THE HAT FEATURES IN DEPARTMENTS: Science

1	**We review learning:** The lesson begins with a brief review of recent and previous learning, and learning is reviewed systematically, for example through quizzes and tests.	Every student is provided with a knowledge organiser at the start of each topic. Every lesson begins with a retrieval practice quiz based on prior learning. Students have whiteboards present on their desks during lesson, used to review learning periodically through the lessons. We use green pens to review practice exam questions and end of topic tests. Year 12 and 13 students do assessed homeworks to review learning before sitting end of topic tests.
2	**We make the learning clear:** Students are told what they will be learning (learning intentions) and are shown how they can make progress (success criteria).	Learning objectives are shared with students either verbally or in written form. Verbal reminders throughout lessons are used to reinforce the purpose of the lesson and/or the tasks. Success criteria for specific tasks are shared with students so they understand what they are trying to achieve. Exemplar pieces of work can be shown to demonstrate what success looks like for specific tasks. We have developed a spiral curriculum allowing students to review and build upon prior learning and teachers explicitly make reference to the building of skills and knowledge.
3	**We present new learning in small steps:** Students are given the opportunity to practise each step thoroughly, to obtain a high success rate.	We have developed and use the "Six steps to success" for equations. This is used for Physics equations and is increasingly being used in the other subjects. Practical method instructions are often modelled and given a few at a time. Writing frames and sequence strips are used to assist students through chunking of their written work. Visualisers are used with graph work and practical technique to demonstrate each stage of the process. The SoW has been chunked to present learning in smaller steps than is presented in the course specifications. The spiral curriculum allows us to present the big scientific concepts in smaller, more manageable sections through the duration of KS3-5.
4	**We explain clearly and directly:** Explicit and detailed instructions and explanations are given throughout the lesson.	The knowledge organisers ensure definitions and scientific language are consistent across all teachers. Our explanations are clear and instructions are explicit with verbal instructions often being accompanied with supporting written text. Clear explanations and directives are often delivered verbally. Science practicals are modelled in advance of and during students undertaking practical work.
5	**We ask questions of everyone:** For example, through no-hands-up, cold calling and Think-Pair-Share, EVERYONE is involved and encouraged to think.	All lessons begin with a retrieval practice quiz which all students complete. We use "no hands up" when asking students, but often with the inclusion of thinking time to allow less confident students time to either think independently or use think-pair-share. Mini-white boards are commonly used for whole class responses along with other techniques including hand signals and RAG cards in the planners. Targeted questioning is also utilised to differentiate; extending the most able and supporting the less able of our students.
6	**We provide models:** Evidence of modelling by thinking aloud, by using WAGOLLs, worked examples and partially worked examples, and by demonstrating (in practical work).	We comprehensively model practical techniques to ensure correct use of equipment and safety in the science classroom. We model calculations using the "six steps to success", demonstrating on the whiteboards and the visualisers which are also used to model graph drawing techniques. Written work is modelled by teachers who demonstrate the thought process of constructing a piece of written work as well as techniques such as providing examples of good and weaker work.
7	**We guide students' practice:** Evidence of scaffolds (examples, models and writing frames) and teacher's movement whilst students are working to support and to provide corrections and feedback.	Knowledge organisers are given to provide students key words and definitions to guide their use of language. We utilise a variety of techniques to assist with scaffolding such as writing frames, sequence strips, mark schemes, starter sentences. We also guide students practice through verbal feedback in lessons, both individually and whole class. Formative marking also guides practice and provides students with the opportunity to undertake feed forward tasks to improve the quality of their work.
8	**We require students to practise independently:** Clear opportunities for students to work alone, in order to thoroughly practise, for example through timed and un-scaffolded tasks in silence, while monitoring their progress.	The process of providing models and guiding student practice leads to students gaining enough confidence and skill to carry out tasks independently. This could take the form of practical work, calculations, graph skills, analysis of data, producing text or undertaking assessments.
9	**We check for understanding:** Evidence of questioning to check all students understand by asking them to explain what they have learned and by using all-students' response systems such as quizzes and mini whiteboards; evidence of adaptive teaching in response to the checking of understanding; students are retaught if they haven't got it.	Understanding is checked through a variety of formative, summative and low stakes quizzing. We regularly do whole class checking through the use of mini whiteboards, retrieval practice quizzes, Kahoot, Quizzizz. Targeted checking is achieved through verbal questioning, written tasks and assessments. Misconceptions are tackled verbally and with green pen marking of class work. If understanding is not secure, teachers can pause and re-cap on content, recheck on understanding before continuing with more summative methods of checking, mostly in the form of end of topic assessments. All tests have a subsequent feed forward lesson based on WWW and EBI marking.
10	**We use retrieval practice systematically:** Evidence of retrieval practice to make the learning stick.	Knowledge organisers are used systematically for the setting of homework, along with the student's self-quizzing books to look, say, cover, write, check. Every lesson begins with a retrieval practice quiz which includes both recent content along with learning from previous topics. All end of topic assessments have a synoptic approach with questions from previous topics.