Mathematics Feedback Prompts

Please refer to the Mathematics section of Birmingham City University's Subject Specific Development Journal for specific details of what the Associate Teacher has learned prior to their school-based training.

National Curriculum: Reference should be made to the three aims of the National Curriculum – **fluency, reasoning and problem solving**, and Associate Teachers should demonstrate their understanding of the requirements for each of these.

Maths Subject Knowledge: Associate Teachers should be demonstrating accurate subject knowledge and their understanding of effective teaching and learning by planning, delivering and assessing their mathematics lessons using a mastery approach to ensure all pupils gain a deep and secure understanding.

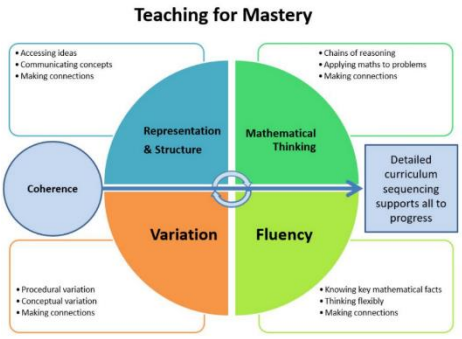
Substantive knowledge: Associate Teachers' substantive knowledge should be evident in both their planning and their teaching.

Declarative Knowledge – 'I know that' Associate Teachers should enable their pupils to know and recall facts and formulae, relationship between facts and operations (conceptual understanding)
There should be consideration of how children commit declarative knowledge to their long-term memory, for instance times tables and number facts and how this is retrieved.

Procedural knowledge – 'I know how' Associate Teachers should enable their pupils to confidently calculate using the 4 operations and understand how they relate to informal methods. Associate Teacher should help pupils to develop efficient, systematic and accurate mathematical methods.

Conditional knowledge – 'I know when' Associate Teachers enable their pupils to organise their thinking to develop a bank of strategies, to solve different types of problems, to reason, to give mathematical proof.

Consideration should also be given to opportunities for pupils to develop their metacognitive skills for instance learning from their mistakes and misconceptions.



The following prompts are designed to support in giving subject-specific mathematics feedback in relation to the 'Five Big Ideas':
Five Big Ideas in Teaching for Mastery | NCETM
This is based on work completed by the Central Maths Hub.

Further Guidance
Questions and prompts for primary trainees: Mentoring conversations for teaching and learning of mathematics (created by East Midlands Maths Hubs)

Key Idea:	What to look for
Coherence *Teaching is designed to enable a coherent learning progression through the curriculum, providing access for all pupils to develop a deep and connected understanding of mathematics that they can apply in a range of contexts.*	➢ Is this lesson part of a sequence that builds on prior learning and plans for progression? How has AfL informed this? ➢ Does the lesson break down tricky learning into manageable steps? ➢ Do the steps enable all pupils to access the learning? Do they need to be adapted? ➢ Are examples provided well-chosen and justified? ➢ Are mathematical misconceptions predicted, planned for and immediately addressed? ➢ How is challenge provided?

Key Idea:	What to look for
Representation and Structure *Representations used in lessons expose the mathematical structure being taught, the aim being that pupils can do the maths without recourse to the representation, supporting them to achieve a deep understanding of mathematical structures and connections.*	➢ Are representations used to support new learning, conceptual and conditional knowledge? ➢ Has the Associate Teacher chosen representations that expose the mathematical structure? Does questioning focus pupil attention on structure? ➢ How does modelling using representations/ manipulatives support understanding of the mathematics? ➢ How are concrete and pictorial representations used to scaffold the learning? To support individual pupils as part of adaptive teaching? ➢ Are connections made between the language, manipulatives, images and symbols?
Mathematical Thinking *Mathematical thinking is central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising.* Pupils should actively engage in mathematical thinking in all lessons, communicating their ideas using precise mathematical language.	➢ What opportunities for pupils to problem solve and reason were provided? Why were they chosen? ➢ Are Pupils should actively engage in mathematical thinking in all lessons, communicating their ideas using precise mathematical language? ➢ Is correct technical mathematic vocabulary along with key phrases and stem sentences modelled and reinforce while 'thinking aloud'? ➢ Is questioning used effectively to promote mathematical discussion and develop mathematical understanding? (E.g. How do you know? prove it, convince me) ➢ Are rich tasks used that allow all pupils to explore concepts deeply? ➢ Does the Associate Teacher highlight aspects of mathematical thinking, such as spotting patterns, making conjectures and proving why something is true? ➢ Is mathematical talk and thinking celebrated?
Fluency *Quick, efficient and accurate recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.*	➢ Were facts and procedures appropriate pitch and challenge? (AfL and matched to NC) ➢ Are there opportunities for retrieval of key facts and procedures? calculation strategies, number bonds, times tables. ➢ Are there opportunities for pupils to engage in practice? Modelled, guided independent. ➢ Are there opportunities for pupils to share, compare and contrast strategies and reflect on flexible and efficient strategy use?
Variation *Draw attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant.* • *Conceptual variation - varying how a concept is represented, often in more than one way, to draw attention to critical features.* • *Procedural variation - considers learning sequence with attention drawn to the mathematical relationships and structure.*	➢ Does the Associate Teacher use examples (and non-examples) to help pupils understand the essential features of concepts? ➢ Are questions and exercises carefully ordered to help pupils make connections and to expose the mathematical structure? ➢ Were misconceptions identified or anticipated? Were tasks / questions designed to draw attention to misconceptions?
Target Setting: At least one subject specific target should be set following an observation. This should include **what** is the next step (to support Associate Teacher progress) **why** is this important (impact on pupil progress) and **how** will this be achieved (what actions are needed?) **E.g. To use concrete resources for column addition to ensure secure procedural knowledge by modelling methods using concrete resources and provide opportunities for pupil to use them alongside the abstract.**	