

# THE HAT FEATURES IN DEPARTMENTS: MATHS



1	<p><b>We review learning:</b> The lesson begins with a brief review of recent and previous learning, and learning is reviewed systematically, for example through quizzes and tests.</p>	<p><u>Daily Review</u> Every lesson starts with a recap of the previous lesson.</p> <p><u>Long term review</u> Every unit starts with a recap of the prerequisite units from previous years. This review leads to further teaching as necessary for the class.</p>
2	<p><b>We make the learning clear:</b> Students are told what they will be learning (learning intentions) and are shown how they can make progress (success criteria).</p>	<p><u>Across the 5-year curriculum</u> Students know where they are at in their journey across a 5-year curriculum. Units are numbered e.g. Geometry 5. Students are told they are recapping e.g. Geometry 1 to 4 at the start of Geometry 5. They progress from their own starting point; sometimes more time is dedicated to reviewing to suit the needs of the class.</p> <p><u>In a lesson</u> - Lessons build on each other, creating a journey of learning that is made clear through the use of titles. The students are expected (when it is appropriate) to create the title themselves approximately half way through the lesson.</p> <p>Students are clear on the success criteria of the lesson through the use of models and examples. Success can be seen in the use of the correct language in a response, the correct layout in written work, as well as showing understanding of the concept and the ability to produce fully worked solutions independently.</p>
3	<p><b>We present new learning in small steps:</b> Students are given the opportunity to practise each step thoroughly, to obtain a high success rate.</p>	<p><u>Curriculum</u> Each unit is broken down into key learning points. These are then broken down further by the teacher to suit their class. We teach to mastery: each learning point is taught in depth and understood by students before we move on. We do not move on too quickly.</p> <p><u>Modelling and a high success rate</u> - Every step is modelled, using I do, We do, You do, or example pairs or silent examples, and students practise each step. Teachers intervene with any misconceptions before moving on.</p>
4	<p><b>We explain clearly and directly:</b> Explicit and detailed instructions and explanations are given throughout the lesson.</p>	<p><u>Prior knowledge</u> In Maths we check for understanding prior knowledge before beginning a new concept.</p> <p><u>Clear explanations</u> - When explaining a new concept, we do not just give instructions, we explain why and how the mathematics work and link to other areas. Our explanations are clear, for the mathematics and also for our expectations of how a mathematician behaves. We take advantage of dual coding and non-verbal techniques where possible.</p>
5	<p><b>We ask questions of everyone:</b> For example, through no-hands-up, cold calling and Think-Pair-Share, EVERYONE is involved and encouraged to think.</p>	<p><u>Questions for all</u> In a Maths classroom, all students should participate every lesson in whole class or direct questioning. We use the no opt out approach – a student may not know the answer, but we will then ask another student for help or a prompt, or to say the answer and allow the first student to repeat it.</p> <p><u>Varied questioning techniques</u> - We use a range of techniques, including no hands up and cold calling, mini whiteboards, multiple choice questions, or whole class response. Student answers should include mathematical thinking as much as possible, they should justify, reason, extend their thinking.</p>
6	<p><b>We provide models:</b> Evidence of modelling by thinking aloud, by using WAGOLs, worked examples and partially worked examples, and by demonstrating (in practical work).</p>	<p><u>“I do, we do, you do”</u> Maths teachers model mathematical processes to their classes every lesson. We make use of the “I do – we do – you do” structure. During I do, teachers can either silently model or narrate their thoughts. During we do, teachers direct the students to work through a similar problem, asking many questions to check for understanding. During you do, we ensure the students are given similar problems so that they can be successful.</p> <p><u>Modelling what, why and how</u> Teachers make use of modelling to address misconceptions, show mathematical thinking, and provide a worked example that students can refer to in the lesson and in the future. Modelling does not only address how to do a mathematical process but must include the thinking behind the process and connections between this topic and others where possible.</p>

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7	<p><b>We guide students' practice:</b> Evidence of scaffolds (examples, models and writing frames) and teacher's movement whilst students are working to support and to provide corrections and feedback.</p>	<p><u>Through modelling</u> Using "we do" students are guided to practise whilst their teacher checks for understanding. The most effective teachers spend more time guiding practice and feeding back immediately.</p> <p><u>Through questioning</u> We ask a lot of questions to the class to guide their thoughts to attend to the right thing, and again, regular feedback to students is provided.</p>
8	<p><b>We require students to practise independently:</b> 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.</p>	<p><u>Through the use of 'you do'</u> Students are set up to be successful when they are asked to attempt questions on their own, by the use of our modelling process. The independent work matches the guided practice initially, then we add application and problem solving tasks as appropriate.</p> <p><u>Through the use of longer sessions of independent work</u> Students are given the opportunity to problem solve, reason and apply when they have achieved a level of mastery in a topic. These opportunities allow for collaboration with peers and skilful scaffolding from teachers to provide just enough support. Should content be missing, the content is retaught before students attempt more complex problems.</p> <p><u>Tasks that require method selection</u> Understanding is then progressed through the use of application of problem-solving questions, and a mixture of questions for independent learning, requiring students to method select.</p>
9	<p><b>We check for understanding:</b> 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.</p>	<p><u>Through the use of 'we do'</u> During the 'we do' phase of modelling, teachers check a student has understood the concept through careful questions and walk throughs of procedures and concepts.</p> <p><u>Through the use of questioning</u> Questions are continually asked throughout a lesson to check for understanding of the concept as well as the procedure.</p> <p><u>Through the use of written work</u> Students show understanding on their whiteboards as well as in their books and assessments. Understanding is regularly checked in written work and not just verbal answers. Students are asked to summarise, rephrase, elaborate, justify and prove where appropriate to ensure full transfer to long term memory and clear understanding.</p> <p><u>What the teacher does next</u> If students show a lack of deeper understanding, the teacher corrects and reteaches as necessary.</p>
10	<p><b>We use retrieval practice systematically:</b> Evidence of retrieval practice to make the learning stick.</p>	<p><u>Cold retrieval every lesson</u> In KS3 students complete a "Last lesson, Last week, Last topic, Last term" at the start of every lesson. In KS4, students progress when ready to 5 cold recall questions at the start of each lesson from the entire course. These topics are then retaught in the moment if misconceptions occur.</p> <p><u>Combining topics</u> Older topics are combined with the current topic to provide an opportunity for retrieval as well as applying old skills to new ones.</p>