



## Day 1: Reasoning in KS2 Mathematics

- ◆ To break learning into small steps, planning sequences of lessons to build conceptual understanding
- ◆ To represent mathematical ideas using equipment, images and bar models
- ◆ To embed mathematical reasoning in day-to-day maths lessons

## Morning Session Outline (9:00am—11:45pm)

### Planning sequences of lessons

We will look at breaking learning down into small steps, and how to plan sequences of lessons that build conceptual understanding. This includes how key concepts are represented practically and visually, as well as techniques for embedding reasoning in each phase of this process.

### Use of equipment and bar modelling in KS2

Examples and guidance will show how equipment can be used to deepen children's understanding of key concepts and ideas. We will also share techniques for using bar modelling to model standard and non-standard questions.

### Developing reasoning throughout a unit of work

A range of strategies will be shared for how to develop reasoning and talk. We will consider reasoning strategies that can be used at the start of a unit of work, techniques that can be used to develop talk and tasks that will give children the opportunity to work at greater depth. Teachers will be given an application task which will be shared in day 2 of the training.

## Day 1: Early Number Sense - Beyond Counting

- ◆ To identify the knowledge and skills that children need to have a secure sense of number
- ◆ To be consistent in the use of equipment and images to help children recognise quantities and to represent concepts.
- ◆ To have a coherent approach to the teaching of non-counting calculation.

## Afternoon Session Outline (1:00pm—3:45pm)

### Building a sense of number

We will consider the different concepts that children have to understand as they develop an early understanding of number. Then we will explore how visual representations can be introduced to help children recognise small quantities and build a strong number sense. A range of free resources will be shared for developing key early concepts including an early understanding of part-whole. We will also show how real-life contexts can be used to help children make connections and build understanding.

### Developing efficient calculation strategies

We will look at how children progress to being able to calculate using efficient strategies. Thought will be given as to how key concepts can be introduced in EYFS/Y1 and developed in KS1 so children are able to calculate using efficient strategies. We will identify mathematical 'big ideas' that help children to have long-term success. Resources for introducing reasoning will also be shared. Teachers will be given an application task which will be shared in day 2 of the training.

*"Particular strengths of I See Maths are the quality of the CPD offered in terms of subject knowledge, pedagogy and embedding this into classroom practice."*

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## Day 2: Reasoning in KS2 Mathematics

- ◆ To share and reflect on outcomes from session 1
- ◆ To use questions and tasks that develop and extend mathematical reasoning and talk
- ◆ To explicitly teach problem-solving skills, teaching relating problems together

## Morning Session Outline (9:00am—11:45pm)

### Extending mathematical reasoning

We will share outcomes from session 1, consider the impact on learning and unpick any difficulties. Then a range of techniques for developing mathematical reasoning will be shared. We will consider how open questioning can develop the quality of talk. We will also look at how variation in questioning can help all children to build conceptual understanding and develop mental fluency.

### Teaching problem-solving skills

Through a range of example lessons, we will show how problem-solving can be explicitly taught by using related examples together and through the use of equipment and bar models. Participants will plan how problem-solving can be broken down and explicitly taught. A range of resources will be shared for developing problem-solving skills.

## Day 2: Early Number Sense - Beyond Counting

- ◆ To share and reflect on outcomes from session 1
- ◆ Use a bank of games and resources for building fluency in number recognition and calculation
- ◆ To develop and use questions and tasks to develop mathematical reasoning and talk

## Afternoon Session Outline (1:00pm—3:45pm)

### Developing number fluency

We will share outcomes from session 1, consider the impact on learning and unpick any difficulties. Then a range of resources and techniques will be shared for improving children's recognition of small quantities, their ability to make connections between different representations and their recall of number bonds. We will consider how these games and resources can be used within a mastery curriculum.

### Questions and tasks for developing reasoning and talk

A range of lesson ideas, resources and questions will be shared for developing mathematical reasoning in EYFS and KS1. We will look at how children's misconceptions can be addressed, how equipment can be used to represent concepts and how children can be encouraged to find different solutions to problems. We will also explore how children's visual-spatial reasoning can be developed, and the affect this has on their wider mathematical attainment.

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