Stamford Green Primary School

Working together to be the best we can

Maths Workshop

The Aims of the National Curriculum

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics at Stamford Green - **Fluency**

Children need to be fluent in:

- Recall of key number facts;
- Mental calculation strategies;
- Written calculation strategies.

Key Number facts – bonds to 10

4 + 6 = 10

Linked facts are:

6 + 4 = 10;

10 – 4 = 6; 10 – 6 = 4

40 + 60 = 100; 60 + 40 = 100;

100 – 60 = 40; 100 – 40 = 60

Key Number facts – bonds to 10

4 + 6 = 10

Linked facts are:

600 + 400 = 1000;

1000 – 400 = 600; 1000 – 600 = 400

0.4 + 0.6 = 1; 0.6 + 0.4 = 1;

1 – 0.6 = 0.4; 1 – 0.4 = 0.6

Key Number facts – bonds to 10

4 + 6 = 10

Linked facts are:

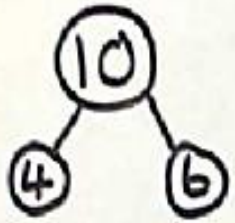
2600 + 400 = 3000;

5000 – 400 = 4600; 8000 – 600 = 7400

2.4 + 0.6 = 3; 9.6 + 0.4 = 10;

0.1 – 0.06 = 0.04; 10 – 0.4 = 9.6

Thinking about numberbonds



$4+6=\square$
$10-6=\square$
$10-\square=4$
$\square=4+6$
$\square-4=6$
$4+\square=10$

add
plus
addition
total

subtract
take away
minus
difference

$6+4=\square$
$10-4=\square$
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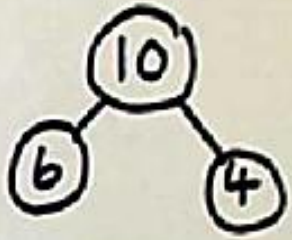
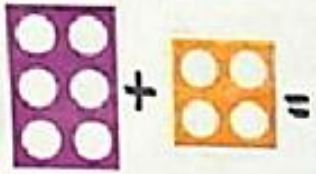


How many more beads make 10?



$\square+6=4+6$

$4+6=\square+4$

$\square+4=\square+6$

There are 10 children in a group. 4 are boys. How many girls?

I add my number to 6. It makes 10. What is my number?

What is 6 more than 4?

4p
How much will I have left after buying the sweet?

What is the total of 6 and 4?

How many ice creams do I have in total?

What is 4 less than 10?

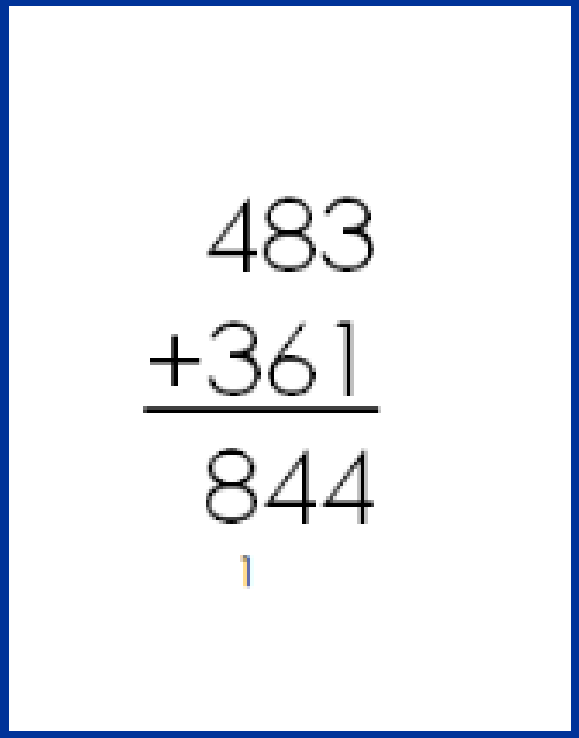
What is the difference between 10 and 6?

I have eaten 6 chocolate bars. How many are left?

Subtract four from ten.

What is the sum of 6 and 4?

Without fluent recall of addition facts – this doesn't work:-



Key Number facts – multiplication tables

7 x 8 = 56

Linked facts are:

8 x 7 = 56;

56 ÷ 7 = 8 ; 56 ÷ 8 = 7

7 x 80 = 560; 8 x 70 = 560;

560 ÷ 8 = 70; 560 ÷ 70 = 8

Key Number facts – multiplication tables

7 x 8 = 56

Linked facts are:

8 x 0.7 = 5.6;

5.6 ÷ 7 = 0.8 ; 5.6 ÷ 0.8 = 7

70 x 80 = 5600; 800 x 70 = 56000;

5600 ÷ 80 = 70; 56 ÷ 0.7 = 80

5600 ÷ 80 = 70; 56 ÷ 0.7 = 80

Bob wanted to give the whole of Y6 a drink on a hot day. He has 5.6L of orange squash concentrate.

It takes 80ml of squash to make a drink for one person. Does he have enough?

Year 5 took £56 by selling lollies.

The lollies cost 70p each.

How many did they sell?

"The expectation is that the majority of pupils will move through the curriculum at broadly the same pace"

Mathematics National Curriculum 2014

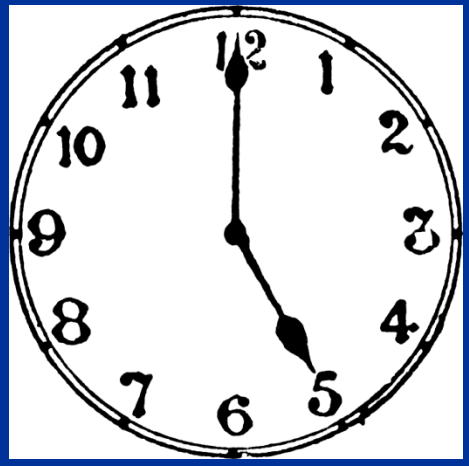
So how do we challenge everyone?

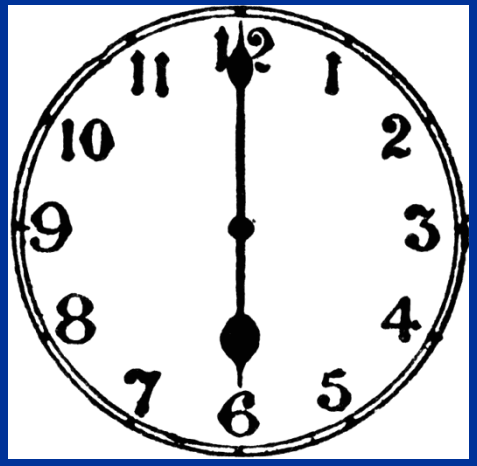
How fluent is fluent?

Y1 National Expectation:

"Pupils should be taught to:

Tell the time to the hour and half past the hour"





How fluent is fluent?

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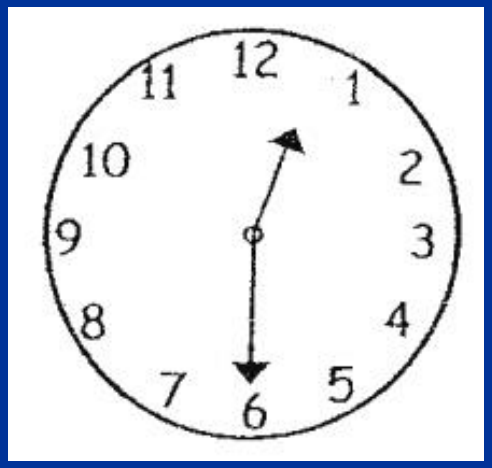

How fluent is fluent?

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How fluent is fluent?

Y1 National Expectation:

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Bob goes swimming at 5 o'clock. Which clock shows that time?

How fluent is fluent?

Y1 National Expectation:

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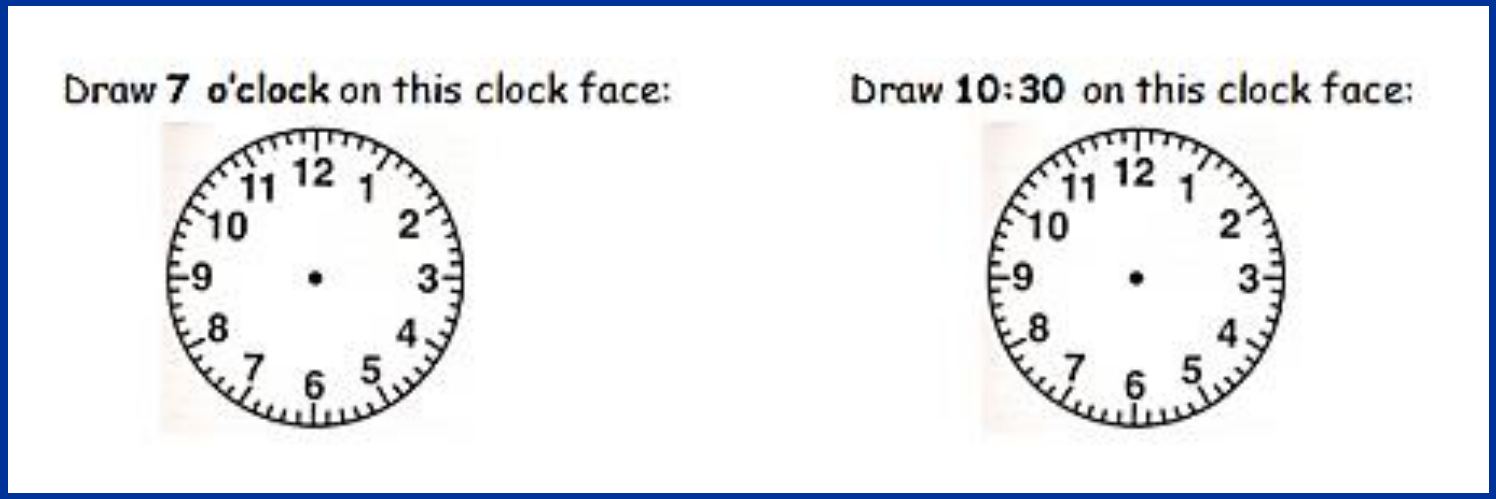

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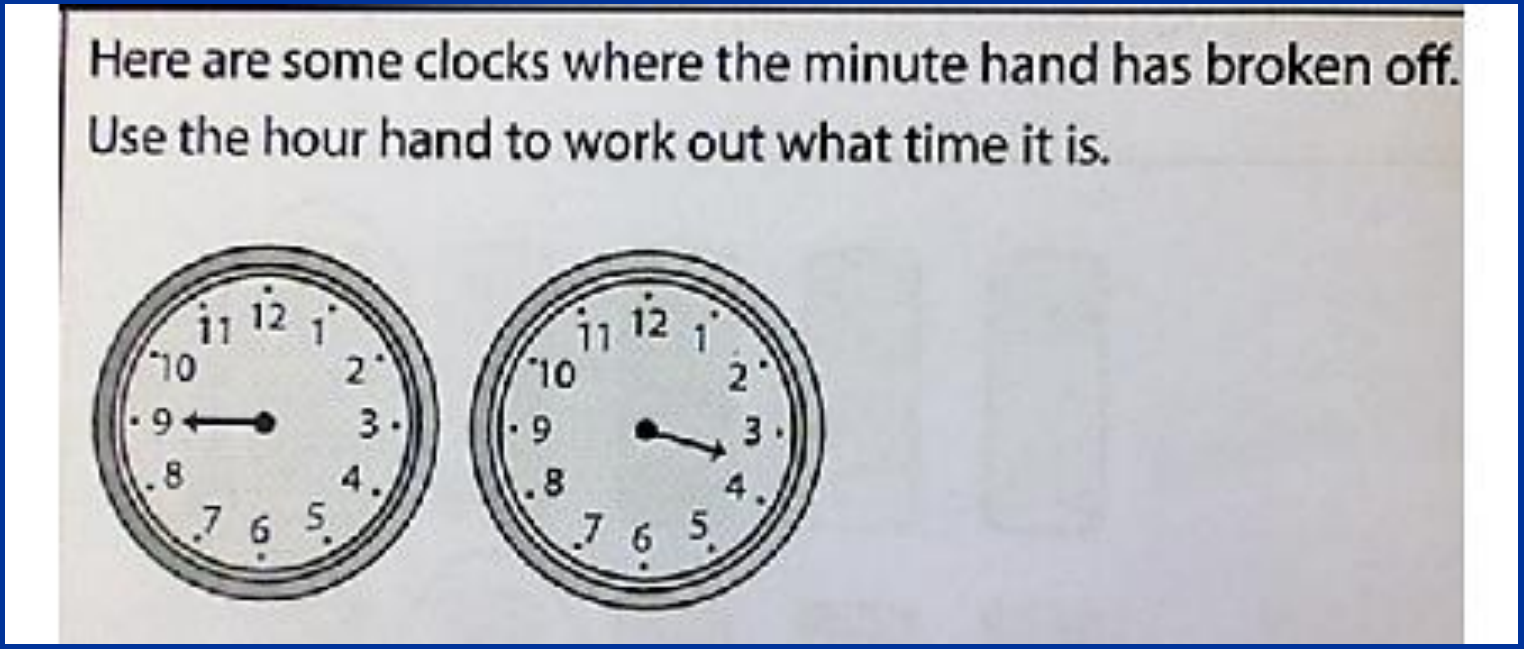


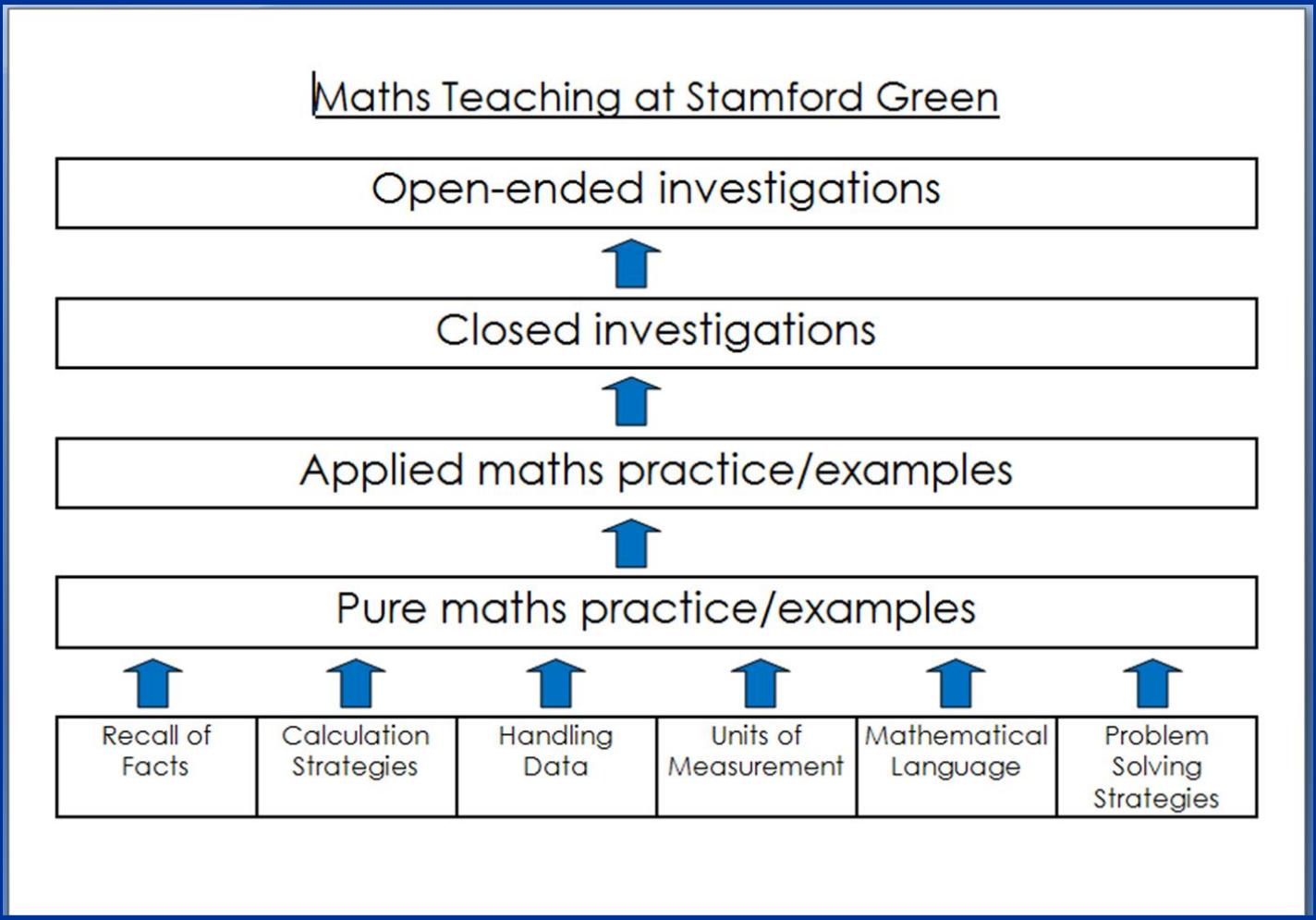
Mathematics at Stamford Green
Reasoning

Confident mathematicians:

- Apply concepts that they know;
- Are 'pattern sniffers';
- Can think abstractly;
- Are flexible and creative in their strategies;
- Can transfer mathematical concepts to unfamiliar situations;
- Are persistent in solving challenging problems.

(Stepanek 1999)

How do we teach it?



Mathematics at Stamford Green
Reasoning

- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

Mathematical Reasoning:
Another and another…

Write down a fraction that is equivalent ¼

and another…

and another…

and another…

Mathematical Reasoning:
Always, sometimes, never.

Halves are the same size.

Halves are the same shape.

When you multiply the product is always larger than the multiplicand.

A square is a rectangle.

Mathematical reasoning:
Odd One Out?

25

13

50

Mathematical Reasoning:

True or False?

Even + Even = Even

Even + Odd = Even

Odd + Even = Odd

Odd + Odd = Odd

Can you explain why?
Can you prove it?

Mathematics at Stamford Green
Problem Solving

- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Problem Solving:
Visual representation

Josie had 7 times as many sweets as Abi.

Josie gave Abi some of her sweets.

They now each have 20.

How many sweets did Josie have before sharing them with Abi?

Problem Solving:
Visual representation

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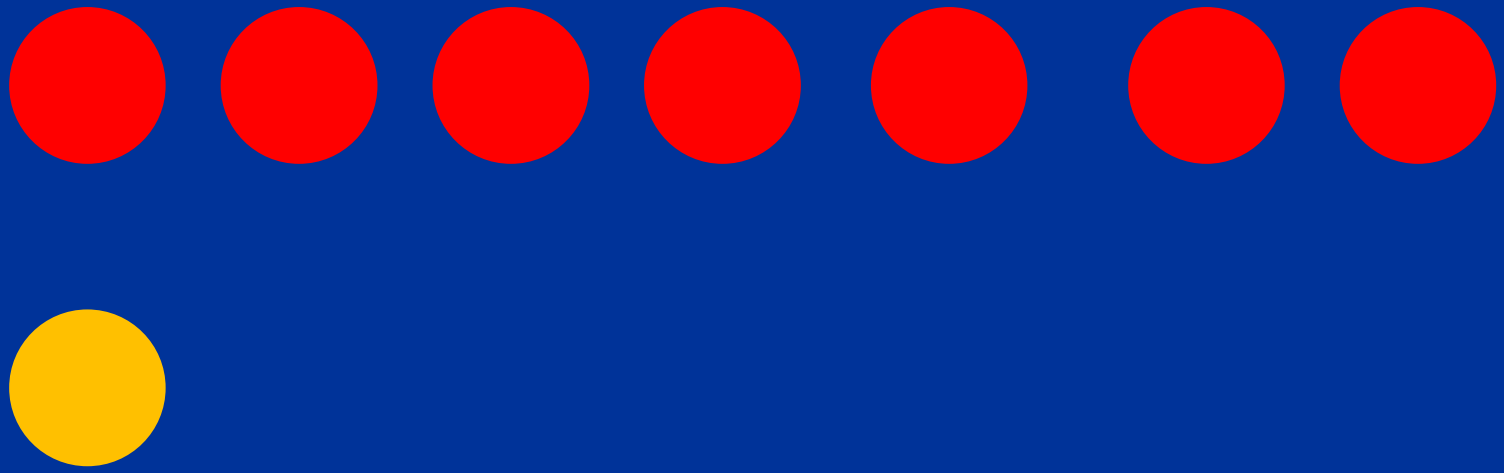

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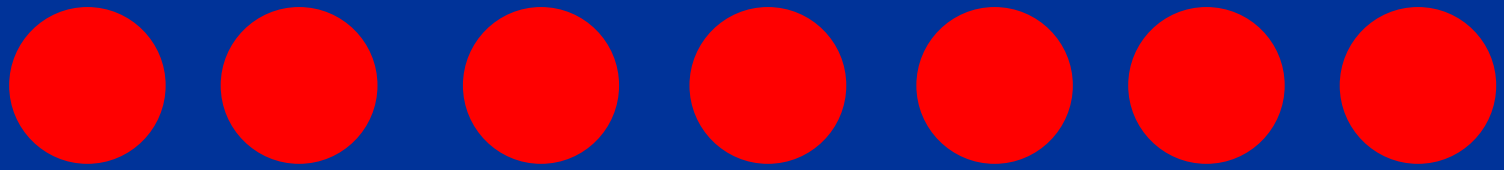


How many sweets did Josie have before sharing them with Abi?

Counters – Have a go!

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?

Counters

Farmer Brown has a third of the sheep that Farmer Giles has.

After 12 of Farmer Giles' sheep escape into Farmer Brown's field they have the same amount.

How many sheep do they have in total?

Counters

A farmer has 24 animals.

There are three times as many sheep as cows.

How many sheep and how many cows?

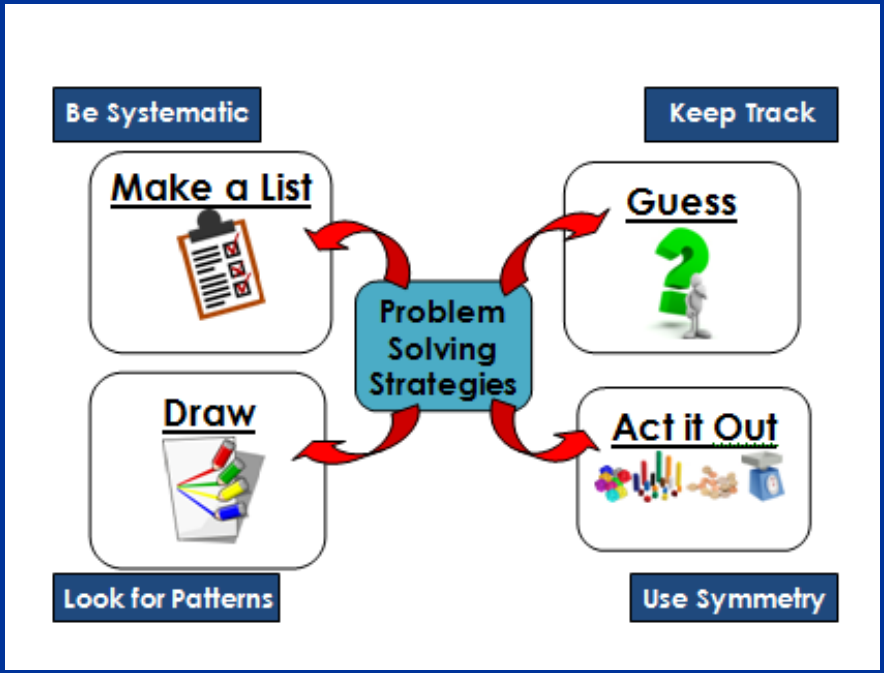
Another farmer has 42 animals.

There are twice as many ducks as cows and three times as many sheep as cows.

How many sheep, cows and ducks?

The counters help to reveal the **structure** of the question.

Once children understand how to manipulate the information a simple drawing can be used instead.



Be Systematic

Keep Track

Make a List

Guess

Problem Solving Strategies

Draw

Act it Out

Look for Patterns

Use Symmetry

“Open” Problems

How much water is drunk on one day at Stamford Green?

“Open” Problems

“Open” Problems

How can we encourage these characteristics?

Confident mathematicians:

- Apply concepts that they know;
- Are 'pattern sniffers';
- Can think abstractly;
- Are flexible and creative in their strategies;
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Encouraging Maths

What does your child hear about maths in your home?

- http://www.familymathstoolkit.org.uk/

Encouraging Maths

Maths is everywhere in Sport

- http://www.bbc.co.uk/sport/football/world-cup/2014/schedule/group-stage

So…

Fluency

Reasoning

Problem Solving