

## Bar Model Teacher Notes



### Product Code

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### How do bar models support primary children's problem solving?

Teaching pupils how to solve problems in mathematics is a problem that teachers are continually trying to solve. Learning how to calculate is not actually the main problem. The difficulty is that pupils often do not know which calculation is appropriate – they cannot reason about the relationships between the numbers involved in the problem context. The bar model is a tool to help them do that. Children can talk through a problem and use the bar model to give them something to think with when they are trying to make sense of a new concept. Teachers can question the pupils about the reasons and meanings behind calculations while using the bar model as a point of reference.

### What is a bar model?

A bar model is simply an image – a diagram - which clarifies relationships between elements of the problem so that pupils can easily identify what they know, what they don't know and what they need to work out. The bar model doesn't do the calculation – pupils have other tools for that; bar models are the images that support the reasoning and decision-making that enable pupils to utilise their calculation skills. Pupils can begin to understand and construct simple bar models from Key Stage 1 and even Foundation Stage.

## The TTS bar modelling kit

Children learn mathematics most effectively when they have opportunities to experience mathematical ideas concretely, using manipulatives, as well as through pictures and diagrams, symbols and words. Dr Amanda Simpson has worked with TTS to develop a manipulative bar-modelling kit for use in classrooms that gives teachers and pupils opportunities to solve problems together, at the same time introducing bar models and developing skills for constructing and interpreting them in order to solve different types of problems – from simple addition and subtraction problems to very challenging fractions and ratio problems. Bar models also develop in pupils, very naturally, an algebraic way of thinking so that progression to work on algebra is far smoother than it has traditionally been.

By using the magnetic strips pupils can work practically with bar modelling. This is partially useful when modelling complex situations where they are unlikely to draw the model right first time. Using the magnetic strips, they can chop and change their model as their ideas develop.

## Developing conceptual understanding

With practise, using concrete and pictorial tools to represent problem situations, pupils learn to identify the element of the situation that needs to be evaluated. At the same time, they actually understand ('see') why it is the answer to the problem. Pupils also, quickly and spontaneously, begin to visualise these models and manipulate them 'in their mind's eye' – at this point they have been internalised as mental tools that equip them for working fluently and with conceptual understanding at all stages of mathematics.

