

MODELS AND EXPLANATIONS FOR EARLY ADDITION AND SUBTRACTION

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PHASE: Foundation Phase

TIME: 2 hours

The Wits Maths Connect Primary Project (WMCPP) has spent the past 3 years working with teachers in ten partner schools on improving mathematics teaching and learning and assessing the effectiveness of interventions developed by the (WMCPP).

Conversations with teachers and interviews and assessments with learners point to areas within early addition and subtraction that continue to be seen as problematic. This evidence shows that learners are often able to perform basic addition and subtraction calculations such as:

$$9 + 7 = \square \text{ and } 9 - 7 = \square$$

Yet, they often have difficulty in solving missing subtrahend ($9 - \square = 2$), missing addend ($9 + \square = 16$) and missing start ($\square - 7 = 2$; $16 = \square + 7$) problems.

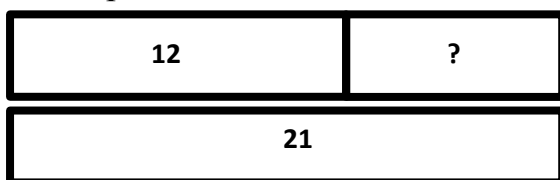
When we ask teachers how they deal with and explain these latter problem types, they have usually told us that they tell children to use rules like: 'For $9 - \square = 2$, you just do $9 - 2$ and for $9 + \square = 16$, you do $16 - 9$ '.

These rules allow children to produce the correct answer for the current problem, but they frequently remain unable to remember the rules well enough to solve similar problems independently.

In order to aid teachers in dealing with the difficulties that learners experience when attempting such problems, this workshop aims to introduce and discuss two key models and associated explanations for early addition and subtraction problems: the part-part-whole bar model and the number line model. Our experience suggests to these models being useful for helping children to see the structure of problems and to use this structure to select appropriate problem-solving strategies. We will use these models in the context of both number sentences and word problems relating to early addition and subtraction. The workshop will incorporate opportunities for teachers to become familiar with the use of these models and accompanying explanations that support children's take up and use of these models in their own work.

e.g. $12 + [] = 21$

Part-part-whole bar model:



Number line model

