

# Y5/6 Maths Training - Bar Modelling

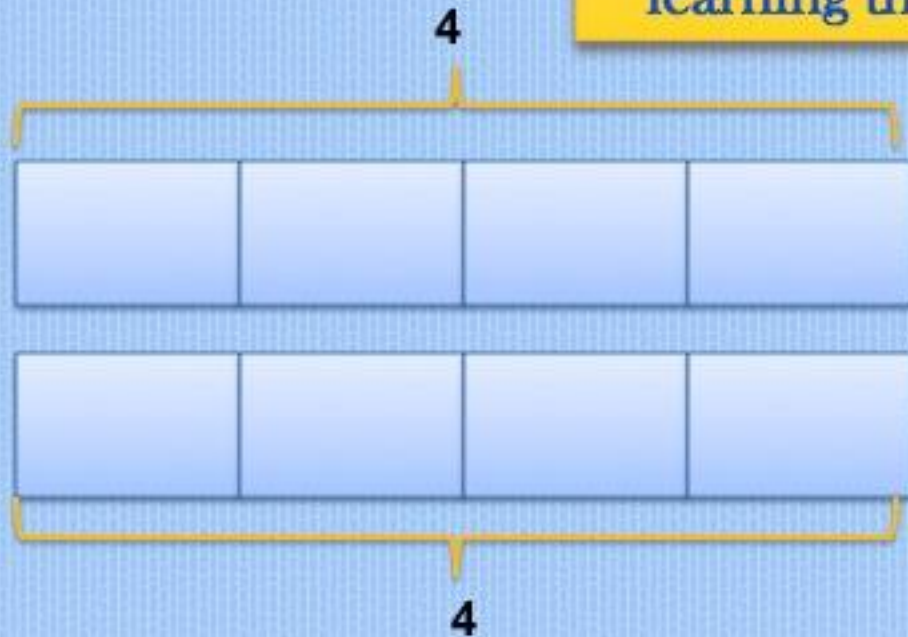
25/9/18

Singapore Math  
uses the C-P-A  
Approach which is  
based on a host of  
learning theories

Concrete



Pictorial



Abstract

$$4 + 4 = 8$$

$$4 \times 2 = 8$$


# KS2 SATs

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

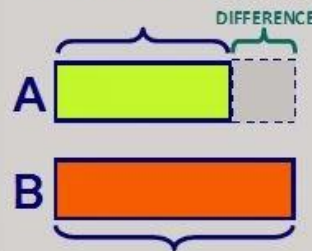
# Bar Modelling

## Solving Problems with Bar Modeling

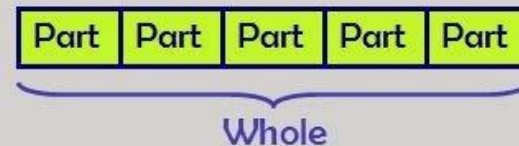
### Part-Part-Whole



### Comparison

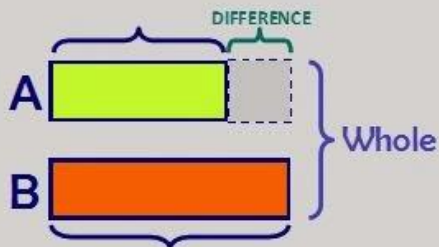


### Equal Parts of a Whole

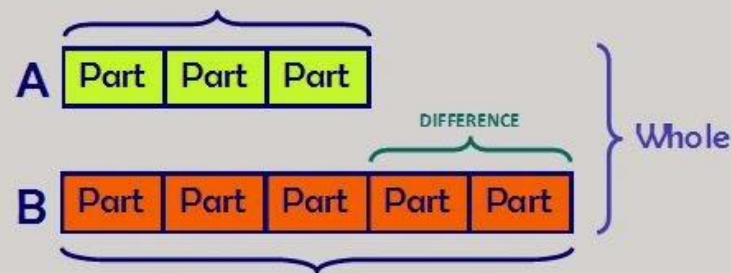


an Equal Part is a UNIT

### Comparison AND Part-Part-Whole




### Comparison AND Equal Parts of Wholes



an Equal Part is a UNIT

# Steps to Bar Modeling (Bob Hogan-Char Forsten)

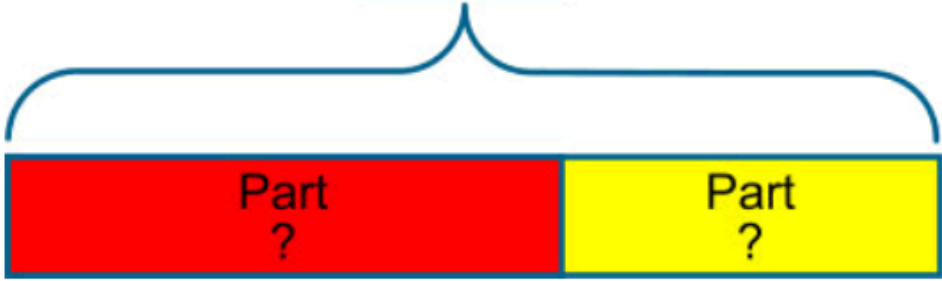
- Charlotte has a piece of wood  
That measures 24m long.  
She chops it into 4 equal parts.  
How long is each part?
- \* **Step 1:** Read the entire problem
  - \* **Step 2:** Decide WHO is in the problem.
  - \* **Step 3:** Decide WHAT is in the problem.
  - \* **Step 4:** Draw the unit bar(s).
  - \* **Step 5:** Read each sentence, one at a time, adjusting the bar(s) as needed.
  - \* **Step 6:** Put the QUESTION MARK in place.
  - \* **Step 7:** WORK COMPUTATION to the side or underneath.
  - \* **Step 8:** ANSWER the question in a complete sentence.



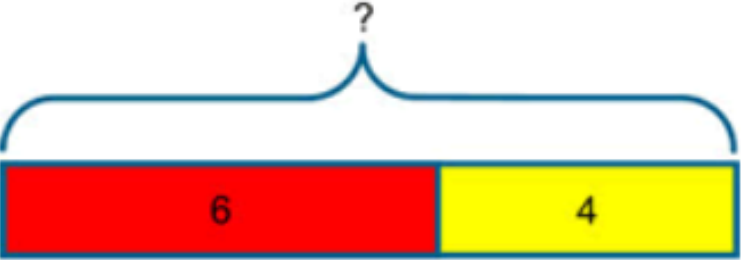
# Using Bar Models for Addition and Subtraction

In problems involving addition and subtraction there are three possible unknowns as illustrated below and given the value of two of them the third can be found.

Whole  
?



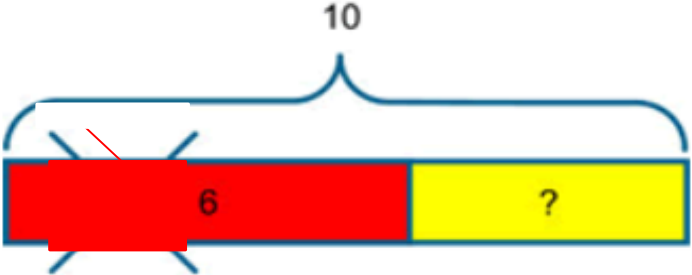
**Addition**



**I have 6 red pencils and 4 yellow pencils. How many pencils do I have?**

(I combine two quantities to form the whole)

**Subtraction  
- Take Away**

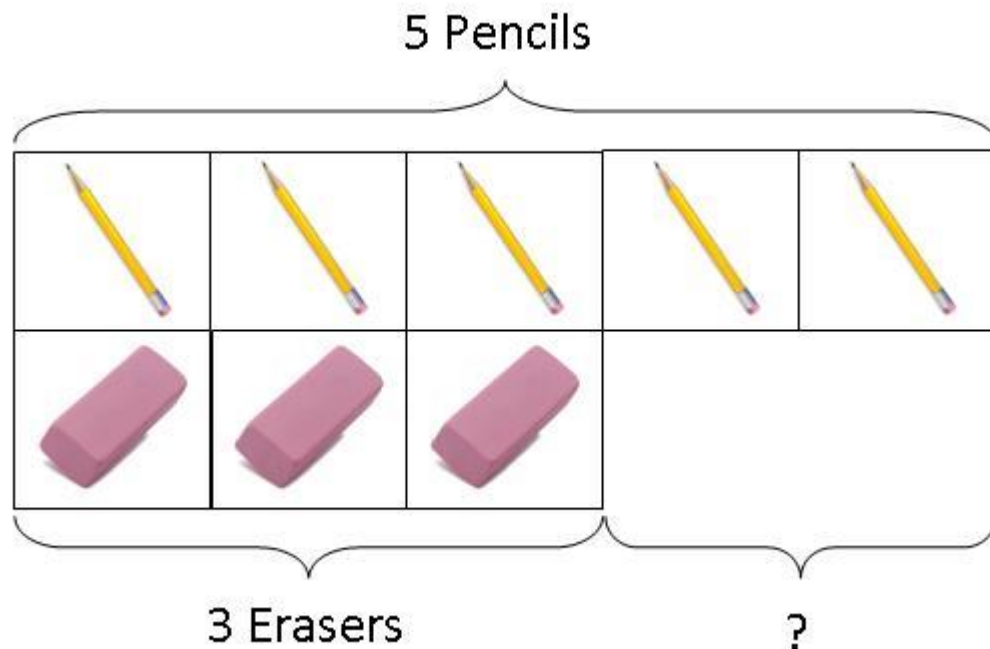


**I had 10 pencils and I gave 6 away, how many do I have now?**

(This time we know the whole but only one of the parts, so the whole is partitioned and one of the parts removed to identify the missing part)

# Subtraction - Comparison Model

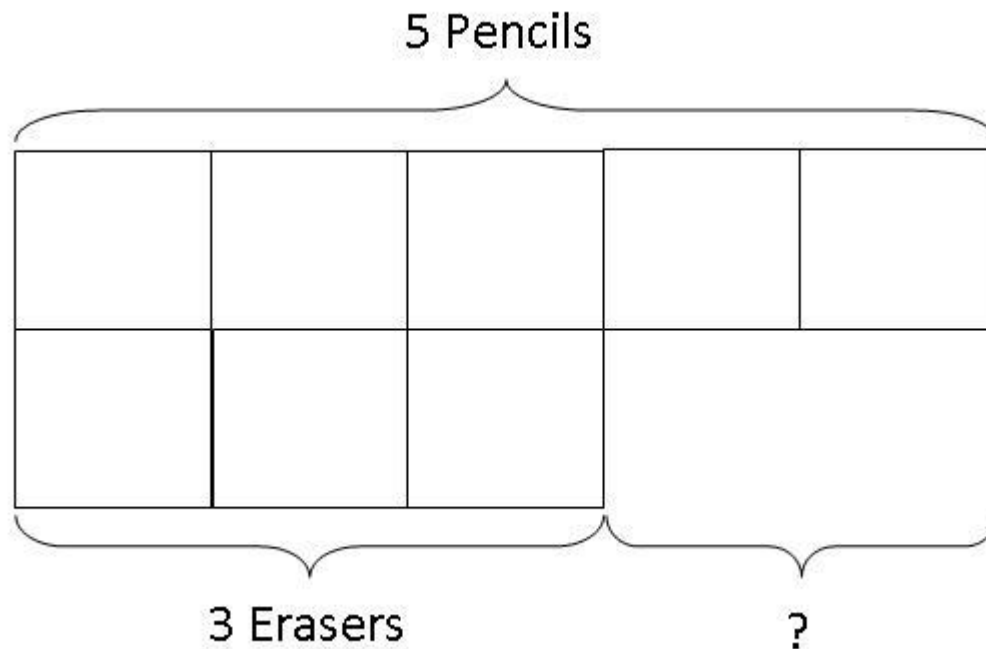
- \* Peter has 5 pencils and 3 erasers. How
- \* many more pencils than erasers does he
- \* have?



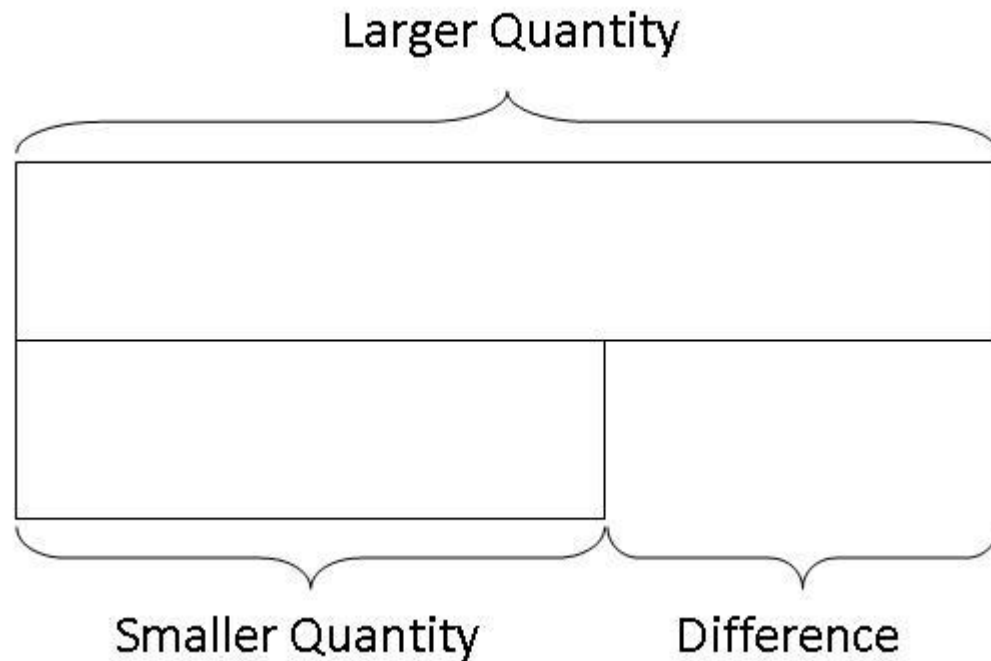


# Moving to the abstract

- \* Peter has 5 pencils and 3 erasers. How many more pencils



# 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?



# Using Bar Models for Multiplication and Division

- \* 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  $\frac{1}{3}$  of them, how many does she have left?
- \* Stacey has 30 sweets, she eats  $\frac{2}{3}$  of them, how many does she have left?
- \* A dress costs £32, it is reduced in price by 50%, how much does it cost now?



# Solving Proportional Problems

- \* 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  $\frac{5}{8}$  of it. How much money did she have left?

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



# How would you solve this problem?

- \* Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one-fourth 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?

- \* In a zoo, the adult polar bear weighs three times more than the baby elephant.



- \* Together they weigh 700 kilograms.
- \* How much does the polar bear weigh?