Chemistry Curriculum Intent

Department Philosophy: Our overarching aim is to develop well rounded chemists who can not only explain complex theoretical concepts, but can investigate them practically for themselves. Investigative skills and techniques are at the heart of chemistry at WHSG and we have embedded frequent opportunities for our learners to develop these at all stages of the curriculum. Our curriculum reflects the vast number of our students for whom chemistry will form part or all of their further studies and to this end, from year 7 to year 13, we deliver our lessons with the expectation that our students will take the skills and knowledge they have gained here on into their future careers.

By the end of Key Stage 4 our students will know:	By the end of Key Stage 5 our students will know:
1. *How to use SI units correctly, converting where necessary. Students can select an appropriate number of significant figures and use prefixes and powers of ten for orders of magnitude* 2. *They can follow a method with little to no guidance to collect valid data. They can communicate this data using correct scientific vocabulary and can mathematically process it where relevant* 3. *The structure of atoms, ions and isotopes and be able to describe how one becomes another. They will know of the evidence for atomic structure* 4. *They will be able to construct and balance chemical equations using state symbols correctly* 5. *How to select the most appropriate separation technique for different mixtures* 6. *How to describe and explain the trends of the periodic table and how the periodic table was assembled* 7. *How to explain the properties of a substance based on its structure and bonding* 8. *How to use moles to carry out chemical calculations* 9. *The chemistry of the reactivity series and the relevance of this for selecting metal extraction techniques. They will construct relevant chemical equations and energy profiles for these reactions* 10. *How to manipulate the rate at which a chemical reaction occurs and how to explain this in terms of collision theory* 11. *The basic principles of organic chemistry as the study of carbon based compounds* 12. *How to name and draw particular functional groups and how these functional groups dictate the reactivity of a compound* 13. *Analytical techniques used for the identification of particular compounds or ions* 14. *How our atmosphere has changed over time and the evidence we have for its continuing evolution* 15. *The industrial and commercial importance of the chemistry they study. In particular in the production of potable water, NPK fertilisers, alloys, composites, ceramics and glass.*	16. *The underlying principles of **organic chemistry** as the study of the millions of covalent compounds of the element carbon* 17. *The analytical techniques used to identify organic compounds and how to interpret the results of such techniques* 18. *How to draw reaction mechanisms to explain the chemical reactions of organic compounds* 19. *That chemistry plays the dominant role in the search for sustainable and safer agrochemicals and for new materials to match the desire for new technology* 20. *The underlying principles of **inorganic chemistry** as the study of chemical compounds which are not carbon based* 21. *How to describe and explain the trends, properties and reactions of group 2, group 7 and period 3* 22. *How to describe and explain the properties of transition metals including their substitution reactions to form complex ions* **23.** *The underlying principles of **physical chemistry** as the study of how matter behaves on a molecular and atomic level and how chemical reactions occur* 24. *The electronic configuration of atoms and ions up to Z=36* 25. *How to use and manipulate various equations to calculate amounts of substance* 26. *Of the reasons for physical and chemical properties as explained by their bonding* 27. *The chemistry of energetics, kinetics, equilibria and thermodynamics* 28. *How to construct and balance redox equations and know their importance for understanding chemical cells which power electronic devices such as mobile phones, tablets and laptops as well as transportation* 29. *The chemistry of acids and bases and the importance of this in being able to understand how a buffer system works* 30. *How to select the correct practical techniques for themselves which will allow them to collect experimental data which they can then process both qualitatively and quantitatively with total independence*