Science's Curriculum Intent Statement

School wide, shared values for Willenhall Curriculum:

1. Knowledge Rich – Hinterland knowledge as well as core.
2. Focus On Mastery by revisiting core knowledge and concepts.
3. Emphasis on long term memory and recall – quizzes that interleave throughout.
4. Inclusion- Scaffolding for lower abilities where all levels of students will overcome challenges.
5. Maximises the impact of Assessment – Knowledge checks at the end of components and composites.

Overarching Goal

The aim of the science curriculum is to help pupils develop into curious, independent, knowledge hungry learners, who are able to question and explain how the world works. Studying the three core disciplines of science this broad knowledge builds from the molecular level, organism level through to the environmental level. As well as knowledge we also aim to develop inquisitive thinkers and give them the skills necessary to follow the scientific method of investigation, inquiry and analysis through a series of practical activities.

Curriculum Sequencing:

The curriculum builds on the big ideas found within the traditional Key Stage 3 Science National Curriculum. In order to allow students to make links between concepts and phenomena, we have carefully sequenced our composites so that components in each composite are distributed across KS3 and provide the basic scaffold to learning in KS4.

By the end of KS3 students have a secure knowledge in the foundation block concepts of knowledge: Biology- Structure and function of living organisms, Material cycles and energy, Interactions and interdependencies, Genetics and evolution; Chemistry - The particulate nature of matter, Chemical reactions, Energetics, The periodic table, materials, Earth and atmosphere; Physics – Energy, Waves, Motion and Forces, Electricity and electromagnetism, Matter.

Across both key stages we build the ability to understand scientific attitudes, develop experimental and analytical skills and have strong grasp of measurement, core vocabulary, units, symbols and nomenclature – thus allowing pupils leaving KS3 to be GCSE ready. As pupils progress, and knowledge is deepened, we expect them to exit KS4 holding the breadth and depth of knowledge and skills to be able to transition onto advanced science course.

Key curriculum principles that underpin all of content and sequencing choices:

Science, at its root, is about gleaning knowledge in order to better understand the world around us, as such pupils with need to collect, process and retain large amounts of substantive knowledge, our curriculum both recognises and supports this process. [supports statement 1 of shared] For example, in order to be able to discuss the ethical and medical implications of stem cell research, first pupils will need a broad range of knowledge, for cellular structure, differentiation and specialisation to the medical processes and historic advances within the field of stem cell research, only then will they be able to tackle this discussion fully. In order to engage with a subject, pupils need a careful balance of support, to allow them to access, and challenge, to keep their engagement and sense of worth and progress. We aim to scaffolding task, arrange logical sequencing of topics to build natural schema and continually questioning pupils to promote self-reflection and drive improvement. [supports statements 4 of shared] We are in the process of crafting a more uniform method of scaffolding and challenge during you do tasks in science lessons and work closely with the SEND department to support those pupils with more complex requirements.

As this substantive knowledge will only remain with pupils as long as they are revisiting and utilising it our curriculum has a high focus on planning to the limitations of the working memory (a small number lesson outcome, focusing on core knowledge); while recognising the importance of transferring across to

the long term memory, where schema can be developed (via low states quizzing – a corner stone to our assessment policy). [supports statements 2, 3 & 5 of shared] Beginning to build on challenging misconceptions and even stronger use of data generate by end of composite and component test, assessed you dos and low stakes quizzing – trailing a new look of assessment policy, constantly evolving the curriculum to best meet the needs of our pupils. This allows us to revisit, and review, the core knowledge periodically across both a half-term, term, year, key stage and throughout a pupil's science journey.

Examples of what this looks like in practice:

KS3 - Yr 7 we start by focusing on the introduction of science - safety and precautions needed to be taken into a scientific laboratory; revisited each time a practical. Up until this year students are unlikely to experience the nature of a scientific lab therefore it is necessary to introduce them to this very early on. This is followed by 'electricity', as it is engaging, practical rich, very relatable and builds on the cultural capital of students who have already been exposed to electricity in their home. We then divert scheme and investigate cells, linked by discussing building blocks, electricity to electrons and organisms to cells. Next revisit the electricity composite to teach voltage and resistance so they can apply the knowledge of electricity to better understand how we can change electricity to suit our needs. Our curriculum continues to follow this theme of building on knowledge and linking the three scientific disciplines together.

Yr 8 we build upon the scaffolded knowledge in year 7. For example, electricity is then explored in a greater detail by introducing the concept of magnetism by solenoids and their uses. Moving from year 7 cells we now look at how cells and tissues form organs and system that allow the functioning of specific things such as breathing and digestion.

Yr 9 we deepen our knowledge of electromagnets to investigate the electromagnetic spectrum and tie in wave properties. This spiralling allows for greater retention of material and knowledge in our long term memory and the sequencing enables us to strengthen our students' schema

KS4 - we strengthen the knowledge gained from KS3, we address misconceptions that arise and we plug any gaps our students encounter. In KS3 they will learn the nucleus is the control centre of the cell without truly understanding what that means. In KS4 they will understand and go into detail the structures in the Nucleus that control our genetic information. Our intentions at KS3 is to build the base of which all our knowledge will develop to greater heights in KS4.

Application of knowledge in an exam setting is a major focus of our KS4 curriculum. Assessments will allow for retrieval practice and a focus on the A01, A02 and A03 objectives assessed in Science according to the AQA Trilogy Combined Science Specification. So now moving from explain to me, a classroom teacher, how the nucleus works, to answering an examiners question about the amount of genetic information in the nucleus and different points in a cells cycle. Application of the breadth of knowledge accumulated over 3 years of KS3.