Medium Term Planning - Topic: PERIODIC TABLE

Curriculum Intent **Skills/National Curriculum Links**	**In addition to working further on objectives from Year __, pupils will be taught, following National Curriculum guidelines, the following this topic:** • Explain how and why the ordering of the elements has changed over time. • Explain how the electronic structure of metals and non-metals affects their reactivity. • Use the periodic table to make predictions about the electronic structure and reactions of elements. • Predict the electronic structure of stable ions for the first 20 elements. • Illustrate the reactions of Group 1 metals with balanced symbol equations. • Explain how Group 1 metals form ions with a +1 charge when they react with non-metals. • Justify how Group 1 metals are stored and the safety precautions used when dealing with them. • Illustrate the reactions of Group 7 metals with balanced symbol equations. • Explain how Group 7 non-metals form ions with a −1 charge when they react with metals. • Explain in detail how to compare the reactivity of the Group 7 elements. • Use electronic structure to explain the trends in physical and chemical properties of Group 1 and Group 7 elements. • Apply knowledge of reactivity of Groups 1 and 7 to suggest and explain the trend in reactivity of Groups 2 and 6. • Justify the use of a transition metal or its compound in terms of its chemical properties. • Suggest why Group 1 metals have different properties compared to transition metals.
Spiritual, moral, social, and cultural development	**SMSC:** group work from practical activities in this section. Also pupils can work in groups to produce a timeline for the development of the periodic table. **PSHE/British Values:** The history of the is important development of the atom when learning about british values and world values. Students will complete teamwork, leadership and put science into everyday situations. They will show mutual respect during classwork. **Skills Builder:**Listening (Receiving, retaining and processing info), Speaking (The oral transmission of info and ideas), Problem solving (Find a solution to a situation or challenge), Creativity (imagination and generation of new ideas), Staying positive (The ability to use tactics and strategies to overcome setbacks), aiming high (Set clear and tangible goals), Leadership and teamwork
Numeracy	
Literacy	**Vocabulary Tier 2:** atoms, elements, periodic table, groups, columns, molecule, nucleus, electrons, neutrons, protons, combine, metals, nonmetals, orbiting. Particles, state, substances, giant structure, temperature, constantly, arrangement, decrease, increase, accumulate. **Vocabulary Tier 3:** limitations, interactions, spherical, distort, covalent bonding, ionic bonding, metallic bonding, lattice, electrostatic, giant structure, molten, intermolecular forces, polymers, limitations, tetrahedral, delocalized, fullerenes, graphene, tensile, alloys, nanoscience, particulate matter, micrometers, nanotechnology, proportion, nanocages, antimicrobial, catalysts. **Reading:** Following a written method and read risk assessments. Students may be directed to the textbook; this could be in lesson or at home on Kerboodle. **Writing:** Describing and explaining scientific phenomenon, free response writing for describing precautions taken, use of word mat to promote sentence formation. **Oracy:** inclusion of BEST resources which are research evidence on common misunderstandings in science, effective diagnostic questioning and formative assessment, constructivist approaches to building understanding, and effective sequencing of key concepts that promote metacognitive talk and dialogue.
Becoming future ready	**Careers/Employability:** Scientist Chemist Drug development Teacher Post-doctoral researcher
Adaptation **QFT/SEND Provision**	Throughout this topic, quality first teaching will provide differentiation: **By product:** Linear assessments and differentiated practical work. **By resource:** Lessons are differentiated per class and students, worksheets are available if support and assessments are linear. **By Intervention**: by providing different levels of supervision and support **By Progressive Questioning:** exploring pupils' understanding through interactive dialogue. **By Grouping:** according to prior attainment, gender, social preference, preferred learning style.

	By Task: Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range. **By Offering Optional Activities:** In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.
Implementation Curriculum Delivery Learning Outcomes **(Core Knowledge)**	To be able to: 1.2.1 The **elements in the periodic table are arranged in order of atomic (proton) number and so that elements with similar properties are in columns, known as groups.** 1.2.2 **Before the discovery of protons, neutrons, and electrons, scientists attempted to classify the elements by arranging them in order of their atomic weights.** **The early periodic tables were incomplete** and some elements were placed in inappropriate groups if the strict order of atomic weights was followed. **Mendeleev overcame some of the problems by leaving gaps for elements that he thought had not been discovered and in some places changed the order based on atomic weights.** Elements with properties predicted by **Mendeleev** were discovered and **filled the gaps**. Knowledge of isotopes made it possible to explain why the order based on atomic weights was not always correct. Students should be able to describe these steps in the development of the periodic table. 1.2.1 The table is called a periodic table because similar properties occur at regular intervals. **Elements in the same group in the periodic table have the same number of electrons in their outer shell (outer electrons) and this gives them similar chemical properties.** Students should be able to: • explain how the position of an element in the periodic table is related to the arrangement of electrons in its atoms and hence to its atomic number • predict possible reactions and probable reactivity of elements from their positions in the periodic table. 1.2.3 Elements that react to form positive ions are metals. Elements that do not form positive ions are non-metals. **The majority of elements are metals. Metals are found to the left** and towards the bottom of the periodic table. Non-metals are found towards the right and top of the periodic table. Students should be able to: • **explain the differences between metals and non-metals on the basis of their characteristic physical and chemical properties.** • explain how the atomic structure of metals and non-metals relates to their position in the periodic table • explain how the reactions of elements are related to the arrangement of electrons in their atoms and hence to their atomic number. 1.2.4 **The elements in Group 0 of the periodic table are called the noble gases. They are unreactive and do not easily form molecules because their atoms have stable** arrangements of electrons. The noble gases have eight electrons in their outer shell, except for helium, which only has two electrons. The boiling points of the noble gases increase with increasing relative atomic mass (going down the group). Students should be able to: • explain how properties of the elements in Group 0 depend on the outer shell of electrons of the atoms • predict properties from given trends down the group. 1.2.5 The elements in Group 1 of the periodic table are **known as the alkali metals and have characteristic properties because of the single electron in their outer shell.** Students should be able to **describe the reactions of the first three alkali metals with oxygen, chlorine, and water.** In Group 1, the r**eactivity of the elements increases going down the group.** 1.2.6 The elements in **Group 7 of the periodic table are known as the halogens and have similar reactions because they all have seven electrons in their outer shell. The halogens are non-metals and consist of molecules made of pairs of atoms.** Students should be able to **describe the nature of the compounds formed when chlorine, bromine, and iodine react with metals and non-metals.** In Group 7, the **further down the group an element is the higher its relative molecular mass, melting point, and boiling point.** **In Group 7, the reactivity of the elements decreases going down the group.** **A more reactive halogen can displace a less reactive halogen from an aqueous solution of its salt.** 1.2.5 In Group 1,the reactivity of the elements increases down the group. Students should be able to: • explain how properties of the elements in Group 1 depend on the outer shell of electrons of the atoms • **predict properties from given trends down the group.** 1.2.6 In **Group 7, the reactivity of the elements decreases down the group.** Students should be able to: • explain how properties of the elements in Group 7 depend on the outer shell of electrons of the atoms • predict properties from given trends down the group.

	1.3.1 The transition elements are metals with similar properties which are different from those of the elements in Group 1. Students should be able to describe the difference compared with Group 1 in melting points, densities, strength, hardness and reactivity with oxygen, water, and halogens. Students should be able to exemplify these **general properties by reference to Cr, Mn, Fe, Co, Ni, Cu.** 1.3.2 Many **transition elements have ions with different charges, form coloured compounds and are useful as catalysts.** Students should be able to exemplify these general properties by reference to compounds of Cr, Mn, Fe, Co, Ni, Cu.
Current learning to be developed in the future within:	At A level students will learn about the development in the periodic table, also the reactivities of different elements with reference to groups and periods including the sizes of atoms, protons, neutrons and electrons.
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.