



Parents and Carers Information Guide to using Manipulatives Summer 2023

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Introduction

Dear Parents and Carers,

Maths manipulatives refer to the hands-on resources used in maths classrooms to develop children's understanding of mathematical concepts, often in a practical, tactile way.

It was not long ago that these concrete resources were relegated to KS1 classrooms only. With increasing numbers of schools adopting a mastery approach to teaching maths, manipulatives are now a common feature of maths lessons across all classes at primary school - and even secondary school.

Initially, children need support and guidance on which manipulatives to select and how to use them. Over time, children are guided towards making their own choice of manipulatives - this allows them to take ownership of their own learning and development.

This information guide will look at some popular resources used across both schools of the Carey Federation and also share alternatives, such as on-line and do-it-yourself options, and provide you with example activity ideas to give you an idea of the versatility these resources can offer and support your child with their mathematics at home.

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DIENES BASE 10



- Dienes base 10 are an essential manipulative in any school.
- ✓ They are usually plastic (although we do have some older, wooden versions), consisting of ones cubes, tens rods, flat hundred squares and thousand blocks, which children can use to build and represent numbers.
- They are a fantastic visual way for children to understand the relationship between ones, tens, hundreds and thousands.

Dienes base 10 are predominantly used in Key Stage 1 and lower Key Stage 2, but some older children who are struggling with the concept of place value may benefit from using them. They are also useful in decimal representation in upper KS2.

As numbers get larger and children become more confident with the base 10 number system, this resource is usually replaced with place value counters.

This resource is brilliant for children being introduced to place value and the base 10 number system. Children begin by using the Dienes to represent numbers. They are also essential for children when they are first introduced to formal written methods of addition, subtraction, multiplication and division.

Dienes are particularly useful for helping children understand the concept of grouping/exchanging, as children are able to physically exchange the blocks, for example, ten ones cubes for a ten red, or a ten rod for ten ones cubes.

Free Online

<u>https://mathsb</u> <u>ot.com/manipula</u> <u>tives/blocks</u>





Bundles of 10 straws

PLACE VALUE COUNTERS



- ✓ Place value counters are the next step in the progression from concrete Base 10 towards a more abstract understanding of place value.
- ✓ They serve a similar purpose to the Dienes Base 10, but with the key difference being that they are all the same size.
- ✓ This enables pupils to work with much larger numbers, in addition to progressing on to decimal numbers.
- ✓ They also ensure children are not over-reliant on being able to see the difference in size to understand the concept of the base 10 number system.

Place value counters are an essential resource for children in Key Stage 2.

Place value counters are very useful for children to understand the concept of place value and can be used for much larger numbers than the Dienes.

In addition to the place value of whole numbers, they are also useful for children's introduction to decimal numbers.

Place value counters are also very helpful for children learning the formal written methods of addition, subtraction, multiplication and division.

Free Online

https://mathsb ot.com/manipula tives/placeValu eCounters



Milk bottle tops

2-SIDED COUNTERS



- ✓ 2-sided counters are a simple but very effective resource.
- ✓ They are plastic counters with one colour on one side and a different colour on the other.
- They have a diverse range of uses and can be used to support a wide range of maths concepts across all year groups.

2-sided counters are one of the of the few resources which are useful all the way from EYFS through to Year 6.

2-sided counters have a wide range of uses, including place value, written calculations, fractions, ratio and algebra.



Stick 2 colour discs (circles) printed on card together.

Free Online

https://mathsb ot.com/manipula tives/twoColour Counters

NUMICON



- ✓ Numicon consists of different coloured, flat plastic shapes.
- Each shape contains holes, representing numbers from 1 to 10 and is an excellent, multi-sensory way for children to develop number sense.
- ✓ The patterns are structured so that number relationships can be seen and experienced.
- ✓ The pieces are also weighted according to size, giving an added dimension to how they can be used.

Numicon can be used across the school from EYFS to Year 6. It can be used as a whole class or with smaller groups as an intervention resource.

Numicon can be used to teach a wide range of concepts, such as: place value, written calculations, fractions, decimals and percentages, as well as number bonds, odds and evens.

Free Online

<u>https://mathsb</u> <u>ot.com/manipula</u> <u>tives/numberFr</u> <u>ames</u>

REKENREK



- ✓ The Rekenreks (meaning 'counting racks') have gained popularity in recent years.
- ✓ Rekenreks are composed of 20 beads in two rows of ten or 100 beads in ten rows of ten, with five red and five white beads on each rod.
- ✓ They provide a visual model encouraging children to build numbers in groups of five and ten and to use doubling and halving strategies and to solve addition and subtraction problems.
- ✓ Repeated use of this resource leads to mental images, which in turn leads to the automaticity of number facts.

Rekenreks are used primarily in EYFS and Key Stage 1 but can be used to support children further up the school.

Rekenreks are a good visual resource to help children to visualise numbers and improve their addition/ subtraction strategies, such as doubling or finding near doubles.

Supports children to conceptually subitise (one push 6 - 5 of one colour 1 of another).





Watch a video here: https://www.youtube .com/watch?v=g96gc JwP_qk

Free Online

<u>https://mathsb</u> ot.com/manipula <u>tives/rekenrek</u>

TENS FRAMES



- Tens frames are rectangular frames split into ten sections.
 Thinking about numbers using a tens frame can be a helpful way for children to learn basic number facts.
- ✓ They help children to visualise numbers within ten and beyond and are a great tool for helping to develop number sense.
- ✓ For older children, tens frames are useful for helping to understand and visualise decimal numbers, including addition and subtraction of decimals.

Tens frames are useful across all key stages from EYFS to Year 6.

For younger children, tens frames are a great resource for counting, place value, addition/subtraction of numbers within 10 and 20.

For older children, the value of the tens frame becomes one, with each section representing 0.1.

Using the manipulative in this way enables children to visualise and understand decimal numbers, in addition to helping to visualise addition and subtraction of decimal numbers.

Do-it-yourself

Use buttons, pasta, cereal pieces, coins or anything you can get your hands on!

Free Online

https://mathsb ot.com/manipula tives/tenFrame

CUISENAIRE RODS



- ✓ Cuisenaire rods are plastic or wooden and are colour coded depending on their size (from 1cm to 10cm).
- They provide an interactive, hands on way to explore maths concepts, such as number bonds, fractions, decimals and ratio

A useful resource for both Key Stage 1 and Key Stage 2 classrooms.

Cuisenaire rods are very versatile and can be used to teach a wide range of concepts, including: number bonds, patterns, fractions, decimals, scaling, ratio and as a concrete aid when using bar models. Free Online

https://mathsb ot.com/manipula tives/unitBox

Early Years and Key Stage 1 : Links to Numberblocks 'Step Squad'



Numebrblocks Online

https://www.bbc .co.uk/cbeebies/ shows/numberbl ocks

- Numicon Support Videos
- Mathsbot
- How manipulatives are transforming mathematics in Key Stage 2
- <u>Concrete resources for Parents: How you</u> <u>can transform maths learning at home</u>
- <u>https://www.theschoolrun.com/what-</u> <u>concrete-pictorial-abstract-approach-</u> <u>maths</u>