Singapore Bar Method

How can it help children of all ages and abilities to calculate simple to complex calculations?
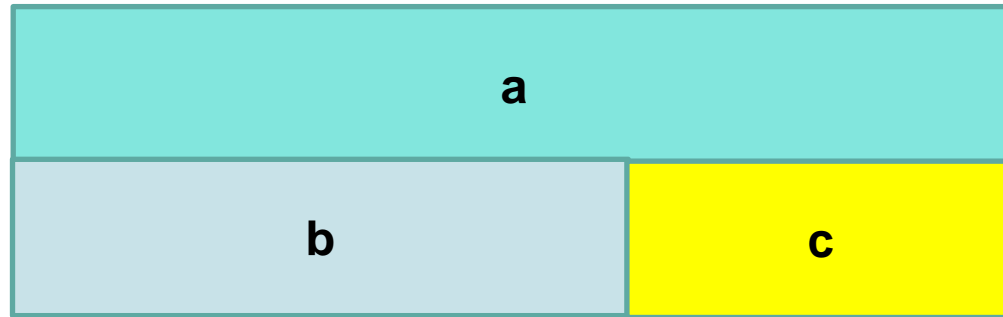
The product of two odd numbers is odd

Always, Sometimes, Never

Overview

Consider representations to
link the conceptual understanding of the
structure of the mathematics with selecting
appropriate mathematical operations in
order to solve problems

Generalisation

a

b	c

This can then help the children solve, for example, missing
number problems:

$45 + ? = 93, ? - 62 = 13, 146 - ? = 79, ? + 82 = 147$

KS2 2012

24 In a class, 18 of the children are girls.

A quarter of the children in the class are boys.

Altogether, how many children are there in the class?

Show your working

Singapore Bar Method

Laura had £240. She spent 5/8 of it. How much money did she have left?

Overall percent correct, Singapore: 78%,
United States: 25%).

Why were Singapore so successful?
They used a particular representation which enabled pupils to access the structure of the mathematics
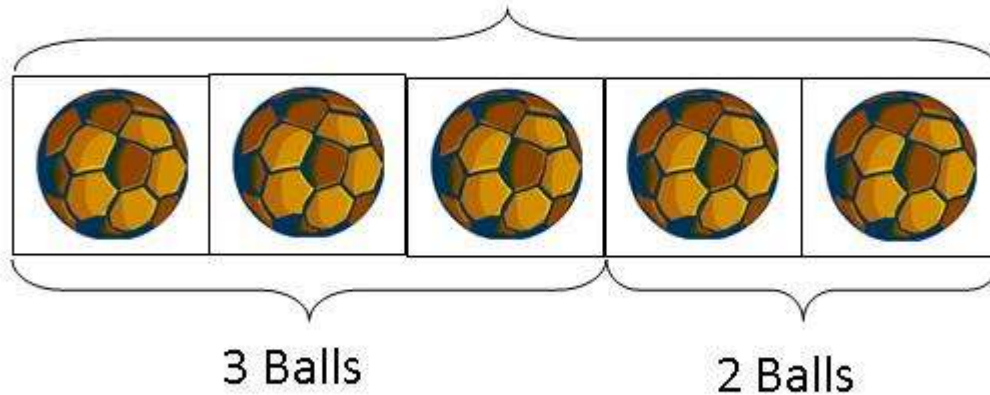
Using the Singapore Bar for Addition and Subtraction

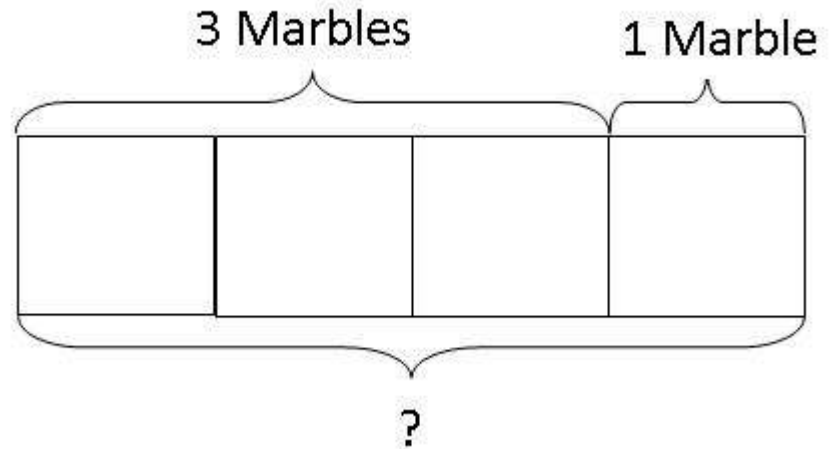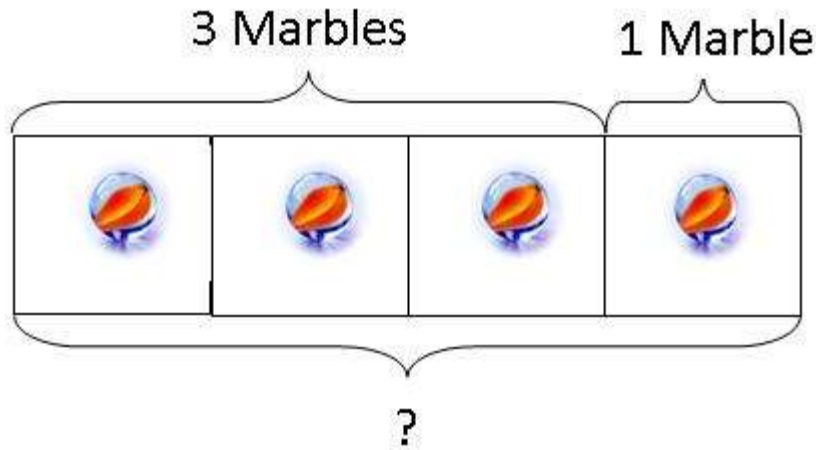# Addition - Aggregation

There are 3 footballs in the red basket 2 footballs in the blue basket. How many footballs are there altogether?

3 Balls   2 Balls

Addition - Augmentation

Peter has 3 marbles. Harry gives Peter 1 more marble. How many marbles does Peter have now?

3 Marbles   1 Marble   3 Marbles   1 Marble
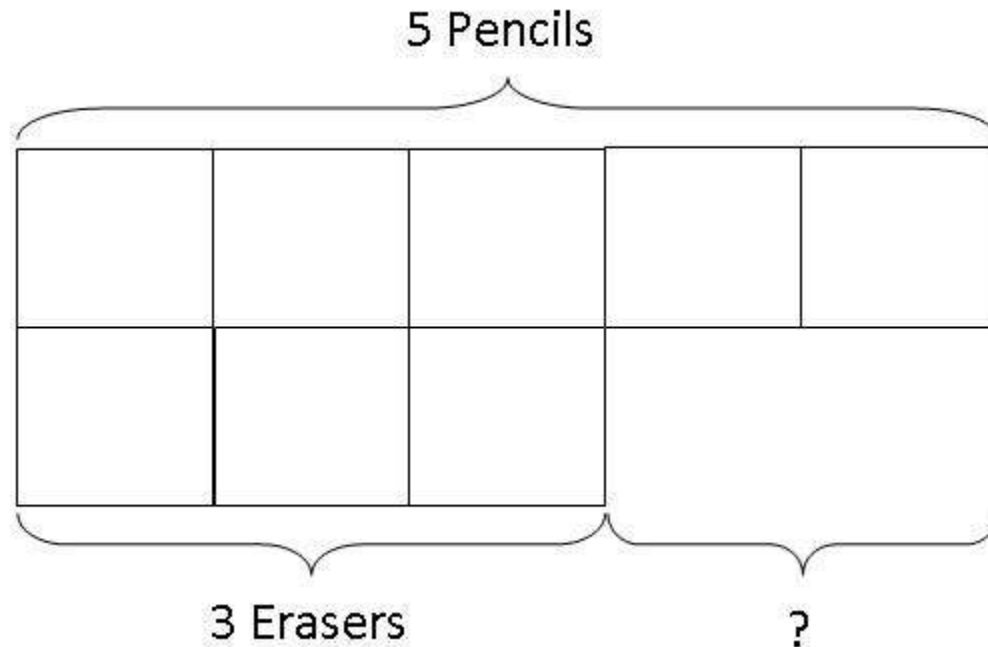
?

?

Concrete ⟶ Abstract

Subtraction - Comparison Model

Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?
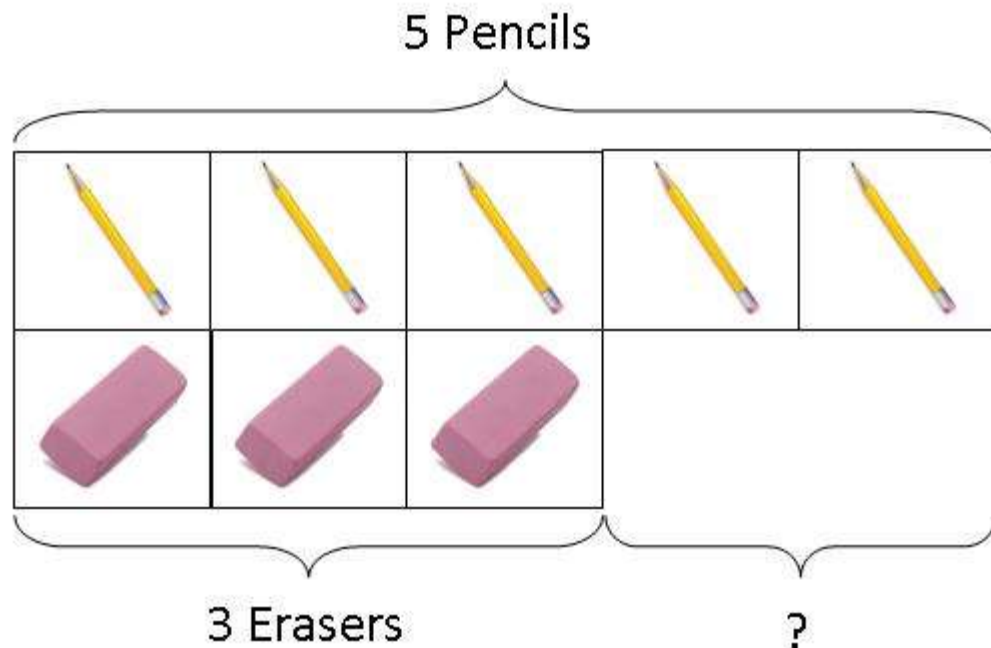
Moving to the abstract

Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?

Generalisation
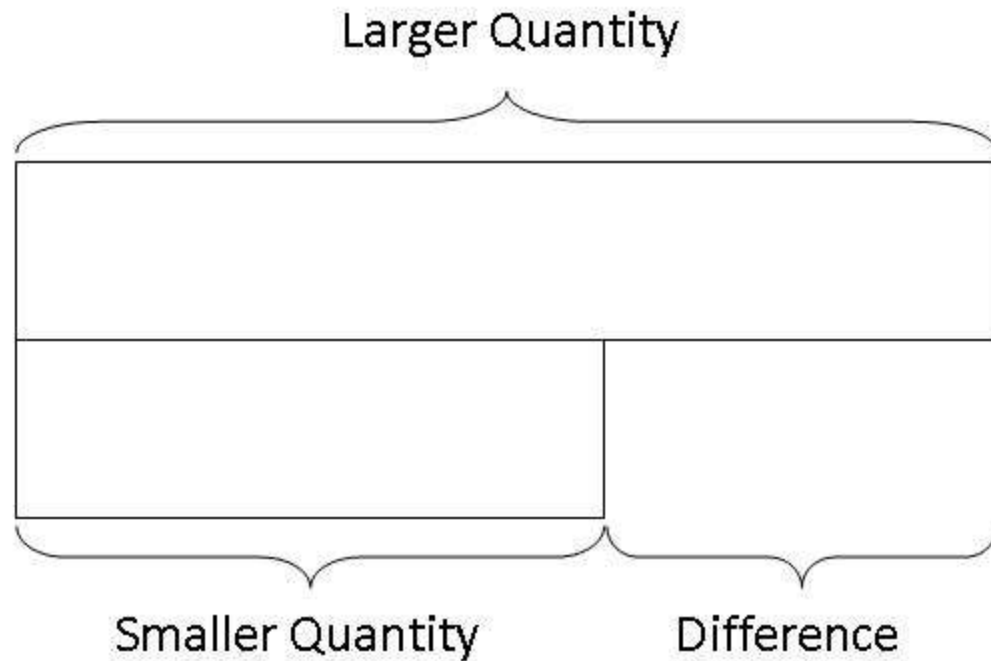
Problems to Solve

Tom has a bag of 64 marbles, his friend gives him 28 more, how many does he have now?

Kelsey was running a 26 mile marathon, after 18 miles she felt very tired. How many more miles did she have to run?

Carly bought an apple for 17p and a banana for 26p, how much has she spent?

Ali had £10, he bought a DVD for £6.70 and a CD for £2. 90, how much money did he have left?

Multiplication and Division

Bar Method…

Peter has 4 books

Harry has five times as many books as Peter. How many books has Harry?

4

4	4	4	4	4

Multiplication

Henry ate 10 meatballs at the Christmas party. Shane ate 3 times as many meatballs as Harry . How many meatballs did they eat altogether?

Helen has 9 times as many football cards as Sam. Together they have 150 cards. How many more cards does Helen have than Sam?

The sum of 2 numbers is 60. One number is 9 times as big as the other. What is the bigger number?

The sum of 2 numbers is 64. One number is 7 times as big as the other. What is the smaller number?

Division

108 Year 3 children are going on a field trip to the art museum. Each bus must carry 12 children. How many buses are needed?

Mr Smith had a piece of wood that measured 36 cm. He cut it into 6 equal pieces. How long was each piece?

Sam had 5 times as many marbles as Tom. If Sam gives 26 marbles to Tim, the two friends will have exactly the same amount. How many marbles do they have altogether?

Problems involving proportion

Take a Strip and a paperclip

Your Strip Represents 10p

- Show me 5p
- Show me 2p
- Show me 8p
- Show me 7p

Your Strip Represents £1

- Show me 50p
- Show me 20p
- Show me 80p
- Show me 70p

Your Strip Represents 1 metre

- Show me 50cm
- Show me half a metre
- Show me 20cm
- Show me 80cm
- Show me 70cm

Your Strip Represents £5

- Show me £3

- Show me £4

- Show me £3.50

- Show me £3.59

- What would the half way mark represent?

Draw 5 bars

Mark on 50% and the remaining proportion

Mark on 25% and the remaining proportion

Mark on 75% and the remaining proportion

Mark on 40% and the remaining proportion

Mark on 35% and the remaining proportion

Solving Proportional Problems

Peter has ten sweets he eats half of them how many does he have left?

Ali has 30 sweets, she eats 1/3 of them, how many does she have left?

Stacey has 30 sweets, she eats 2/3 of them, how many does she have left?

A dress costs £32, it is reduced in price by

50%, how much does it cost know?

Solving Proportional P

A Super Mario Game costs £45, it is reduced in price by 25%, how much does it cost now?
A computer game was reduced in a sale by 20%, it now costs £40, what was the original price
A computer game was reduced in a sale by 40%, it now costs £60, what was the original cost?
Laura had £240. She spent 5/8 of it. How much money did she have left?

24 In a class, 18 of the children are girls.

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Show your working

Reflection

As learners come to use particular representations in learning activities, the representations help guide the learning process and become a part of the learners' cognition. Murata (2008 p376)
With the aid of these simple strip diagrams, children can use straightforward reasoning to solve many challenging story problems conceptually. (Beckmann 2004 p46)

References

Aki Murata (2008): Mathematics Teaching and Learning as a Mediating Process: The Case of Tape Diagrams, Mathematical Thinking and Learning,10:4, 374-406

Beckman, S. (2004). Solving algebra and other story problems with simple diagrams: A method Demonstrated in grade 4–6 texts used in Singapore. *The Mathematics Educator, 14(1), 42–46.*

Useful Resources

http://www.mathplayground.com/thinkingblocks.html

Ratio

Tim and Sally share marbles in the ratio of 2:3
If Sally has 36 marbles, how many are there altogether?

A herbal skin remedy uses honey and yoghurt in the ratio 3 : 4. How much honey is needed to mix with 120 g of yoghurt?

A health bar sells desserts with chopped apricot and yoghurt In the ratio 2 : 5.How much chopped apricot will be mixed with 150 g of yoghurt?

At peak times my mobile phone costs 1 times as much as it does off-peak. A peak call costs 90p. What would it have cost off-peak?

How would you solve this problem?

Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one quarter of the remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles were in the bag to start with?

(Problem N16, page 19. Overall percent correct, Singapore: 81%, United States: 41%)

Bar Method Modelling

www.mathplayground.com

 - Thinking Blocks