**Science Department Curriculum, Lesson Structure and Routines**

**Curriculum Intent**

 *The science curriculum at ……………….. will develop students into creative thinkers and problem solvers, built upon a strong foundation of powerful knowledge, which will allow them to apply this to everyday contexts. Teachers will ensure students are exposed to interconnected areas of substantive and disciplinary knowledge in lessons and will be given opportunities to develop fluency and mastery of these.*

**Curriculum structure**

The curriculum is developed around the concept of Powerful knowledge. A philosophy that all students have the right to be exposed to the available knowledge around them and this can only be delivered effectively through the classroom environment. The curriculum is broken down into knowledge blocks instead of lessons, this removes any restrictions on time to teach, instead teachers focus on making sure knowledge is secure before moving on.
Each knowledge block has an overarching Big Question and then a maximum of three explicit powerful knowledge intent statements that inform teacher planning and assessment. These statements can be broken down further for differentiation, but still no more than three statements at a time will be taught to pupils. There is then guidance for when to use the assessment label questions with suggested questions present. Expected prior knowledge is identified and suggested and knowledge check questions are present to be used for formative assessment. Practical activities are also listed, and their curriculum purpose linked to disciplinary knowledge is identified. Finally, the RRTs (literacy tasks) are sequenced.

**Curriculum Implementation**

Remembering

The department has a culture of remembering embedded in the curriculum which will continuously allow students to retrieve previously taught material through a variety of activities.

Each lesson will begin with a *low-stakes quiz* consisting of a minimum of 5 questions retrieving knowledge from more than 2 months ago.

If it becomes apparent that a significant proportion of the class has forgotten some of the knowledge, this will not be addressed at this moment. However, the teacher will keep a record of these areas and they will be consolidated and revisited during a specific intervention lesson called **Total Recall.** These will occur once every half term. These gaps will also be targeted through Additional College Learning (ACL) activities.

Following on from this there will be 3-5 questions that ask students to retrieve knowledge from the previous lesson, to check for gaps. If gaps are identified this will be addressed at that moment to ensure new knowledge is added to strong existing knowledge

Within the course of a teaching sequence, there will be a key recall label. These questions will be identified from specific sections of the curriculum where students traditionally struggle to remember/master. There is one label per topic.

Retrieval will also be carried out by students as part of the Additional College Learning (ACL) through two software packages that are designed around spaced retrieval. These are Tassomai and Educake. Specific targets will be set for this each half term.

Pedagogy

**Introduction of new material**

When teachers introduce a new topic to students, prerequisite knowledge is checked with a label containing several questions designed to inform the teacher about the current understanding of this knowledge domain.

New knowledge is delivered through high-quality teacher explanations, modelling, and analogies. There is an expectation that most of this instruction comes through adaptive teaching including dual coding and direct instruction; including the *I do, we do, you do* approach to develop mastery.

**Checking for understanding**

Formative assessment of new learning will consist of *knowledge pit stops* to ensure secure understanding or the need to reteach. This will include the use of mini whiteboards (MWB), cold call questioning with thinking time, and knowledge check labels.
Teachers will adapt their lessons based on the information this assessment provides.

**Independent Practice**Students are given many opportunities to undertake challenging independent work to apply the knowledge they have been taught.

At the end of a learning sequence, once core knowledge is secured by the majority, students are expected to undertake independent application of knowledge through SLOP (Shed Loads of Practice) activities and exam-style questions.

**Assessment and Feedback**

**Assessment**

Assessment in science at ……………….. will make sure there is assessment for learning (AFL), assessment as learning (Retrieval activities) above and also assessment of learning (summative assessment)

There is a summative assessment schedule for all year groups.
These consist of end-of-unit assessments for KS3 which are an hour and use specific KS3 targeted questions.

In KS4 there are five specific assessment points where knowledge from several topics is checked. The data from this assessment will be used to inform the targeted areas of retrieval in the ACL activities.

**Feedback**

The red and amber assessment labels will be peer or self-assessed. The teacher will use formative assessment tools to identify gaps and provide verbal feedback to the class on how to improve and succeed.

Within each unit of work, there will be an identified task that students will undertake, and this will inform written feedback via labels. Students will receive specific feedback on their outcomes for the task and the teacher will provide whole class verbal feedback on the improvements and achievements

**Mathematics in Science**

The …………… Science department has a uniform approach to teaching Mathematics in science. Specific procedures are introduced in year 7 and then revisited frequently to develop fluency. This procedure was developed alongside the Maths department to ensure strong links between the subjects.

Before teaching any equation, its conceptual basis is modelled to the students so that they are aware of what physical property of the universe the equation represents.

Equations are taught to students using the following procedure: **Recall**, **Rearrange**, **Change units**, **Substitute**, **Calculate**, **Units** (**R**egular **R**ainbows **C**an **S**how **C**olourful **U**mbrellas).

**Practical Work in Science & Scientific Literacy**
Practical work in science is vital in developing students into competent practitioners.
 Practical work at …………………. will give students regular opportunities to put theory into practice as well as a vehicle for the instruction of various aspects of disciplinary knowledge. Students will have many chances to develop fluency in each aspect of disciplinary knowledge over the course of each key stage. The coverage of disciplinary knowledge is mapped out across the curriculum (completed by March 2023)

**Literacy in Science**

In line with the whole school literacy policy, literacy activities called *Reciprocal Reading Task* (RRT) are embedded into the curriculum to expose students to subject-specific texts. There is one RRT in each unit of the curriculum. Each RRT exposes students to scientific articles and is followed by a series of text-specific questions linked to the style and content of the text.

**Additional College Learning (ACL) & Extracurricular activities**

The main ACL in science is using **Tassomai** and **Educake** software. These spaced retrieval questions deepen understanding and develop long-term remembering of knowledge.
The volume of questions attempted is differentiated by class to allow all to reach success in the activity.

There is an extracurricular activity every week called **Chaotic Science,** where students are encouraged to develop their independent enquiry skills, safety awareness and application of knowledge though working with complete chemistry and physics kits.

Additionally, there is another extracurricular activity called **Wildlife Warriors.** This where students work outside in the pond area to develop and encourage habitat growth. Through these students develop their knowledge of ecology and ecosystems and apply existing knowledge to solve issues that may arise.