INTRODUCTION 2014

With the introduction of the new National Curriculum, there is an increased expectation for deep understanding in mathematics. Because of this, the teaching and learning of calculation has to be well understood, and efficiently learned. This new edition identifies clear steps to understanding in calculation.

MAIN INTRODUCTION

This book outlines key activities and outcomes to enable teachers to ensure that children are taught a clear development of skills and understanding in calculation for the four rules of number. This progression is based on children's understanding of place value as exchange (one ten can be exchanged for ten ones etc). It leads to children being able to subtract using a decomposition method, and to divide using short division. It will support class teachers, subject leaders and senior staff in providing a cohesive structure to the teaching and learning of calculation.

The exchange model is illustrated in three ways:-

- Using base 10 material, which is available in many schools
  If appropriate, children can be taught to represent the Base 10 materials diagrammatically as follows:

  . representing **1**
  I representing **10**
  ☐ representing **100**
  eg **531** can be represented as:
  ☐☐☐ **|||** **.**
  ☐☐
  5 **3** **1**

- Using money/coins. Children often struggle to see money as a context for number. If they learn about money in parallel to number, using the same games and activities, it can help.

- Using counters/cubes. This version of the exchange model uses anything that can be used as counters, interlocking cubes, counters, different colour bottle tops etc.

Children will need a deep and secure understanding of place value as exchange as they begin to calculate with numbers greater than 10. Therefore, they will need to have had thorough experience of playing exchange games, both forwards and backwards.

Section One of this book begins by describing an exchange game, which is fundamental to children being able to use the most common methods of calculation used in our schools. It goes on to offer some simple suggestions for games and activities to support children's developing understanding of the number system in the Foundation Stage and Years One and Two

Section Two illustrates how children can be taught to use their understanding of exchange to calculate in addition, subtraction, multiplication and division.

Section Three identifies the essential/ non-negotiable skills and knowledge in written calculation for each year group. This will begin with experiences in the Foundation Stage, and includes exchange, counting and making collections, leading to the use of base10 materials in Year 1. They are taught to calculate with the support of this model, and will be encouraged to visualise the materials, to support their understanding. Teachers will need to use their discretion about supporting children who are finding calculating a challenge, and encourage them to use the notation above to prompt their understanding and methods, and as an aid to their understanding.

The development of understanding through this model is intended as a core. All the other wonderful activities that are currently used involving number lines and place value cards are essential in developing children's rounded sense of number, and can be used to support and supplement this core.

It is helpful to children if all staff in a school use the same models and the same language for calculation procedures. Suggested language is identified in italics in Section Two. This is the language children should hear and use when they are calculating with and without the Base10 materials.

If children can already securely access ALL skills and knowledge identified for their year group, teachers will need to look to the demands of the curriculum for the following year to support them and move their learning forwards.

NB

1. *If children are already proficient in a different calculation method, they need not change, provided the method is an efficient one.*
2. *If children have tried and failed at the methods offered here, teachers may choose to offer a different method provided the method is an efficient one.*