

Beyond Fluency

Wednesday 23rd November 2016



National Curriculum

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

Reasoning

Reasoning skills demonstrate how a child is able to use their previous knowledge to help explain or calculate a problem.

Hot.

Q15. Megan goes on a walking holiday for five days.
The table shows how far she walked on the first four days.

Monday	Tuesday	Wednesday	Thursday
14 km	23 km	13 km	13 km

Megan says,

'My average for the first four days is more than 15 km.'

$$\begin{array}{r} 14 \\ 23 \\ 13 \\ + 13 \\ \hline 63 \end{array}$$

Explain why Megan is **correct**.

If you add the 4 days' amounts, you would get 63km and if you divide that by 4 (to find the mean average) you would get 15.75km ✓

y is her last day.

Application

Application skills demonstrate how a child is able to transfer a new skill in to a different context.

To apply BODMAS to word problems.

1. S. 3 $(96 \div 12) \times 2 + (12 \times 2) \times 2$

$$12 \times ? = 96 \text{ m}^2$$

$$12 \times \underline{8} = 96 \text{ m}^2$$

$$12 \text{ m} + 8 \text{ m} + 12 \text{ m} + 8 \text{ m} = \underline{\underline{40 \text{ m}}} \quad \checkmark$$

2. $(1004 \div 2) - 213 = 3$

$$1004 \div 2 = 502$$

$$\begin{array}{r} 491 \\ 502 \\ - 213 \\ \hline \end{array}$$

$$= \underline{\underline{289 \text{ pages}}} \quad \checkmark$$

3. $(632 \div 2) \div 2$

Set 3

The area of a rectangular field is 96 m^2 . The length of one side is 12 m . The farmer needs to know its perimeter to work out how much fencing will be needed?

I have read 213 pages of my 1004 page book. How many pages must I read until I reach the middle?

Katie picked 632 strawberries. She ate half of them on Monday and half of what was left on Tuesday. How many were left on Wednesday?

Karen is making book shelves. She wants to make 3 shelves that are 1.25 m long. She has a piece of wood that is 5 m long. What length of wood will be left over?

Problem Solving

Problem solving skills demonstrate how a child is able to apply their mathematical knowledge to help solve number problems that often involve a real life context.

Name:

Date:

Key Stage 2 Maths Practise Reasoning: 4-Digit by 2-Digit Division



For each question, write the missing digits to make the division correct.

1.

$$\begin{array}{r}
 \begin{array}{cccc} & 1 & 4 & 2 \end{array} \\
 \boxed{2} 6 \overline{) 3 \boxed{6} 9 \boxed{2}} \\
 \underline{2 \boxed{6}} \\
 1 \boxed{0} 9 \\
 \underline{1 \boxed{0} 4} \\
 5 \boxed{2} \\
 \underline{5 \boxed{2}} \\
 0 \quad 0
 \end{array}$$

2.

$$\begin{array}{r}
 \begin{array}{cccc} & 2 & 3 & 7 \end{array} \\
 4 \boxed{2} \overline{) 9 \boxed{9} \boxed{5} 4} \\
 \underline{8 \boxed{4}} \\
 1 \boxed{5} \boxed{5} \\
 \underline{1 \boxed{2} \boxed{6}} \\
 2 \boxed{9} 4 \\
 \underline{2 \boxed{9} 4} \\
 0 \quad 0 \quad 0
 \end{array}$$

3.

$$\begin{array}{r}
 \begin{array}{cccc} & 5 & 4 & 1 \end{array} \\
 1 \boxed{8} \overline{) 9 7 \boxed{3} \boxed{8}} \\
 \underline{9 \quad 0} \\
 7 \boxed{3} \\
 \underline{7 \boxed{2}} \\
 1 \boxed{8} \\
 \underline{1 \boxed{8}} \\
 0 \quad 0
 \end{array}$$

4.

$$\begin{array}{r}
 \begin{array}{cccc} & 2 & 1 & 9 \end{array} \\
 \boxed{} 5 \overline{) 7 \boxed{} 6 \boxed{}} \\
 \underline{7 \boxed{}} \\
 \boxed{} 6 \\
 \underline{\boxed{} 5} \\
 \boxed{} 1 \boxed{} \\
 \underline{\boxed{} 1 \boxed{}} \\
 0 \quad 0 \quad 0
 \end{array}$$

HOT

Misconception

Misconceptions are another form of reasoning but is aimed at the children being able to demonstrate their understanding by proving a calculation is incorrect.

<u>Mistake</u>	<u>Correct</u>	<u>Explanation</u>
$\begin{array}{r} 2072 \\ 5 \overline{) 1337} \end{array}$	$\begin{array}{r} 027 \text{ r } 2 \\ 5 \overline{) 1337} \end{array}$	0 needs to go above the 1 as 5 is unable to go into 1. Then the 1 should be carried over to the 3. Writing the answer above this number. The remainder is written off to the side.
$\begin{array}{r} 111 \\ 6 \overline{) 776} \end{array}$	$\begin{array}{r} 129 \text{ r } 2 \\ 6 \overline{) 7756} \end{array}$	The remainder of $7 \div 6$ needs to be carried over to the next column to make 17. 6 goes twice into 17 so a two should be written above the 7. The remainder, 5, needs to be carried to the next column and the final remainder should be written to the side.
$\begin{array}{r} 94 \text{ r } 3 \\ 4 \overline{) 379} \end{array}$	$\begin{array}{r} 094 \text{ r } 3 \\ 4 \overline{) 379} \end{array}$	The answer is correct however, the method isn't right as the remainders have not been carried to the next column. E.G.: 4 goes 9 times into 37 with a remainder of 1 to be carried.
$\begin{array}{r} 137 \\ 7 \overline{) 9652} \end{array}$	$\begin{array}{r} 137 \text{ r } 3 \\ 7 \overline{) 9652} \end{array}$	The final remainder, 3, had not been written down. E.G.: 7 goes 7 times into 52 with a remainder of 3 to be carried.

used reasoning to explain short division

used reasoning to explain short division

WWW

Over to our experts

Why is reasoning and problem solving important?

- Allows children to demonstrate they have a solid understanding of concepts oppose to learning mathematical concepts by rote.
- Supports their fluency
- Real life concepts