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| **Year 9 Curriculum Map : Chemistry** |
|  | **Autumn** | **Spring** | **Summer** |
| **Assessment Objectives** | **AO1** - Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures (40%)**AO2** - Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. (40%)**AO3** - Analyse information and ideas to: interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures. (20%) |
| **Unit Length** | **Topic:** C7 Atoms, elements and compounds – 17 lessons | **Topic:** C8 – Chemical energy – 14 lessons | **Topic:** C9 – Sustainable development – 14 lessons |
| **Key Learning Outcomes** | 1. How are bonding and structure related to properties of substances?
2. What are the three types of chemical bonds?
3. How are ionic bonds formed?
4. What is the structure of ionic compounds?
5. How are covalent bonds formed?
6. What is the structure of covalent compounds?
7. How are metallic bonds formed?
8. *Progress assessment*
9. *Reteach and DIRT*
10. How can we test for common gases?
11. What are formulations?
12. What is chromatography?
13. *End of unit assessment*
14. *Reteach and DIRT*
 | 1. How does a reaction occur?
2. What are endo and exothermic reactions?
3. How can we observe whether a reaction is endo or exothermic?
4. What is needed for a reaction to occur?
5. *Progress assessment*
6. *Reteach and DIRT*
7. How can the rate of reaction be changed?
8. How can we measure the change in a reaction rate?
9. *End of unit assessment*
10. *Reteach and DIRT*
 | 1. How do we use Earth’s resources?
2. What is sustainability?
3. What is potable water?
4. What are ceramics and composites and how do we use them?
5. What are polymers and how do we use them?
6. How are plastics affecting our oceans?
7. *Progress assessment*
8. *Reteach and DIRT*
9. How are metals extracted from the Earth?
10. How is electrolysis used to extract metals from their ores?
11. What is a carbon footprint and how can we reduce it?
12. What are life cycle assessments?
13. *End of unit assessment*
14. *Reteach and DIRT*
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| **Prior knowledge** | **Year 4:*** Compare and group materials together, according to whether they are solids, liquids or gases
* Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)

**Year 7:*** 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
* The concept of a pure substance
* Simple techniques for separating mixtures
* The identification of pure substances
* The varying physical and chemical properties of different elements
* Changes with temperature in motion and spacing of particles
* Internal energy stored in materials

**Year 8:*** The varying physical and chemical properties of different elements
* The properties of metals and non-metals
 | **Year 6:*** Beginning to understand the difference between reversible and irreversible change.

 **Year 7**:* The difference between chemical and physical changes
* Differences between atoms, elements and compounds
* Chemical symbols and formulae for elements and compounds
* Conservation of mass chemical reactions
* Word equations

 **Year 8**: * Chemical symbols and formulae for elements and compounds
* Chemical reactions as the rearrangement of atoms
* Representing chemical reactions using formulae and using equations
* Combustion, thermal decomposition, oxidation and displacement reactions
* 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
* What catalysts do
 | **Year 1:** * Describe the simple physical properties of a variety of everyday materials.
* Compare and group together a variety of everyday materials on the basis of their simple physical properties.

 **Year 2:** * Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

 **Year 4:** * Recognise that environments can change and that this can sometimes pose dangers to living things.

 **Year 7:** * Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.
* How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
* Earth as a source of limited resources and the efficacy of recycling.
* The production of carbon dioxide by human activity and the impact on climate.

 **Year 8:** * The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.
* How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
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| **CEIAG** **Specific careers links** | Research scientistChemical engineeringForensic scientistFormulations chemistToxicologistPharmaceutical chemist | Laboratory technicianKinetics scientist Analytical chemistResearch scientistEngineer | Environmental scientistConservationistPlumberMaterials scientistsWater quality technicianPolymer chemistEngineerGeochemist |
| **RRSA** | Article 14: Freedom of thought, belief and religionArticle 24: Health and the Health servicesArticle 28: Right to educationArticle 29: Goals of educationArticle 27: Adequate standard of living | Article 14: Freedom of thought, belief and religionArticle 24: Health and the Health servicesArticle 28: Right to educationArticle 29: Goals of educationArticle 27: Adequate standard of living | Article 14: Freedom of thought, belief and religion Article 24: Health and the Health servicesArticle 28: Right to educationArticle 29: Goals of educationArticle 27: Adequate standard of living  |
| **Cross curricular links** | DT – Properties of materialsMaths – Calculating Rf values, comparing boiling points and melting pointsPhysics – Particle model of matter | Biology – CatalystsMaths – Rate equation and calculating gradient | Biology – Biodiversity, ecosystemsGeography – Sustainability, carbon footprint DT – Properties of materials, polymers and composites, life cycle assessmentsPhysics – Energy resources  |
| **Useful websites/videos** | Most expensive metals:<https://www.youtube.com/watch?v=VBGYQ51my5c&t=18s>Hindenburg crash:<https://www.youtube.com/watch?v=CgWHbpMVQ1U>Nylon in WW2:<https://www.youtube.com/watch?v=lnUUNjYKm6w>Eco-diamonds:<https://www.youtube.com/watch?v=eQY_STUJCvg> | Coolest chemical reactions:<https://www.youtube.com/results?search_query=coolest+chemical+reactions>Vinegar and bicarb rocket launch:<https://www.youtube.com/results?search_query=coolest+chemical+reactions>Catalytic converter theft:<https://www.youtube.com/watch?v=o1YgP7ic84w> | Where does sewage go?:<https://www.youtube.com/watch?v=YW6GBciRHLg>Carbon fibre:<https://www.youtube.com/watch?v=1JpfOjKrw58>Brief history of plastic:<https://www.youtube.com/watch?v=9GMbRG9CZJw>Great pacific garbage patch:<https://www.youtube.com/watch?v=9GMbRG9CZJw>Ocean clean up:<https://www.youtube.com/watch?v=O1EAeNdTFHU>Carbon footprint: <https://www.youtube.com/watch?v=9GMbRG9CZJw>COP26:<https://www.youtube.com/watch?v=12q3WcTJYgM> |
| **Wider Reading** | Manufacture of ‘eco-diamonds’ Use of chlorine gas in WW2 Use of hydrogen gas in bombs Use of fertilisers to tackle global hunger crisis  | Uses of neutralisation reactionsUses of endo/exo reactionsDecomposition of hydrogen peroxide in the Kursk sinking | Importance of Nylon in WW2Water shortages in the UKImpact of plastics in the oceanGreat pacific garbage patch |
| **Literacy Programme** | * Decode it NOW
* Guided practice/model answers
* Sentence Starters
* Writing strategies
 | * Decode it NOW
* Guided practice/model answers
* Sentence Starters
* Writing strategies
 | * Decode it NOW
* Guided practice/model answers
* Sentence Starters
* Writing strategies
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| **Independent Learning Tasks** | Mind-map revision homeworkRetrieval practice homework Knowledge Organiser practice Questions. Selective reading activity. Points grid ILT. | Mind-map revision homeworkRetrieval practice homework Knowledge Organiser practice Questions.Selective reading activity. Points grid ILT. | Mind-map revision homeworkRetrieval practice homework Knowledge Organiser practice Questions.Selective reading activity. Points grid ILT. |