

## What is CPA?

CPA stands for concrete-pictorial-abstract, and this approach is based on research by psychologist Jerome Bruner. The research suggests that there are three steps (or representations) necessary for pupils to develop understanding of a concept.

### Concrete



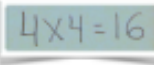
This is the physical stage of learning that all children must experience to gain a conceptual understanding of new areas of learning. In Year 1 that may mean that when they are learning to add they are using cubes to create groups and then count the total. In Year 6 when learning how to find a fraction of an amount they may use counters to help their initial understanding.

### Pictorial



The pictorial stage - a student has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of a division exercise this could be the action of circling objects.

### Abstract



The symbolic stage - a student is now capable of representing problems by using mathematical notation, for example:  $12 \div 2 = 6$  This is the ultimate mode, for it "is clearly the most mysterious of the three."

## What is bar modelling?

Bar modelling has been developed as a way to visually represent a word problem, it is not used to teach children how to complete calculations but how to complete word problems and puzzles.

### Here are two examples:

Sarah has 35p, she gives her brothers some of her money and she is left with 7p. How much did she give to her brothers?



$$35p - 7p = 28p$$

Sarah gave her brothers 28p.

James put some money in his pocket and went to the store. He used  $\frac{9}{10}$  of his money to buy a book and had £3 remaining. How much did the book cost?



$$£3 \times 8 = £24$$

The book cost £24.

One of the best ways to become more confident using bar modelling is to use a game called 'Thinking Blocks' on the computer. There are 4 free apps you can download called Thinking Blocks Addition, Multiplication, Ratio and Fractions.

## Ways to help your child:

### Ask Questions:

#### Out and About

- What is the number on that bus/front door?
- Which direction are we walking in?
- Which way is left/right/forwards/backwards?
- How many steps up? (Count in 1's, 2's)
- How long until the next bus/train?

#### In the shops

- How much does this cost?
- Which costs more/less?
- How much would two of these be?
- Which coins/notes do I have?
- What is the price on that item?
- How much has this been reduced by.
- How much more do I need to buy this?
- How many can I buy with this much money?

#### Preparing Meals

- Can you tell me what this weighs in grams/kilograms/pounds/ounces?
- Which weighs more?
- How much do you think this might weigh?
- What is the weight/capacity on the packet?
- Can you tell me what the capacity is in litres/millilitres?
- How much liquid does this cup hold?
- How many halves/quarters has this food been cut into?
- Can you help set the food timer?

#### At home

- What is the time? (Both digital and analogue clocks)
- How many minutes until bedtime/lunch time?
- How many jumps can you do in 1 minute?
- How many minutes in a hour/ half an hour/ quarter of an hour?
- How many pages in this story book?

# Mathematical Vocabulary

## General

ones, tens, hundreds, thousands, place value, digit, real story, maths story, part-part-whole, number sentence, equation, regroup and rename



## Addition and Subtraction

add, addition, more, plus, increase, sum, total, altogether, score, double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between, half, halve, how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as, tens boundary, hundreds boundary, ones boundary, tenths boundary, inverse

## Multiplication and Division

lots of, groups of, times, multiply, multiplication, multiplied by, groups of, multiple of, product, once, twice, three times... ten times..., times as (big, long, wide... and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each, group in pairs, threes... tens, equal groups of, divide, division, divided by, divided into, remainder factor, quotient, divisible by, inverse



**Math Vocabulary Cards App** - play games with words and pictures to learn mathematical vocabulary.

## Useful Websites:

- [www.mathsisfun.com](http://www.mathsisfun.com)
- [www.nrich.maths.org](http://www.nrich.maths.org)
- [www.mathplayground.com](http://www.mathplayground.com)
- [www.ncetm.org.uk](http://www.ncetm.org.uk)
- [www.primaryadvantage.co.uk](http://www.primaryadvantage.co.uk)
- [www.bbc.co.uk/bitesize/primary/](http://www.bbc.co.uk/bitesize/primary/)
- Espresso Home Access

## Useful Mathematics Apps



**Little Monkey Apps (Aleesha Kondys)**  
Friends of Ten, Addition, Subtraction Times Tables, Ladybird Maths and Fraction Wall



**Brian West Apps**  
Pizza Fractions 1, 2, 3, 4, 5, 6, & 7 Numberline  
Frog, Monkey Rows, Monkey Time, Military Time Force



**Math Playground Apps**  
Dare to share, Thinking blocks Addition, Multiplication, Ratio and Fractions



**Andrew Brodie Apps**  
Mental Maths and Time (all primary ages)



# Glasgow Counts

# Parent Guide

