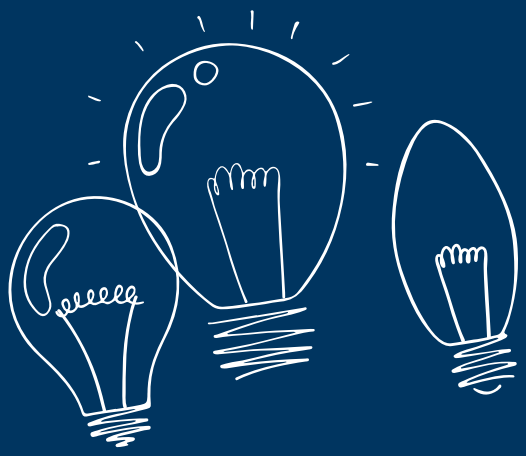

Learning by Questions

Learning by Questions AND PRIMARY MATHS MASTERY

BASED ON NCETM'S 'TEACHING FOR MASTERY: FIVE BIG IDEAS'

Take a look in more detail at exactly how LbQ mastery Question Sets successfully deliver every aspect of the NCETM's 'Teaching for Mastery' recommendations, and how we can support your whole-school implementation of a mastery approach.

teach PRIMARY AWARDS 2020

bett AWARDS 2021 FINALISTS

bett AWARDS 2020 WINNER SECONDARY CONTENT

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Learning by Questions

Learning by Questions

learning_by_questions

Introduction to the NCETM and the 'Five big ideas'

Since 2014, most UK schools should be working towards the delivery of a 'mastery' curriculum for mathematics. Many have invested heavily in one of the two textbook-based schemes approved by the DfE, whilst others follow mastery schemes such as White Rose using their other resources.

The question of 'What is Mastery?' is a big one, but a vital one. The DfE-funded National Centre for Excellence in the Teaching of Mathematics (NCETM) have produced excellent materials explaining the five main elements of mastery teaching. Their document 'Teaching for Mastery: Five Big Ideas' provides the basis for the approved resources and popular schemes like White Rose.

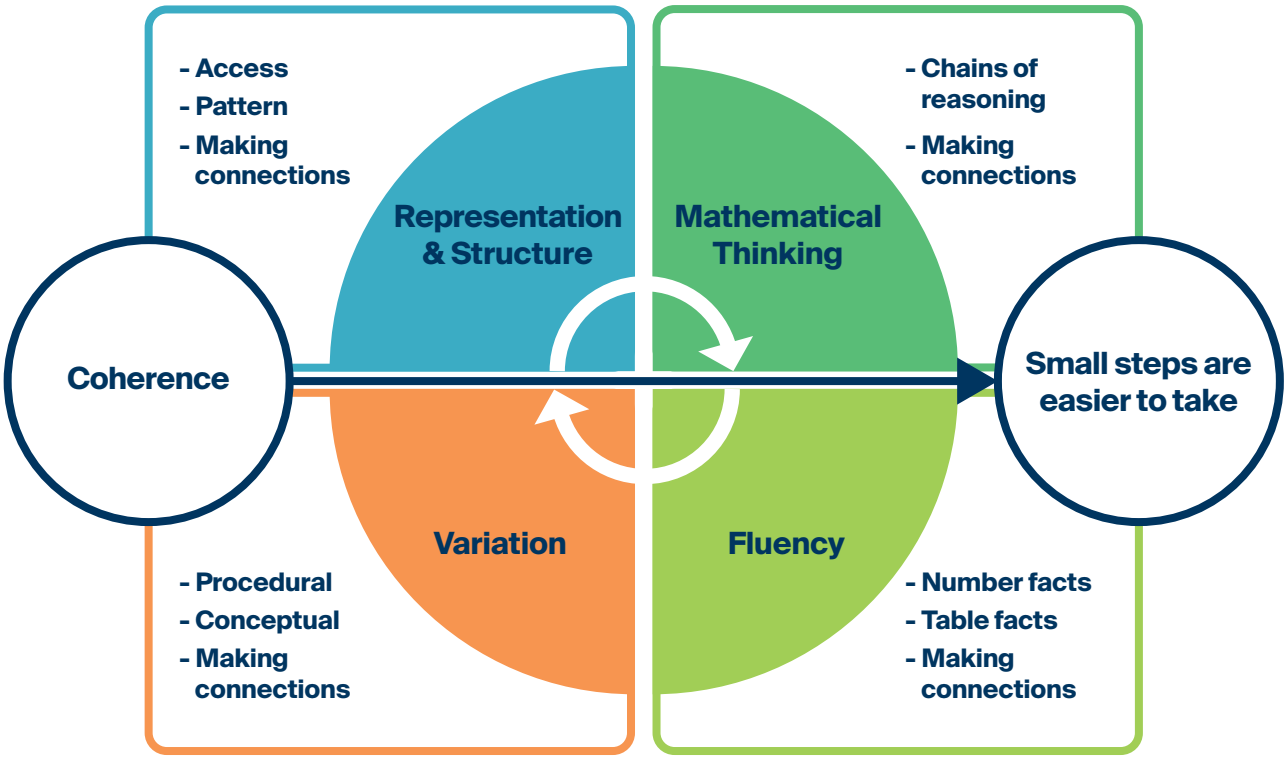
A fundamental change in the adoption of a mastery approach is that all children should be able to achieve: it is for every child. Children should all be working together on the same topic. The focus is on allowing children to gain a 'greater depth' of understanding rather than racing onto the next objective. As Debbie Morgan, Director for Primary Mathematics, says this requires: "Longer time on key topics". This enables sustainable learning and consistent progress to be made, building on previously mastered learning.

Such an approach is a move away from a spiral curriculum, where children would spend less time on a topic but would revisit topics several times during a year.

To support this change, the NCETM and regional maths hubs were founded to promote the effective teaching of mathematics and the achievement of mastery for all children. White Rose Maths has evolved and produces widely-adopted schemes of learning as well as providing training and other support to schools.

Here at LbQ, we hold White Rose Maths' groundbreaking work in such high regard that we consulted with them from our early design stages, during development and finally through to delivery. Our Question Sets not only align with their schemes of work, but also their commitment to quality, inclusion and love of subject.

The diagram below shows a summary of the NCETM's Five Big Ideas. This document will explore each of the five areas in more detail, and show exactly how Learning by Questions meets each and every aspect of a mastery approach. LbQ can work seamlessly alongside whatever approach a school is taking to mastery, whilst also having many additional benefits for leaders, teachers and pupils.



Learning by Questions

AND THE FIVE BIG IDEAS

Representations and Structure

- ✔ Varied pictorial support is provided in the first level of our mastery Question Sets.
- ✔ Bar models are used to support conceptual understanding and problem solving.
- ✔ Pictorial support is gradually removed as the children progress in their understanding.
- ✔ Non-standard representation are included.

Mathematical Thinking

- ✔ Open reasoning questions in the third level of each mastery set promote active thinking and allow children to gain deeper understanding of topics.
- ✔ Responses to open questions can be instantly viewed on a whiteboard to facilitate class discussions or explanations.
- ✔ Dedicated reasoning Question Sets allow children to explore topics and deepen their reasoning skills.
- ✔ All mastery sets use and encourage the use of accurate mathematical language.

COHERENCE

Children are taken on a journey of understanding, taking small connected steps between questions and levels.

Children gradually progress to fluency, reasoning and problem solving questions automatically.

Our sets can be used flexibly by teachers along with White Rose Maths 'Small Steps'.

Variation

- ✔ Questions are carefully sequenced in the first level of a set to build understanding.
- ✔ Conceptual variation is used in the first level to allow children to make fundamental connections.
- ✔ A wide range of question types are used with a variation of language.
- ✔ Instant feedback adjusts thinking and corrects misconceptions early.

Fluency

- ✔ The second level of each mastery set contains a range of fluency questions.
- ✔ An ever-increasing range of Practice Question Sets enable children to become fluent in basic number facts.
- ✔ Ready-made sets to prepare for the new 'Multiplication Tables Check'.
- ✔ 'Progressive Practice' Question Sets take children on a journey through a particular skill strand.

Learning by Questions

BASED ON NCETM'S **'TEACHING FOR MASTERY: FIVE BIG IDEAS'**

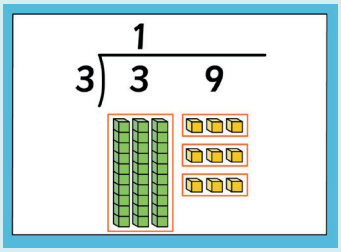
LbQ: Mastery in action

REPRESENTATIONS AND STRUCTURE

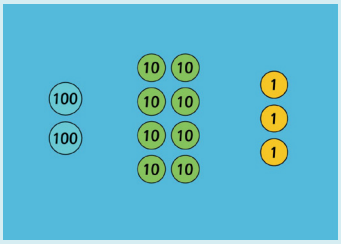
The first level of all our mastery Question Sets contains purposefully sequenced questions with images to secure fundamental understanding. All children (not just less confident children) explore varied representations of concepts and processes with support that is gradually reduced as they progress through the level.

In later levels, images are used effectively to help children deepen their understanding. For example, clear bar models are often utilised to help children to understand how to approach more complex word-based problems.

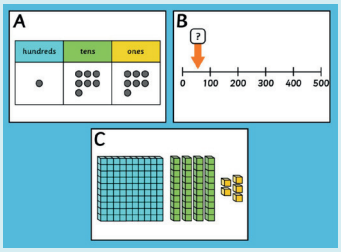
Images include representations of the concrete manipulatives that children are likely to be using in class. When children are ready, they are automatically progressed through the question sets to tackle fluency, reasoning and problem solving questions. Children who aren't quite ready are given more questions with support before they progress to the fluency level.



Use the image to find the answer to 39 ÷ 3.



What is the total value of the counters?



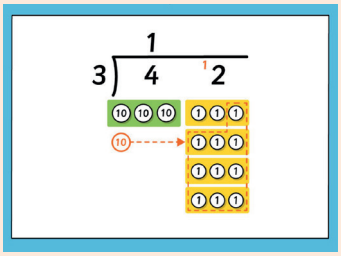
Which image represents the number 177?

VARIATION

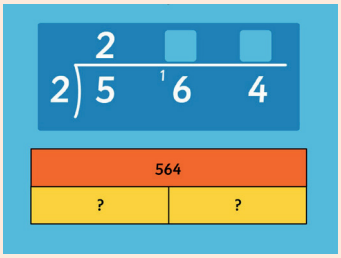
Level 1 includes careful variation in terms of images, but also in the way that the questions build on each other. Conceptual variation within Level 1 allows children to make connections and build on existing knowledge.

Questions in Level 3 of the mastery sets often require the children to make comparisons between calculations or images, thereby deepening their understanding of concepts and sustaining their new learning. Each question has detailed feedback that is instantly delivered to correct misconceptions, strengthen understanding and build confidence.

As well as variation, you will also find variety. LbQ's Mastery and Practice Question Sets contain a wide range of question types.



What is 42 divided by 3?



Calculate 564 divided by 2.

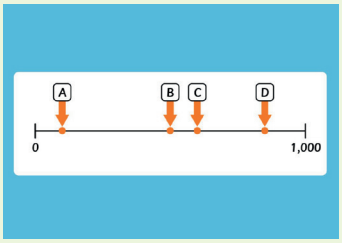
LbQ: Mastery in action

FLUENCY

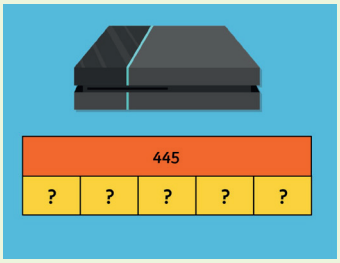
The second level of LbQ's mastery Question Sets is 'Fluency'. This level contains a variety of question types that allow all children to develop a procedurally and conceptually fluent understanding of a topic or process.

During the fluency level, children move towards being able to calculate more automatically and without support. Towards the end of the level, children make real-life connections through questions that require them to use simple reasoning and solve one-step word problems.

It is vital that all children master instant recall of key number facts in order to access many areas of the mathematics curriculum. LbQ provides a whole suite of ready-made practice Question Sets. These support children to become more fluent in the recall of essential number facts such as times tables. Most practice sets offer a supported level with image or strategy prompts as well as an independent level. These can be adapted depending on the children's level of fluency.



Which label is pointing to 857?



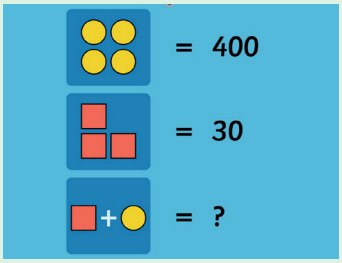
A company makes 445 games consoles in five days, and they make the same number of consoles each day. How many games consoles does the company make each day?

MATHEMATICAL THINKING

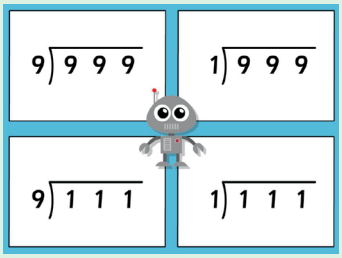
LbQ's mastery Question Sets promote mathematical thinking throughout the sets, but especially in the third and fourth levels ('Reasoning' and 'Problem Solving with greater depth'). Children have the opportunity here to analyse, make comparisons and connections, and solidify their understanding of a topic.

Children are encouraged to think about misconceptions and common mistakes (some of which they may have made themselves). In doing so, they are less likely to retain the misconception or make these mistakes in the future. LbQ's instant feedback helps children to see these links and helps to adjust their thinking.

The Reasoning level of our mastery sets contains open questions for children to think about and submit their responses. Anonymous responses are instantly visible to the teacher and can be explored in depth as a class, further deepening understanding.



What number is represented by one square and one circle?



Which calculation has the largest answer?

LbQ: Mastery in action

COHERENCE

Learning by Questions allows teachers to deliver a coherent journey towards mastery. Each curriculum objective has its own full mastery set, organised into easy-to-find topics that match the National Curriculum. Question Sets can easily be adapted depending on the needs of a class or individual child.

Full mastery sets take children on a journey through four levels:

- **Level 1.** Understanding of basic concepts and prerequisite knowledge.
- **Level 2.** Fluency.
- **Level 3.** Reasoning.
- **Level 4.** Problem Solving with greater depth.

LbQ recognise that this journey may take several lessons. It has the facility for teachers to adapt our mastery Question Sets to allow children to complete parts separately. A teacher can easily choose to deliver only certain levels or questions in response to the children's learning needs.

Learning by Questions is not a scheme of work in itself and does not replace the teacher. Its granular and comprehensive approach means that LbQ can be utilised alongside any scheme of learning. LbQ content aligns closely with the White Rose 'Small Steps': our sets help children to take small, connected steps towards mastery.

Alongside full mastery sets, supplementary Question Sets are available to give children additional practice or to extend thinking further.

PRACTICE QUESTION SETS
secure a skill or recall key facts

REASONING QUESTION SETS
develop key skills, address misconceptions and extend thinking

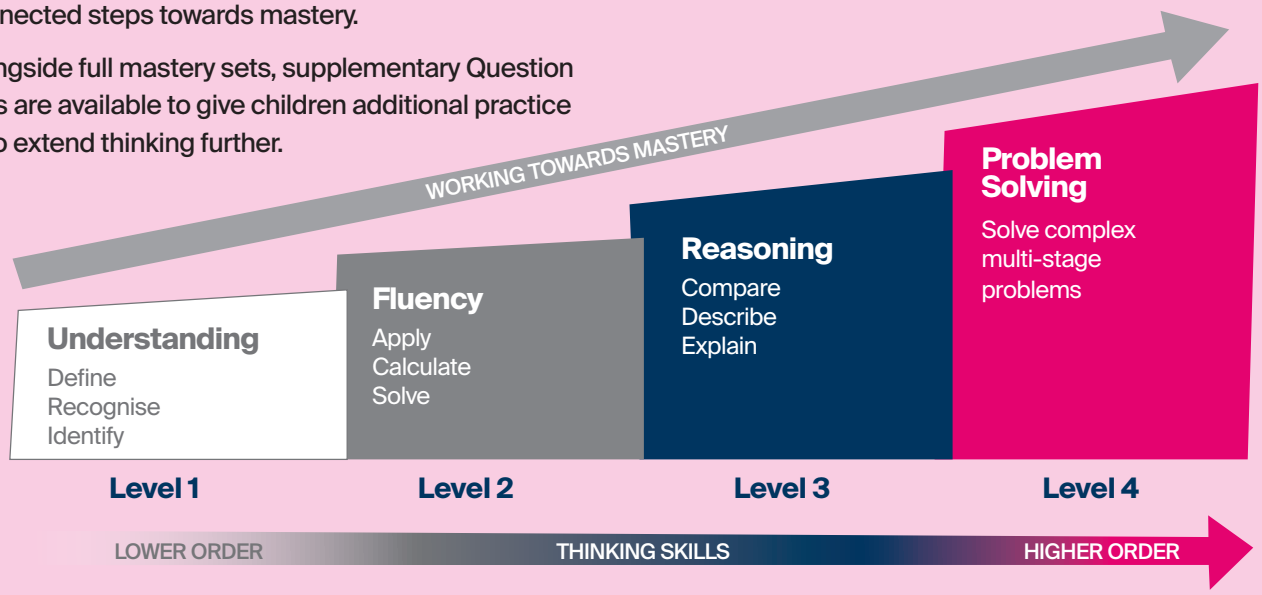
PROBLEM SOLVING QUESTION SETS
solve simple and multi-step problems within and across topics

END OF TOPIC REVIEWS
ideal for diagnostic or pre-teach assessment and for revision

READY-MADE SATS ASSESSMENTS
prepare children for the National Curriculum Tests

READY-TO-PROGRESS ASSESSMENTS
diagnose if children are secure in the key areas

In every type of set, children will always receive in-the-moment feedback and guidance to support them on their journey.



Maths Mastery Question Set Levels