRAC compounds</p>
4. Chemical formulae	<p>ARE - Write the chemical names and formulae for some simple compounds</p> <p>AGD - Differentiate elements from compounds when given names and properties.</p>	<ul style="list-style-type: none"> • chemical symbols and formulae for elements and compounds 	

5. Metals and non-metals	<p>ARE - Use patterns to classify an element as a metal or non-metal</p> <p>AGD - Explain how the position of an element can be used to suggest properties of elements</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements the periodic table: periods and groups; metals and non-metals the properties of metals and non-metals 	<p>powerpoint practical instructions printed off battery, bulb, 2 wires with plug and croc clip torch beaker, kettle hammer dil HCl, 2 x dropping tile, 2 x pipette copper chloride soln</p>
6. Periodic Table	<p>ARE - Compare patterns in properties in the groups and periods of the Periodic Table and use them to make predictions.</p> <p>AGD - Predict the properties of an element, given its position on the Periodic Table</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements the principles underpinning the Mendeleev periodic table the periodic table: periods and groups; metals and non-metals how patterns in reactions can be predicted with reference to the periodic table 	
7. Group 1	<p>ARE - Use patterns to predict properties of Group 1 elements</p> <p>AGD - Describe patterns in the properties of Group 1 elements using data given</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements how patterns in reactions can be predicted with reference to the periodic table 	<p>Demo group 1 metals, trough, scalpel, test tube, gloves, tile, UI solution</p>

8. Group 7	<p>ARE - Use patterns to predict properties of Group 7 elements</p> <p>AGD - Describe patterns in the properties of Group 7 elements using data given</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements how patterns in reactions can be predicted with reference to the periodic table displacement reactions 	<p>Demo displacement of halogens</p> <p>0.1% solutions of chlorine water, bromine water, and iodine water</p> <p>0.1M solutions of potassium chloride, potassium bromide, and potassium iodide</p> <p>test tubes</p>
9. Group 0	<p>ARE - Use patterns to predict properties of Group 0 elements</p> <p>AGD - Describe patterns in the properties of Group 0 elements using data given</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements how patterns in reactions can be predicted with reference to the periodic table 	<p>Demo balloons of H and He</p>
10. Identifying unknown substances	<p>ARE – To represent elements and compounds with particle diagrams.</p> <p>AGD – To compare a range of different substances.</p>	<ul style="list-style-type: none"> the varying physical and chemical properties of different elements how patterns in reactions can be predicted with reference to the periodic table 	

<p>11. Atoms in chemical reactions</p>	<p>ARE - Write word equations to represent chemical reactions</p> <p>AGD - Convert word equations into balanced formula equations</p>	<p>Chemical reactions</p> <ul style="list-style-type: none"> chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations 	<p>2 demos:</p> <p>Whoosh bottle</p> <p>Burning magnesium ribbon (blue glass needed to watch demo)</p>
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