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Year 8 Overview 2024-25 – *Chemistry*

Date	Wk	Week	Units Studied & Learning Outcomes	Key Concepts & Assessment
8 weeks (?? Lessons) (38Days)				
Tues 2-Sep 9-Sep 16-Sep* 23-Sep 30-Sep 7-Oct 14-Oct 21-Oct	A B A B A B A B	1 2 3 4 5 6 7 8	• <u>Overview of Unit/No. lessons</u> The Periodic Table: 9 lessons • <u>Lesson **Sequence** of Content</u>: Lesson 1-Identify atoms, elements, compounds and mixtures Lesson 2- Structure of the atom Lesson 3-Electron configuration Lesson 4-Mendeleev's Periodic Table Lesson 5-Organisation of the Periodic Table Lesson 6 & 7-Groups of the Periodic Table Lesson 8-Quick quiz assessment Lesson 9-Long answer question • <u>Unit Learning Outcomes</u>: • **GW**: Recall definitions of key terms, atom, element, compound and mixture. • **BI:** Describe the arrangement of an atom. • **EW**: Explain the organisation of the Periodic Table and how this links to reactivity of certain groups **Prior** | **Current (Y8)** | **Next** N/A | Understand the arrangement of the periodic table and basic structure of the atom | Year 9 – Atomic structure (charge and mass) Group 1 properties Year 10- Isotope. Ion formation. Patterns in the periodic table. Year 11 – Trends in the period table, groups 1,7,0. Atomic structure and electronic configuration.	**Foundational Concepts:** Atomic structure & the periodic table **Outcomes** • Recall key term definitions for atom, element, compound, molecule and mixture. • Give examples of each of the above. • Know atomic structure in terms of sub-atomic particles and their charges. • Be able to draw electronic configuration for some of the first 20 elements • Describe how the properties of compounds and mixtures differ • Describe Mendeleev's Periodic table and why he left gaps • Know how the Periodic table is organised in terms of groups and periods • State some simple properties/trends of the groups of the periodic table • **Skills used/learned** ○ Analysis skills ○ Interpretation skills ○ Evaluation skills **Tier 2/3 Vocabulary** Referenced on PowerPoint slides, quick quizzes. • **KW:** Atom, element, compound, mixture, nucleus, electron, proton, neutron, groups, periods, alkali metals, halogens, noble gases, reactivity, configuration. **Links to root words-Etymology** ○ Atom- from Greek atomos "uncut, unhewn; indivisible," ○ Compound- late 14c., compounen, "to put together, to mix, to combine; to join, couple

				together," from Old French compondre, componre "arrange, direct," and directly from Latin componere "to put together," **Links to culture** ○ Interesting uses of the elements in everyday life. E.g. Elements in a smartphone- Rare earth metals. ○ Colours of the fireworks. **History** ○ In 1869 Russian chemist Dimitri Mendeleev started the development of the periodic table, arranging chemical elements by atomic mass. He predicted the discovery of other elements, and left spaces open in his periodic table for them. ○ Can discuss the idea of the atom being developed from early ideas of the Greek philosopher Democritus, but this is studied in detail at KS4. **Career ideas**- Patent attorney, computational chemist, crystallographer, nanotechnology, Science communicator, research innovations. • ***Equality Diversity and Inclusion (EDI) links?*** **EDI links:** • Scientists from different nationalities contributed to ideas • Lise Meitner's work in nuclear physics led to the **discovery** of nuclear fission • Maria Goeppert-Mayer, the German-born scientist who formulated the nuclear shell model that finally made it possible to understand how the nucleus of **atoms** works. *Parent and Carers month/Black History month* *3/9 World afro day* *23/9 International day of sign languages* *10/10 world mental health day* *5/10 world teachers day* *6/10 World cerebal palsy day* • **Assessment** (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.)
Half-Term			**7** weeks (?? lessons) (35 Days)	
4-Nov	A	9		• ***Equality Diversity and Inclusion (EDI) links?*** *Mens health awareness month/disability confident month*

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11-Nov	B	ST1		*1/11 Diwali* *12/11 Remembrance Sunday* *13/11-19/11 Transgender awareness week* *14/11 World Diabetes Day* *1/12 World AIDS day* *25/12 Christmas Day*
18-Nov	A	ST1		
25-Nov	B	12		
2-Dec	A	13		
9-Dec	B	14		
16-Dec	A	15		
Christmas Holiday			6 weeks (?? lessons) (30 Days)	
6-Jan	B	16	**<u>Overview of Unit/No. lessons</u>** Reactions of Metals: 11 lessons <u>Lesson **Sequence** of Content</u>: Lesson 1-Properties of Metals Lesson 2-pH of Metal and Non-Metal Oxides Lesson 3-Metals and Water Lesson 4-Metals and Oxygen Lesson 5 & 6-Metals and Acid HSW Lesson 7-Metal Carbonates and Acid Lesson 8-Metal Oxides and Acid Lesson 9-Displacement of Metals Lesson 10-Quick quiz assessment Lesson 11-Long answer question	**Foundational concepts:** Chemical reactions **Outcomes** • State properties of metals and non-metals • Give examples of metals and non-metals and know where they can be found on the periodic table • Know the pH of metal and non-metal oxides • Understand what is produced when a metal reacts with oxygen • Understand what is produced when a metal reacts with water • Understand what is produced when a metal reacts with acids • Understand what is produced when a metal carbonate reacts with acids • Understand what is produced when a metal oxide reacts with acids • Be able to perform safe practical's and record observations for the above 5 reactions • Be able to write word equations to show the reactions of metals as above and identify reactants and products. • Understand how to write formulae • Describe what displacement is • Be able to place metals in order or reactivity through practical observations • Understand uses of ceramics, polymers & composites
13-Jan	A	17		
20-Jan	B	18		
27-Jan	A	19		
3-Feb	B	20		
10-Feb	A	21		

Prior	Current (Y8)	Next
Year 6- Properties of materials	Describe the properties and reactions of Metals/Metal compounds with acids	Year 9 – Displacement and chemical equations of metals and acid reactions. Extracting metals. Year 11 – Reactions of metals (making salts)

- **GW**: State properties of metals and non-metals
- **BI**: Describe reactions of metals/metal compounds with acid
- **EW**: Explain the reactivity of metals in terms of displacement reactions

Assessment

- HSW practical task – students should be able to explain findings using their Science knowledge
- End of unit quiz
- Long answer extension question at the end of the unit
- Application task

- **Skills used/learned**
  - Practical skills
  - Method writing
  - Interpretation skills
  - Evaluation skills
  - Maths Skills

Tier 2/3 Vocabulary

Referenced on PowerPoint slides, quick quizzes.

- **KW**: Metal, salt, malleable, ductile, salt, neutralisation, displacement, reactivity series, acid, hydrochloric, hydrogen, carbon dioxide, water, sonorous, shiny.

Links to root words-Etymology

- Displacement-From Old French 'desplacer' meaning "remove to a different place, put out of the usual place".
- Carbonate- by influence of French carbonater "transform into a carbonate." Meaning "to impregnate with carbonic acid gas
- Acid-directly from Latin acidus "sour, sharp, tart"

Links to culture

- Graphite and diamonds are both types of carbon but diamond is much more expensive due to its atomic structure.
- Discuss uses of metal carbonates in everyday life- raw materials in different industrial processes such as drug development, glass making, pulp and paper industry, soap and detergent production, clay and concrete production, limestone statues.
- Discuss displacement as a method of extraction metals from their ores- links to KS4.

History

- Late in the 18th century the interrelated work of English chemist Joseph Priestley and French chemist Antoine-Laurent Lavoisier led to the overthrow of the phlogiston theory. Lavoisier saw Priestley's discovery of oxygen

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				in 1774 as the key to the weight gains known to accompany the burning of sulfur and phosphorus and the metal oxide formation. In his Traité élémentaire de chimie, he clearly established that combustion consists of a chemical combination between oxygen from the atmosphere and combustible matter • **Career ideas-** Builder, materials scientist, chemical engineer, process manufacturer • ***Equality Diversity and Inclusion (EDI) links?*** **EDI links:** • Where resources are most abundant in the world *LGBT+ History month* *27/1 Holocaust memorial day* *1/2 World Hijab Day* *6/2-12/2 Children's mental health week.* *7/2 Safer internet day* *10/2 Chinese New Year*
Half-Term			6 weeks (?? lessons) (29 Days)	
25-Feb	B	22	INSET 24th Feb	• ***Equality Diversity and Inclusion (EDI) links?*** *Women's history month* *Ramadhan begins 1/3* *21/3 World Down Syndrome day* *31/3 Transgender day of visibility*
3-Mar	A	23		
10-Mar	B	24		
17-Mar	A	25		
24-Mar	B	ST2		
31-Mar	A	ST2		
Easter Holiday			5 weeks (?? lessons) (23 Days)	
22-Apr	B	28	**<u>Overview of Unit/No. lessons</u>** Types of Reactions: 10 lessons <u>Lesson **Sequence** of Content</u>: Lesson 1-Difference between a chemical and a physical change Lesson 2-Chemical Reactions Lesson 3-Complete and Incomplete Combustion Lesson 4-Fire Triangle Lesson 5-Thermal Decomposition Lesson 6 & 7-Conservation of Mass HSW	**Foundational concepts:** Chemical reactions **Outcomes** • Recognise types of reactions • Distinguish between chemical and physical changes • State what is needed for burning (combustion) • Know the types of combustion • Understand what the products of burning are and how to test for them. • Define the term fuel. • Describe the characteristics that occur during a combustion reaction. • Know the 3 sides of the fire triangle. • Be able to describe how to put out a fire depending upon the cause.
28-Apr	A	29		
5-May	B	30		
12-May	A	31		
19-May	B	32		

Lesson 8-Exothermic and Endothermic Reactions

Lesson 9-Quick quiz assessment

Lesson 10-Long answer question

Prior	Current (Y8)	Next
N/A	Be able to describe different types of chemical and physical reactions. Know the law of conservation of mass.	Year 9 – Combustion. Year 10- Reversible reactions. Exothermic and endothermic reactions with interpretation of reaction profiles.

- **GW**: State the difference between chemical and physical changes
- **BI:** Describe the reactants and products of combustion reactions
- **EW:** Represent exothermic and endothermic reactions as energy level diagrams

Assessment

- HSW practical task – students should be able to explain findings using their Science knowledge
- End of unit quiz
- Long answer extension question at the end of the unit
- Application task

Easter Monday 21st
Early May bank hol 6/5

- Be able to write combustion equations.
- Describe thermal decomposition
- Be able to explain the law of conservation of mass
- Describe exothermic and endothermic reactions
- Represent these reactions as energy level diagrams
- Know what a catalyst is and its effect on activation energy

Skills used/learned

- Creativity and Imagination skills
- Interpretation skills
- Evaluation skills
- Practical skills
- Observational skill

Tier 2/3 Vocabulary

Referenced on PowerPoint slides, quick quizzes.

- **KW**: Thermal decomposition, exothermic, endothermic, combustion, carbon monoxide, carbon dioxide, conservation of mass, heat, fuel, oxygen, chemical, physical, reversible, irreversible.

Links to root words- Etymology

- Exo comes from the Greek exō ‘outside’.
- Endo comes from Greek endon ‘within’.
- Conservation-from Latin conservationem (nominative conservatio) "a keeping, preserving, conserving," noun of action from past-participle stem of conservare "to keep, preserve, keep intact, guard,"

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				History • The Law of Conservation of Mass dates from Antoine Lavoisier's 1789 discovery that mass is neither created nor destroyed in chemical reactions. • Link the fire triangle to uses of fire extinguishers and how different fires need different ways of being put out. • On August 1, 1774, Joseph Priestly conducted his most famous experiment. Using a 12-inch-wide glass "burning lens," he focused sunlight on a lump of reddish mercuric oxide in an inverted glass container placed in a pool of mercury. The gas emitted, he found, was "five or six times as good as common air." He had used a thermal decomposition reaction to produce oxygen. **Links to culture** • Exothermic and endothermic reactions in every day life- Heat/cool packs. • Chemical changes in everyday life- baking a cake, cooking an egg. • Physical changes in everyday life- melting ice, condensation on windows. **Career ideas-** Chemical plant process operator, laboratory technician, development chemist, heating engineer, health and safety inspector. • ***Equality Diversity and Inclusion (EDI) links?*** **EDI links:** • Marcellin Berthelot French Scientist determined what an exothermic and endothermic reaction were *Good Friday 18/4* *Easter Sunday 20/4* *Autism and stress awareness month.* *25/4 World Malaria Day* *26/4 Lesbian visibility day* *UK national walking month.* *1/5-7/5 Deaf awareness week* *23/05 Vesak*
Half-Term	7 weeks (?? lessons) (34 Days)			

2-Jun	A	33	SJBF INSET 4/7	• ***Equality Diversity and Inclusion (EDI) links?*** *LGBTQ+ pride month.* *Gypsy, Roma and Traveller history month.* *12/6 world day against child labour* *18/6 autistic pride day* *20/6 World refugee day*
9-Jun	B	34		
16-Jun	A	35		
23-Jun	B	36		
30-Jun	A	37		
7-Jul	B	38		
14-Jul	A	39		
(Total: 189 Days)				

Overview of Year 8	
Based on your Flight Path	**By the end of Year 8, students will have learned**
GW:	• Recall key term definitions for atom, element, compound, molecule and mixtures and know examples • Know atomic structure in terms of sub-atomic particles and their charges. • Be able to draw electronic configuration for some of the first 20 elements • Know how the Periodic table is organised in terms of groups and periods • State some simple properties/trends of the groups of the periodic table • State properties of metals and non-metals • Give examples of metals and non-metals and know where they can be found on the periodic table • Know the pH of metal and non-metal oxides • Recognise types of reactions • State what is needed for burning (combustion) • Know the types of combustion • Define the term fuel. • Know the 3 sides of the fire triangle.
BI:	• Describe how the properties of compounds and mixtures differ • Describe Mendeleev's Periodic table and why he left gaps • Understand what is produced when a metal reacts with oxygen • Understand what is produced when a metal reacts with water • Understand what is produced when a metal reacts with acids • Understand what is produced when a metal carbonate reacts with acids • Understand what is produced when a metal oxide reacts with acids • Describe what displacement is • Distinguish between chemical and physical changes • Understand what the products of burning are and how to test for them. • Describe the characteristics that occur during a combustion reaction. • Be able to describe how to put out a fire depending upon the cause. • Describe thermal decomposition • Describe exothermic and endothermic reactions
EW:	• Be able to perform safe practical's and record observations for metal reactions • Be able to write word equations to show the reactions of metals as above and identify reactants and products. • Understand how to write formulae • Be able to place metals in order or reactivity through practical observations • Understand uses of ceramics, polymers & composites • Be able to describe how to put out a fire depending upon the cause. • Be able to write combustion equations. • Be able to explain the law of conservation of mass • Represent exothermic and endothermic reactions as energy level diagrams • Explain what a catalyst is and its effect on activation energy

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Prompt Questions

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Please revisit the prompts from last year:

- What are the Key concepts for this unit?
- How will it link to wider disciplinary knowledge/cultural capital: history, culture, authentic artefacts, music, art, literature?
- How does it build on prior knowledge and link to other units, concepts, years, GCSE?
- What is it intended students will have learned?
  - For each Unit? By the end of the Year?
    - GW: ; BI: ; EW
- Is it worth summarising in a knowledge organiser?
- **Assessment: how do you know they have learned the foundational concepts, curriculum and wider disciplinary knowledge? Does assessment look like GCSE light? Should it?**
- Skills used/learned
- Tier 2/3 vocabulary ((Etymology e.g. of Greek/Latin)