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Guidance for Observation and Target Setting in Primary Mathematics

National Curriculum Purpose of study : Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Aims of the mathematics National Curriculum should be evident in all lessons taught: in short - developing fluency, reasoning and problem solving

6 Key Questions to ask when observing Mathematics lessons:

	Question	*Additional Information*
1	**SUBJECT KNOWLEDGE** How effectively does subject knowledge assist with questioning, responding to questions, explanations, modelling and lesson design? Are mathematical misconceptions considered and addressed?	*Teacher should plan questions that allow pupils to recall previous information and build upon this with new learning.* *Questions should be designed to ensure pupils avoid misconceptions.*
2.	**COHERENCE** Are lessons broken down into small, connected steps that develop the mathematical concept? How does the teaching build on prior mathematical knowledge? What declarative and/ procedural knowledge is being taught?	*Even if using a scheme, all lessons must be adapted to suit learners by building on prior learning.* *Learning objectives and outcomes (steps to success) must be clear in the lesson plan and successfully communicated to pupils?* *Known facts should be practised and pupils given opportunities to retrieve previous learning?* *Declarative Knowledge (What) = facts/ formulae, principles and rules.* *Procedural Knowledge (How) = using a sequence of steps to achieve desired outcomes*
3	**FLUENCY** Are pupils shown how and provided with opportunities to use efficient, accurate and flexible mathematical strategies to develop their understanding?	*Mathematical strategies and models must be carefully explained. Pupils are given opportunities to explore different methods, to talk about most efficient methods and apply these methods to a range of problems*
4	**MATHEMATICAL THINKING** Are the pupils engaged in thinking mathematically? How do you know?	*Do pupils have the time and opportunity explain their thinking and reasoning so they can they justify their answers?*
5.	**CONCEPTUAL AND PROCEDURAL VARIATION** Is there a clear rationale for the choice of both mathematical questions and/or tasks? (Choices of examples for intelligent practice)	*Teacher should choose examples that connect to each other and offer a pattern to support pupils with a particular e.g., procedure? Teachers should plan examples and non-examples to exemplify a concept.*
6.	**REPRESENTATION & STRUCTURE** Are the chosen representations and resources carefully considered and do they effectively support the mathematics being taught?	*Modelling must be clear with teacher explaining and utilising correct mathematical vocabulary.* *Chosen resources should expose the mathematical structure of the concept being taught.*

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Potential **Mathematical Specific** Targets on Lesson Analysis Forms.

Lesson design and delivery, including sequencing and choice of teaching methods (CCF curriculum & pedagogy) Next Steps:
Consider more carefully which pre-requisite mathematical concepts pupils require before starting a new topic and plan to take account of this.
Ensure that the mathematical resources and images you use in the lesson are modelled explicitly. Make this explicit in your lesson plan.
Ensure pupils are given sufficient time and opportunity to practise new learning/concepts.

Pupil progress in this lesson and use of assessment (including questioning) (CCF assessment) Next Steps:
Plan questions that all pupils can access and respond to - e.g., problem solving questions that are low threshold high ceiling or verbal questioning that requires talk partners and then 'show me' on whiteboards. Use findings to adapt mathematical choices, in the lesson.
Live mark e.g., calculations for instant intervention.
In order to maximise the effectiveness of the mathematical learning resource(s) used, plan a range of appropriate questions for pupils that draws out conceptual understanding.
Ensure that there is progression in pupils' mathematical learning – avoid rushing on too soon to the more complex types of abstract mathematical representations.

Comments about student teacher's developing Subject Knowledge and Pedagogy (CCF curriculum & pedagogy) Next Steps
Revisit your subject-knowledge audit to address any gaps in your current knowledge.
Research alternative pedagogical approaches to teach X and consider how to approach possible mathematical misconceptions.
Develop strategies which encourage deeper mathematical thinking using open-ended activities and problems.
Encourage all pupils to utilise correct mathematical vocabulary.
Consider strategies to allow pupils to provide and share coherent mathematical explanations.
Ensure that you provide sufficient opportunities for pupils to apply their mathematical learning to problem solve .
Pay close attention to the correct mathematical modelling of examples to ensure that explicit instruction is clear.

Mathematics programmes of study: key stages 1 and 2

Ofsted Mathematics Research Review