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Year 9 Overview 2025-26 – *Chemistry*

Date	Wk	Week	Units Studied & Learning Outcomes	Key Concepts & Assessment
8 weeks (8 Lessons) (38Days)				
Tues 2-Sep Tues Y7 only Wednesday-whole school	A	1	Overview of Unit/No. lessons Separation techniques & Atomic structure (8 lessons) Lesson **Sequence** of Content: **1 & 2**. Atoms, elements, compounds & mixtures (2 lessons) **3 & 4**. Separating mixtures (2 lessons) **5 & 6.** Required Practical – Chromatography (2 lessons) **7.** Structure of the atom (1 lesson) **8**. Electron configuration (1 lesson) • **GW:** recall what an atom, element, compound & mixture are and recall different separation techniques • **BI:** describe what an atom, element, compound & mixture are and describe different separation techniques • **EW:** explain the difference between atoms, elements, compounds and mixtures and evaluate different separation techniques **Prior**: Year 7 – Separation techniques; Year 8 – atoms, elements, compounds & mixtures; Year 8 – structure of the atom **Current**: Understand separation techniques; Understand chromatography; Understand the structure of the atom **Next**: Year 10 – Purity; Year 10 – atomic structure, configuration, isotopes & ions • Recall of knowledge, application of knowledge, identify patterns from observations, interpret data about Rf values **Assessment:** • Quick quiz • Practical application skills • Exam style questions • Molecular models Q&A **Common misconceptions** Difference between a mixture and a compound Concept of dissolving Solubility	**Foundational concepts:** Substances, structures & properties and Atomic structure & the periodic table and quantitative **Outcomes:** • Understand what an atom, element, compound & mixture are • Understand how to separate different mixtures • Investigate how chromatography can be used to separate a mixture & calculate Rf value • Understand the structure of the atom • Understand patterns in electron configuration **Tier 2/3 Vocabulary** • Glossaries, quick quizzes, within exam questions, PowerPoints. **KW:** Atom, element, compound, mixture, molecule, nucleus, proton, neutron, electron, evaporation, condensation, filtration, crystallisation, distillation, chromatography, soluble, insoluble, solvent, solution **Links to root words (etymology):** • Chromatography "a treatise on colours," 1731, from chromato-, Latinized combining form of Greek khrōma "color", denoting "colour" or "chromatin" + **-graphy**. • Atom - late 15c., as a hypothetical indivisible extremely minute body, the building block of the universe, from Latin *atomus* "indivisible particle," from Greek *atomos* "uncut; indivisible" • **History**: 400 B.C. Democritus' atomic theory posited that all matter is made up small indestructible units he called atoms. • To write with colors -- literally translated from its Greek roots chroma and graphein , chromatography was first developed by the Russian botanist Mikhail Tswett in 1903 as he produced a colorful separation of plant pigments through a column of calcium carbonate. **Career links** – CSI investigator use separation techniques to test samples collected from crime scenes ***Equality Diversity and Inclusion (EDI) links?*** • Maria Goeppert-Mayer won a Nobel Prize for formulating the nuclear shell model which made it possible to understand how the nucleus of an atom works • Albert Einstein – refugee developed ideas about the structure of the atom • Scientists from different nationalities • **Assessment** (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 20th Oct
15-Sep (INSET Friday)	A	3		
22-Sep	B	4		
29-Sep	A	5		
6-Oct	B	6		
13-Oct	A	7		
20-Oct	B	8		

Half-Term			**7** weeks (7 lessons) (35 Days)	
3-Nov	A	9	**<u>Overview of Unit/No. lessons</u>** Organic Chemistry (7 lessons) **<u>Lesson Sequence of Content</u>:** **1**. Electron configuration (1 lesson) **2**. Organic Chemistry – crude oil (1 lesson) **3**. Fractional distillation of crude oil (1 lesson) **4**. Fractional distillation – properties of fractions (1 lesson) **5 & 6**. Atmospheric pollutants – how they are produced and their environmental impact (2 lessons) **7**. Cracking (1 lesson) • **GW**: recall what crude oil is and how it is separated, recall main atmospheric pollutants and state the main gases present in the early atmosphere and todays atmosphere • **BI:** describe describe the process of fractional distillation, describe the environmental impact of each pollutant and describe how the proportion of gases changed over time • **EW**: explain the process of fractional distillation, explain how different pollutants are formed and explain how the proportion of gases changed over time • Recall of knowledge, application of knowledge, identify patterns from observations, interpret data, present word & chemical equations, name compounds, use models to represent compounds, practical skills, evaluate information **Assessment:** • Quick quiz • Practical application skills • Exam style questions	**Foundational concepts:** Earths resources **Outcomes:** • Understand patterns in electron configuration • Explain what crude oil is • Explain the process of fractional distillation • Recall properties of different fractions • Recall the products of burning • Identify the common atmosphere pollutants & explain the environmental impact of each • Alkenes and how to test for them • Understand what cracking is and why it is carried out. **Tier 2/3 Vocabulary** • Glossaries, quick quizzes, within exam questions, PowerPoints, word match activities **KW:** hydrocarbon, saturated, alkane, mixture, compound, fractional distillation, evaporation, condensation, vapour, viscous, volatile, flammable, carbon dioxide, carbon monoxide, sulfur dioxide, nitrogen oxides, particulates, combustion, cracking, thermal decomposition, catalyst, bromine water, alkane, alkene **Links to root words (etymology):** • Hydrocarbon - compound of hydrogen and carbon • Pollute - late 14c., "to defile," a back formation from pollution, or else from Latin pollutus, past participle of polluere "to defile, pollute, contaminate." **Career links** • Conservation Scientist, Environmental Science and Protection Technician, Environmental Engineer, Environmental Lawyer **History:** • The first thermal cracking process for breaking up large hydrocarbons into gasoline came into use in 1913; it was invented by William Merriam Burton, a chemist who worked for the Standard Oil Company (Indiana), which later became the Amoco Corporation. • Fractional distillation and vacuum distillation were invented near the end of the 18th century. The first columns invented for fractional distillation were simple open tubes and it wasn't until the period 1900-1930 that vast improvements were made. **EDI:** Scientists from different nationalities **Assessment** (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 15th Dec
10-Nov	B	10		
17-Nov	A	11		
24-Nov	B	12		
1-Dec	A	13		
8-Dec	B	14		
15-Dec	A	15		

Prior	Current	Next
Year 8 – combustion	Understand what crude oil is & how it is separated Recall atmospheric pollutants, how they form and the environmental impact Recall the process of cracking	Year 11 – organic Chemistry (S) Year 11 – reactions of alkenes (S)

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<table>
<tr><td></td><td></td><td></td><td>

- Model kits
- Q&A

Common misconceptions
Concept of distillation
Boiling and condensation take place at the boiling point
Hydrocarbons are compounds but crude oil is a mixture

</td><td></td></tr>
<tr><td colspan="2">Christmas Holiday</td><td colspan="2">6 weeks (6 lessons) (30 Days)</td><td></td></tr>
<tr><td>5-Jan</td><td>B</td><td>16</td><td rowspan="6">

<u>Overview of Unit/No. lessons</u>
Reactions of metals (3 lessons)

<u>Lesson Sequence of Content</u>:
1. Revision (1 lesson)
2 & 3. Exam & feedback (2 lessons)
4. Conservation of mass during a chemical reaction (1 lesson)
5. Group 1 – Alkali metals (1 lesson)
6. Metals & acids (1 lesson)

- **GW**: recall what happens to mass in a chemical reaction, recall properties of group 1 metals and recall reactions of metals
- **BI**: describe why mass is conserved in a chemical reaction, describe chemical properties of group 1 metals and identify products of reactions of metals
- **EW**: explain conservation of mass in terms of atoms, explain properties of group 1 metals, explain reactions of metals

<table>
<tr><th>Prior</th><th>Current</th><th>Next</th></tr>
<tr><td>Year 8 – displacement & conservation of mass

Year 8 – structure of the atom

Year 8 – reactions of metals</td><td>Recall properties of elements

Understand reactions of metals</td><td>Year 10 – groups of the Periodic table

Year 10 – atomic structure, configuration, isotopes & ions

Year 11 – reactions of metals & making soluble salts</td></tr>
</table>

Recall of knowledge, application of knowledge, identify patterns from observations, interpret data, present word & chemical equations for reactions

Assessment:
- Quick quiz
- Exam style questions
- Q&A

Common misconceptions

</td><td rowspan="6">

Foundational concepts:
Atomic structure & the Periodic table

Outcomes:
- Understand that mass is conserved in a chemical reaction
- Recall properties of group 1 metals
- Understand how to test for hydrogen gas
- Recall products of a reaction between a metal and acid and write equations to represent these reactions

Tier 2/3 Vocabulary
- Glossaries, quick quizzes, within exam questions, PowerPoints, word match activities

KW: Atom, nucleus, proton, neutron, electron, mass, alkali metals, hydrogen, hydroxide

History:
- Niels Bohr (1923) incorporated Langmuir's model that the periodicity in the properties of the elements might be explained by the electronic structure of the atom.
- The British chemist and meteorologist John Daniell, invented one of the very first practical batteries in 1836. In his cell, Daniell utilized a very common single replacement reaction.

Career links
- Extraction Metallurgist, construction & engineering

EDI:
Scientists from different nationalities

Assessment (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 9th Feb

</td></tr>
<tr><td>12-Jan</td><td>A</td><td>ST1</td></tr>
<tr><td>19-Jan</td><td>B</td><td>ST1</td></tr>
<tr><td>26-Jan</td><td>A</td><td>19</td></tr>
<tr><td>2-Feb</td><td>B</td><td>20</td></tr>
<tr><td>9-Feb</td><td>A</td><td>21</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>Balancing equations
Naming salts</td><td></td></tr>
<tr><td colspan="2">Half-Term</td><td colspan="3">6 weeks (6 lessons) (28 Days)</td></tr>
<tr><td>23-Feb
2-Mar
9-Mar
16-Mar
23-Mar
30-Mar (finish Wednesday 1st April)</td><td>B
A
B
A
B
A</td><td>22
23
24
25
26
27</td><td><u>Overview of Unit/No. lessons</u>
Extracting Metals (5 lessons)

<u>Lesson Sequence of Content</u>:
1. Displacement (1 lesson)
2. Mining (1 lesson)
3 & 4.. Extraction of metals – copper from malachite (smelting) (2 lessons)
5.. Extraction of metals – scrap iron and electrolysis of solutions (H) (1 lesson)
6. Extraction of metals from low-grade ores (phytomining & bioleaching) (H) (1 lesson)

• GW: recall steps in extraction of copper from its ore
• BI: describe the steps in extraction of copper from its ore
• EW: explain different methods of extracting copper and represent these using chemical equations

<table><tr><th>Prior</th><th>Current</th><th>Next</th></tr><tr><td>Year 7 & 9 – separation techniques

Year 8 & 9 – reactions of metals</td><td>Understand the process of extracting copper from its ore</td><td>Year 10 – metallic bonding

Year 11 – reactions of metals & electrolysis</td></tr></table>• Recall of knowledge, application of knowledge, identify patterns from observations, interpret data, present word & chemical equations, name compounds, use models to represent compounds, practical skills

Assessment:
• Quick quiz
• Practical application skills
• Exam style questions

Common misconceptions
Ores are finite resources
Environmental impacts of disposing scrap metal</td><td>Foundational concepts:
Earths resources

Outcomes:
• Understand advantages & disadvantages of mining
• Understand how copper is extracted from malachite
• Explain extraction in terms of reactivity
• Explain how copper is extracted using scrap iron and electrolysis of solutions
• Understand how copper is extracted form low grade ores

Tier 2/3 Vocabulary
• Glossaries, quick quizzes, within exam questions, PowerPoints, word match activities

KW: ore, reduction, oxidation, displacement, thermal decomposition, electrolysis, solution

Links to root words (etymology):
• Electrolysis - 1834; the name was introduced by Faraday, from electro- + Greek lysis "a loosening," from lyein "to loosen, set free"
• Hydrocarbon - compound of hydrogen and carbon

History:
• The modern oil industry can trace its origins to Baku in 1837, where the first commercial oil refinery was established to distil oil into paraffin (used as lamp and heating oil). This was followed by the first modern oil well in 1846, which reached a depth of 21 metres.
• Smelting. ... The Egyptians and Sumerians smelted gold and silver from ore 6,000 years ago. As a result, these metals began to have a value that was transferable between people and between cultures. Approximately 5,500 years ago in this history of mining, came the discovery of tin.

• Career links – Energy engineer, Geoscientist, Engineering geologist, Hydrographic surveyor, Mining engineer.

EDI:
• Resources available in different countries
• Impact of mining in countries such as Brazil

Scientists from different nationalities</td></tr>
</table>

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<table>
<tr><td colspan="3"></td><td></td><td>Assessment (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 30th March</td></tr>
<tr><td colspan="2">Easter Holiday</td><td colspan="3">5 weeks (5 lessons) (24 Days)</td></tr>
<tr><td>20-Apr</td><td>B</td><td>28</td><td rowspan="6"><u>Overview of Unit/No. lessons</u>
Earth's Atmosphere (3 lessons)

<u>Lesson Sequence of Content</u>:
1. Earth's early atmosphere (1 lesson)
2. Todays Atmosphere (1 lesson)
3. Carbon Footprint (1 lesson)
4 & 5. Revision (2 lessons)

• GW: state the main gases present in the early atmosphere and todays atmosphere
• BI: describe how the proportion of gases changed over time
• EW: explain how the proportion of gases changed over time

<table><tr><th>Prior</th><th>Current</th><th>Next</th></tr><tr><td>Year 8 – combus tion</td><td>Understand how the Earth's atmosphere has evolved over time</td><td>N/A</td></tr></table>
• Recall of knowledge, application of knowledge, identify patterns from observations, interpret data, present word & chemical equations, name compounds, evaluate information

Assessment:
• Quick quiz
• Practical application skills
• Exam style questions

Common misconceptions

• Oxygen is the most predominant gas in the atmosphere
• There is a high percentage of carbon dioxide in the atmosphere</td><td rowspan="6">Foundational concepts:
Earth's atmosphere

Outcomes:
• Explain what phytomining and bioleaching are
• Understand that evidence about the atmosphere is limited because of the timescale involved.
• Describe the theory that it evolved from volcanic activity.
• Interpret evidence and evaluate different theories about the early atmosphere.
• Understand how the proportion of different gases changed through time

Tier 2/3 Vocabulary
• Glossaries, quick quizzes, within exam questions, PowerPoints, word match activities

KW:
• volcanoes, respiration, photosynthesis, combustion, condensed, locked-up, fossil fuels, dissolved

Links to root words (etymology):
• Photosynthesis - 898, loan-translation of German Photosynthese, from photo- "light" (see photo-) + synthese "synthesis" (see synthesis).

Career links
• Conservation Scientist, Environmental Science and Protection Technician, Environmental Engineer, Environmental Lawyer

History:
• vante Arrhenius (1859-1927) was a Swedish scientist that was the first to claim in 1896 that fossil fuel combustion may eventually result in enhanced global warming. ... This is called the natural greenhouse effect.

EDI:
Scientists from different nationalities

Assessment (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 18th May</td></tr>
<tr><td>27-Apr</td><td>A</td><td>29</td></tr>
<tr><td>4-May
(Bank holiday Mon)</td><td>B</td><td>30</td></tr>
<tr><td>11-May</td><td>A</td><td>31</td></tr>
<tr><td>18-May</td><td>B</td><td>32</td></tr>
<tr><td colspan="2">Half-Term</td><td colspan="3">7 weeks (7 lessons) (35 Days)</td></tr>
<tr><td>1-Jun</td><td>A</td><td>33</td><td rowspan="6"><u>Overview of Unit/No. lessons</u>
Environmental Science (5 lessons)

<u>Lesson Sequence of Content</u>:
1 & 2 – Exam & Feedback (2 lessons)
3. Sustainability (1 lesson)
4. LCA (1 lesson)</td><td rowspan="6">Foundational concepts:
Earth's resources & Chemical Reactions

Outcomes:
• Describe the greenhouse effect in terms of the interaction of long wavelength and short wavelength radiation</td></tr>
<tr><td>9-Jun</td><td>B</td><td>ST2</td></tr>
<tr><td>16-Jun</td><td>A</td><td>ST2</td></tr>
<tr><td>23-Jun</td><td>B</td><td>36</td></tr>
<tr><td>30-Jun</td><td>A</td><td>37</td></tr>
<tr><td>7-Jul</td><td>B</td><td>38</td></tr>
</table>

<table>
<tr>
<td>14-Jul</td>
<td>A</td>
<td>39</td>
<td>
5 & 6. Environmental impacts of global climate change (2 lessons)
7. Testing for gases (1 lesson)

GW: state which gases contribute to the greenhouse effect, state what sustainability is, state what a carbon footprint, state the 4 main gases
BI: describe how the main greenhouse gases are produced, describe factors that contribute to our carbon footprint, describe ways of being sustainable, describe the tests for the 4 main gases
EW: explain the greenhouse effect in terms of short wavelength and long wavelength radiation, explain limitations of reducing the carbon footprint, explain the importance of sustainability, explain the test and positive result for each of the 4 gases

<table>
<tr><th>Prior</th><th>Current</th><th>Next</th></tr>
<tr><td>Year 8 – combustion & reactions of metals

Year 8 – combustion</td><td>Understand the Greenhouse effect and its impact on global climate change

Understand what a life cycle assessment is

Understand what a carbon footprint is

Understand what sustainability is

Understand how to test for gases</td><td>Year 11 – reactions of metals

Year 11 – testing ions</td></tr>
</table>

Recall of knowledge, application of knowledge, identify patterns from observations, interpret data, name compounds, evaluate information, use models to describe phenomena

Common misconceptions

Students confuse the tests for gases and the positive results of those tests. E.g. the squeaky pop test

The concept of peer review and why some data is more reliable than others

Misinformation about the human impact of global warming
</td>
<td>

Identify some impacts of global warming and climate change
Explain what we can do to reduce the impact
Understand what a carbon footprint is
Describe ways of reducing their carbon footprint.
Explain limitations of reducing the carbon footprint
Define sustainability
Explain what finite resources are.
Explain renewable resources
Understand what a carbon footprint is
Describe ways of reducing their carbon footprint.
Explain limitations of reducing the carbon footprint
Define sustainability
Explain what finite resources are.
Explain renewable resources
Identify some impacts of global warming and climate change
Explain what we can do to reduce the impact
Identify the four common gases using these tests
Explain the importance of chemistry in improving agriculture and industry in a sustainable way

Tier 2/3 Vocabulary

Glossaries, quick quizzes, within exam questions, PowerPoints, word match activities

KW:

radiation, emits, sustainability, renewable, finite, synthetic, carbon dioxide, oxygen, chlorine, hydrogen, sustainability, renewable, finite, synthetic

Links to root words (etymology):

finite - from Latin finitum, past participle of finire "to limit, set bounds; come to an end"

Career links

Conservation Scientist, Environmental Science and Protection Technician, Environmental Engineer, Environmental Lawyer

History:

vante Arrhenius (1859-1927) was a Swedish scientist that was the first to claim in 1896 that fossil fuel combustion may eventually result in enhanced global warming. ... This is called the natural greenhouse effect.

EDI:

Scientists from different nationalities
Greta Thunburg – young climate change activist

Assessment (Quiz/Tests/application tasks/ ST: Including foundational concepts, wider disciplinary knowledge, key content.) 7th July
</td>
</tr>
<tr><td colspan="5">(Total: 190 Days)</td></tr>
</table>

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Prompt Questions

Now that the revised curriculum has been taught, please consider the Implementation and Impact of the curriculum you taught. What changes might need to be made to the Curriculum Intent (See Curriculum Map and Overviews) in light of this year's experiences?

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)
- How will you assess students understanding?
- How will written feedback be given?
- How can lessons be adapted?

Overview of Year 9	
Based on your Flight Path	**By the end of Year 9, students will have learned**
GW:	• Recall definitions for key terms – atom, element, compound & mixture • Recall different separation techniques • Recall some parts of an atom • Recall some reactive and unreactive metals • Recall advantages & disadvantages of mining • Recall how crude oil is separated & what cracking is • Recall some environmental pollutants • Recall definitions for carbon footprint, sustainability & life cycle assessment • Recall 4 main gases that we test for
BI:	• Describe what an atom, element, compound & mixture are • Describe different separation techniques • Identify parts of an atom • Describe reactions of different metals • Describe how metals are extracted • Describe the process of fractional distillation and cracking • Identify the main environmental pollutants and how they are produced • Describe factors that contribute to our carbon footprint, describe ways that we can be sustainable and describe the different stages in a LCA • Describe the tests for the 4 main gases
EW:	• Explain the difference between an atom, element, compound & mixture and be able to identify examples of each • Explain why different separation techniques are used for different mixtures • Label a diagram of an atom, recalling charge and mass of sub-atomic particles • Make predictions about reactions of different metals • Explain the different methods of metal extraction, represent these using chemical equations • Explain the process of fractional distillation and cracking • Explain the environmental problems linked to the different pollutants • Explain limitations to reducing our carbon footprint, explain the importance of sustainability and evaluate the impact of a product on the environment by carrying out a LCA • Explain the test and positive result for all 4 gases