Problem Solving in Maths

Parent & Carer workshop

Thursday 2nd May

What is the point in doing maths?

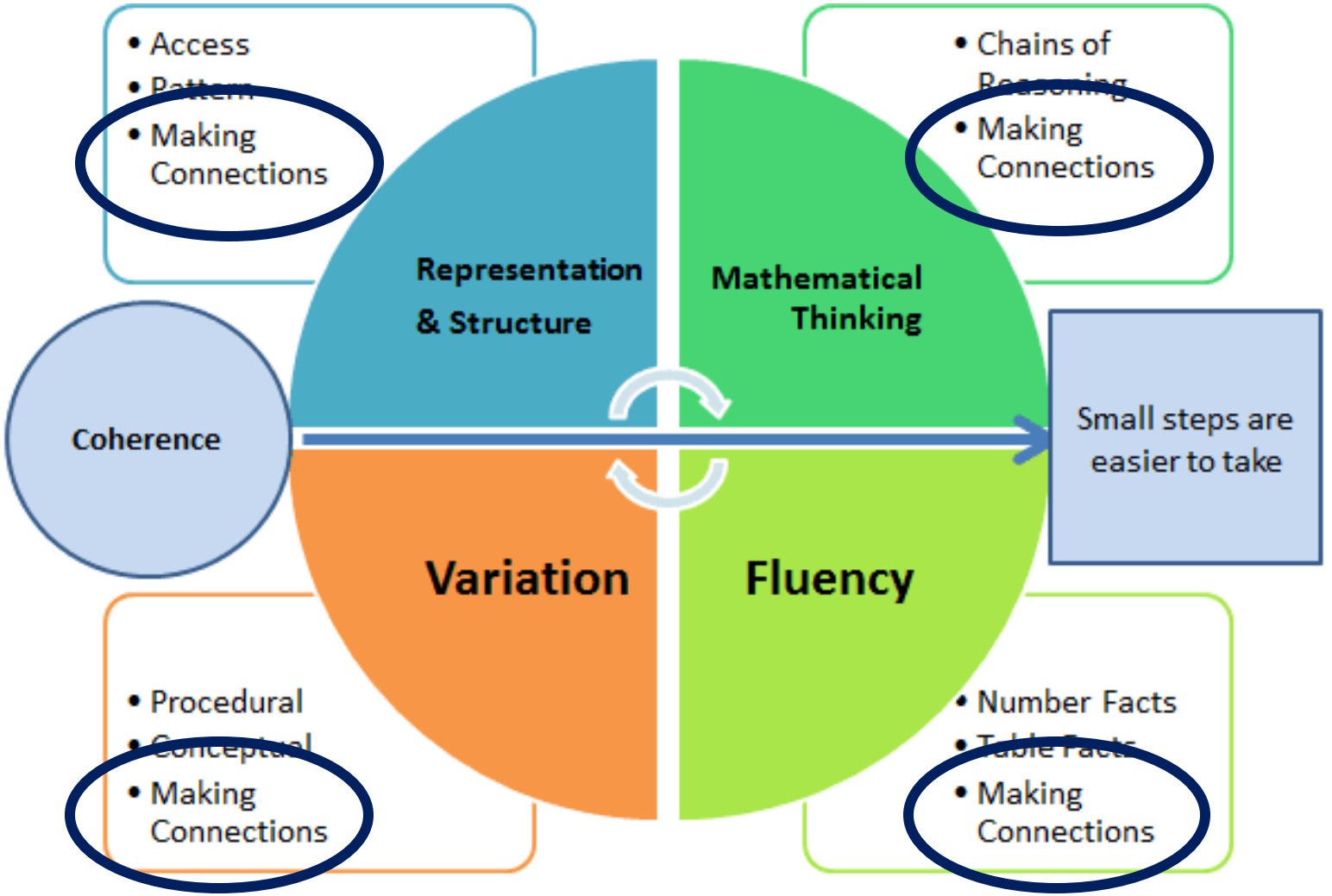
Ask most children what they think maths is and they will say it's all about rules which they need to learn, or facts they have to remember. Ask them why they learn maths and the most frequent answers include something about passing tests, or perhaps being better at handling money when shopping.

What children should be doing is solving problems. Because the *whole point* of learning maths is to be able to solve problems. Learning those rules and facts is of course important, but they are the tools with which we learn to do maths fluently, they aren't maths itself.

The role and purpose of problem solving

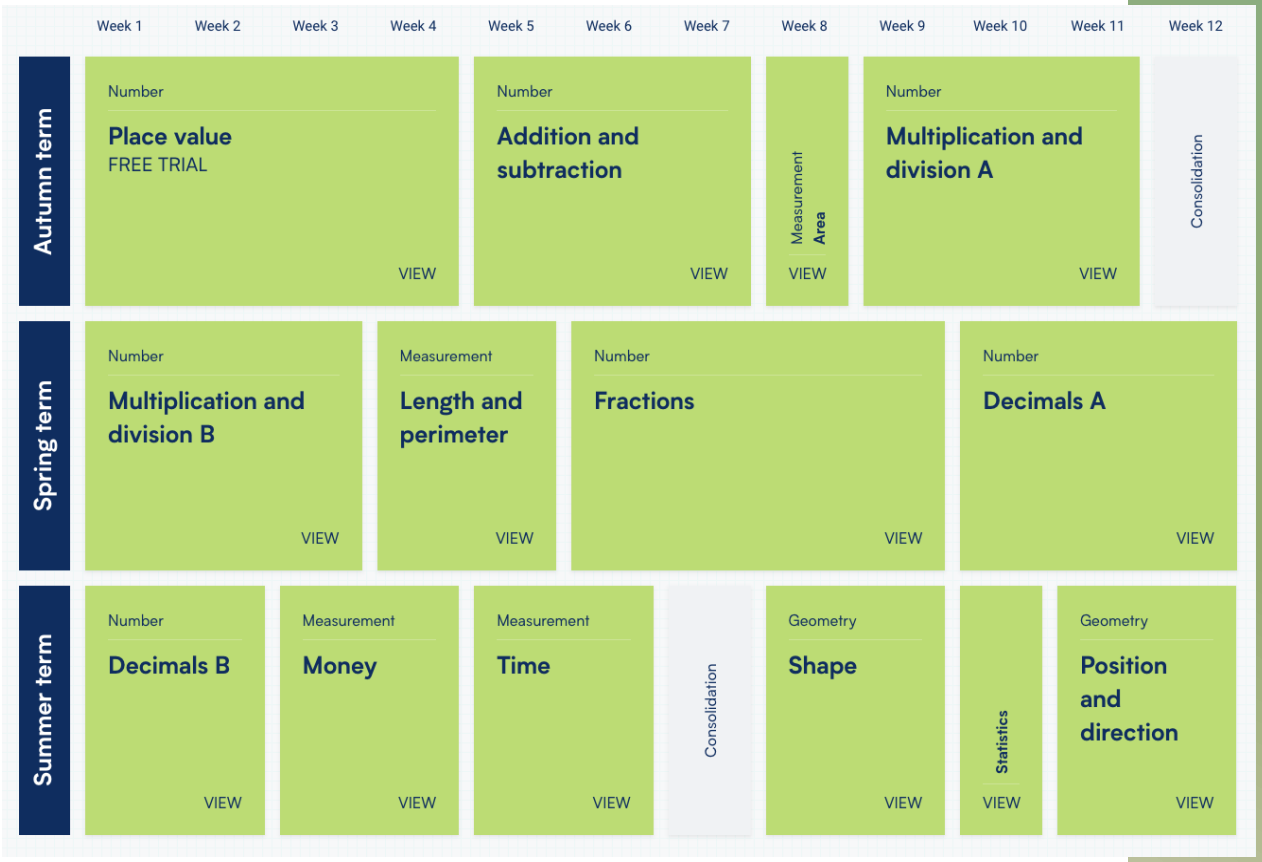
"The national curriculum for mathematics aims to ensure that all pupils.....become fluent.....reason mathematically..... and can solve problems."

Big 5 ideas


• Access
• Pattern
• Making Connections
• Chains of Reasoning
• Making Connections
Representation & Structure
Mathematical Thinking
Coherence
Small steps are easier to take
Variation
Fluency
• Procedural
• Conceptual
• Making Connections
• Number Facts
• Table Facts
• Making Connections

The curriculum

We utilise the White Rose scheme of learning, which provides suggested sequences and coverage for a mastery curriculum. This can be accessed for free by parents and carers on the White Rose website.



Small steps overview

Step 1	Apply number bonds within 10
Step 2	Add and subtract 1s
Step 3	Add and subtract 10s
Step 4	Add and subtract 100s
Step 5	Spot the pattern
Step 6	Add 1s across a 10
Step 7	Add 10s across a 100
Step 8	Subtract 1s across a10
Step 9	Subtract 10s across a 100
Step 10	Make connections
Step 11	Add two numbers (no exchange)
Step 12	Subtract two numbers (no exchange)
Step 13	Add two numbers (across a 10)
Step 14	Add two numbers (across a 100)
Step 15	Subtract two numbers (across a 10)
Step 16	Subtract two numbers (across a 100)

For each small step, teachers consider what problem solving will look like

Subtract 10s across a 100

Complete the sentences with "always", "sometimes" or "never".

When I subtract a multiple of 10 from a 3-digit number, the ones column _____ changes.

When I subtract a multiple of 10 from a 3-digit number, the tens column _____ changes.

When I subtract a multiple of 10 from a 3-digit number, the hundreds column _____ changes.

Here are some digit cards.

2	5	6	8

Use the digit cards to complete the subtraction in as many different ways as you can.

			–		0

How many times did you need to cross a 100?

Talk about it with a partner.

$\frac{1}{5}$ of a number is 22

What is the number?

One day last year, the rate of rainfall from 6:30 am until 9:00 am was 2 millimetres per hour.

What was the **total** rainfall from 6:30 am until 9:00 am?

mm

Some children choose their favourite zoo animal.

The pictogram shows the results.

Key: ● stands for **2** children

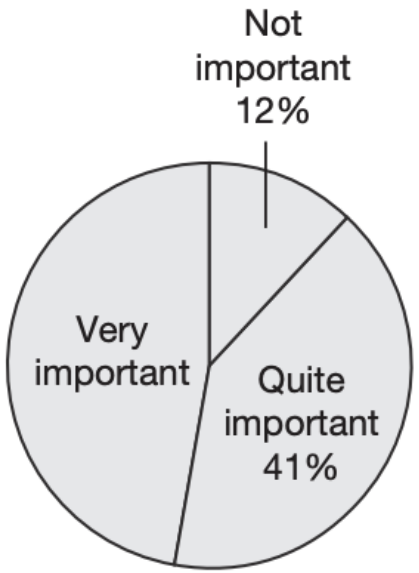
Animal	Number of children
penguin	● ● ●
elephant	● ● ◗
tiger	● ● ● ● ● ●
giraffe	● ◗

How many **more** children choose tiger than elephant?

1,200 pupils were asked this question:

How important is it to have a break when using a screen?

This chart shows the results.



How many pupils answered 'Very important'?

The manager of a flower shop orders 4 boxes of red roses.

There are 50 roses in each box.

The manager makes bunches with 6 roses in each bunch.

What is the **greatest** number of bunches that can be made?

Highlighting problem solving skills

+ Visualising
+ Working backwards
+ Reasoning logically
+ Conjecturing
+ Working systematically
+ Looking for patterns
+ Trial and improvement.

Isolated problem solving

One of the ways we can help learners become better problem solvers is by repeatedly and explicitly giving them opportunities to develop key problem-solving skills.

Isolated problem solving - KS1

Rob and Jennie were making necklaces to sell at the school fair.

They decided to make them very mathematical.

Each necklace was to have eight beads, four of one colour and four of another.

And each had to be symmetrical, like this.

How many different necklaces could they make?

Can you find them all?

How do you know you haven't missed any out?

What if they had 9 beads, five of one colour and four of another?

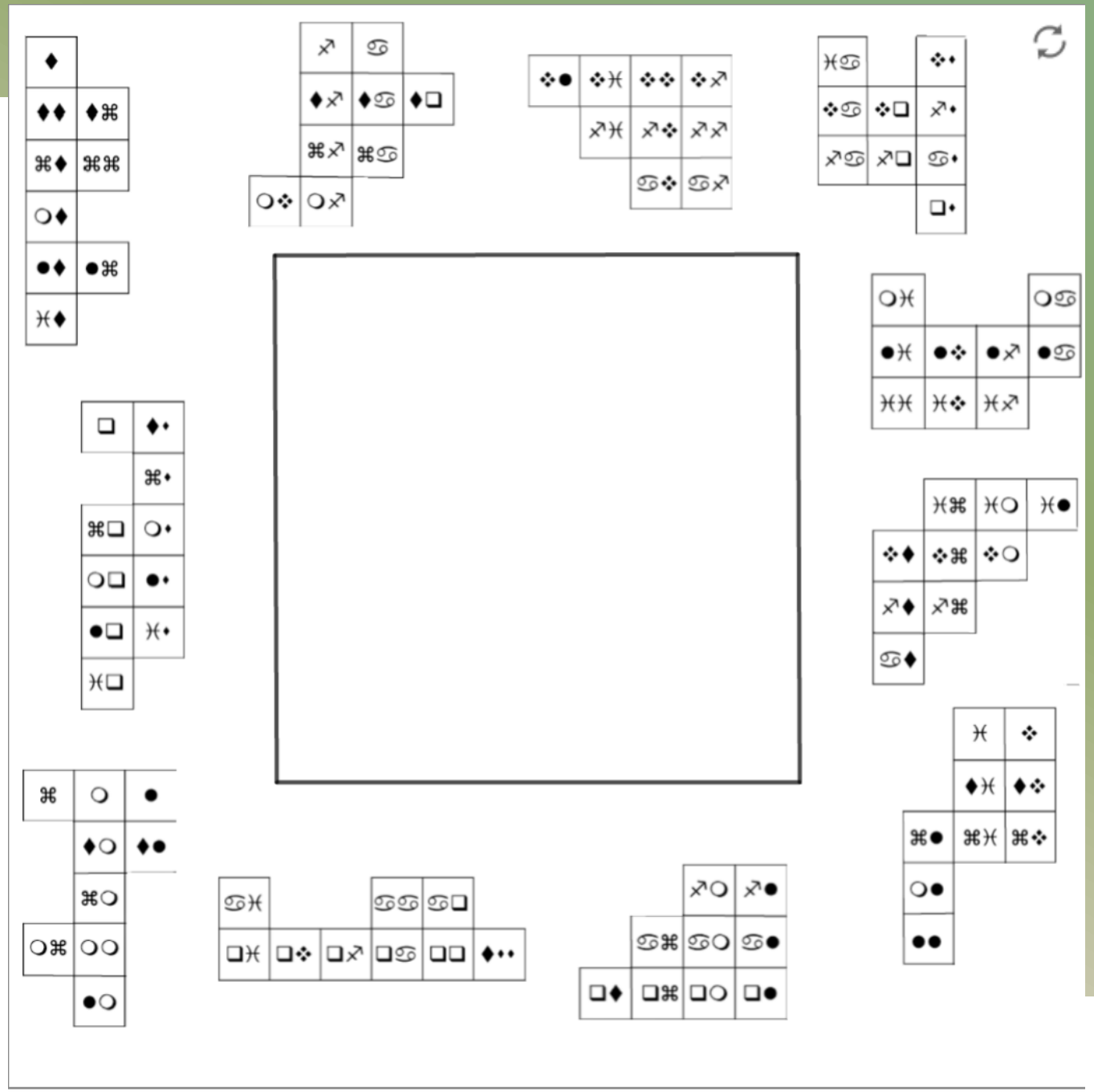
What if they had 10 beads, five of each

Isolated problem solving - KS2

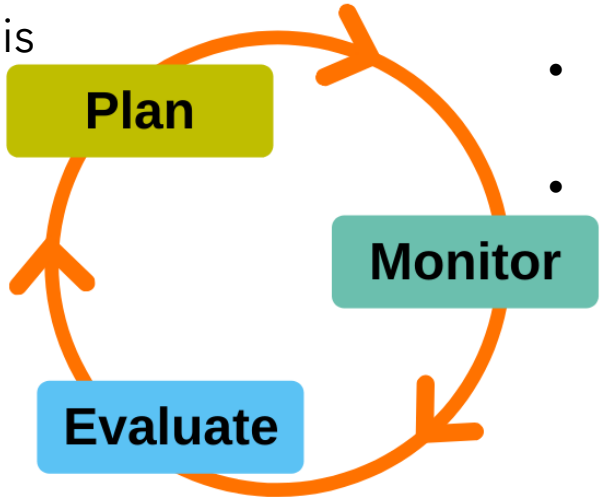
This hundred square is written in code.

It starts with one and ends with a hundred.

Can you build it up? How did you do it?



- What is the problem asking me to do?
- Have I seen problems before that look like this one?
- What maths might help me to solve this problem?
- What information in the problem is important?



- Is my chosen strategy working?
- Should I stick with my plan?
- Has my teacher shown me anything which might help me here?
- Are there different ways to solve this problem?
- Have I made any obvious mistakes?

- Does my answer make sense?
- Is there a way I can check my answer?
- Am I sure I have answered the question
- Does my answer need units?
- Would another child understand my working out?
- Can I explain to someone else what I did and why I did it?
- Would I solve the problem in a different way if I tried it again?

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Nurturing young mathematicians: teacher webinars
30 April (Primary), 1 May (Secondary)

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Maths at Home

This feature is a little different from usual! We have selected some of our favourite activities and games from the NRICH collection that are ideal for working on at home without a teacher.

Maths at Home — **Age 3 to 18**

This article for teachers, parents and carers offers guidance on how learners can get the most out of the activities in our Maths at Home features.

Maths at Home — **Age 3 to 5**

This collection of activities is particularly suitable for 3 to 5 year olds.

Maths at Home — **Age 5 to 7**

This collection of activities is particularly suitable for 5 to 7 year olds.

Maths at Home — **Age 7 to 11**

This collection of activities is particularly suitable for 7 to 11 year olds.

Things you can try at home


Questions?

Feedback