2016 national curriculum assessments

Key stage 1

2016 teacher assessment exemplification: end of key stage 1

Mathematics

Working at greater depth within the expected standard

April 2016

Standards & Testing Agency

Contents

2016 teacher assessment exemplification: end of key stage 1 3

Use of the exemplification materials 3

Interim teacher assessment framework at the end of key stage 1: mathematics 4

Exemplification 6

2016 teacher assessment exemplification: end of key stage 1

Key stage 1 (KS1) mathematics teacher assessment (TA), using the interim teacher assessment frameworks, is statutory for 2016.

This document contains material that exemplifies all of the statements within the KS1 interim TA framework for 'working at greater depth within the expected standard'.

Use of the exemplification materials

- Schools must use the interim TA frameworks to reach their TA judgements.
- If teachers are confident in their judgements, they do not need to refer to the exemplification materials. The exemplification materials are there to help teachers make their judgements where they want additional guidance.
- Local authorities (LAs) may find it useful to refer to exemplification materials to support external moderation visits.
- The judgement as to whether a pupil meets a statement is made across a collection of evidence and not on individual pieces.
- This document consists of pieces of work drawn from different pupils.

Note: you must also refer to the 'Interim teacher assessment frameworks at the end of key stage 1' on GOV.UK as they have not been fully duplicated here.

Interim teacher assessment framework at the end of key stage 1: mathematics

Working towards the expected standard

- The pupil can demonstrate an understanding of place value, though may still need to use apparatus to support them (e.g. by stating the difference in the tens and ones between 2 numbers i.e. 77 and 33 has a difference of 40 for the tens and a difference of 4 for the ones; by writing number statements such as 35 < 53 and 42 > 36).
- The pupil can count in twos, fives and tens from 0 and use counting strategies to solve problems (e.g. count the number of chairs in a diagram when the chairs are organised in 7 rows of 5 by counting in fives).
- The pupil can read and write numbers correctly in numerals up to 100 (e.g. can write the numbers 14 and 41 correctly).
- The pupil can use number bonds and related subtraction facts within 20 (e.g. 18 = 9 + ?; 15 = 6 + ?).
- The pupil can add and subtract a two-digit number and ones and a two-digit number and tens where no regrouping is required (e.g. 23 + 5; 46 + 20), they can demonstrate their method using concrete apparatus or pictorial representations.
- The pupil can recall doubles and halves to 20 (e.g. pupil knows that double 2 is 4, double 5 is 10 and half of 18 is 9).
- The pupil can recognise and name triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres from a group of shapes or from pictures of the shapes.

Working at the expected standard

- The pupil can partition two-digit numbers into different combinations of tens and ones. This may include using apparatus (e.g. 23 is the same as 2 tens and 3 ones which is the same as 1 ten and 13 ones).
- The pupil can add 2 two-digit numbers within 100 (e.g. 48 + 35) and can demonstrate their method using concrete apparatus or pictorial representations.
- The pupil can use estimation to check that their answers to a calculation are reasonable (e.g. knowing that 48 + 35 will be less than 100).
- The pupil can subtract mentally a two-digit number from another two-digit number when there is no regrouping required (e.g. 74 − 33).
- The pupil can recognise the inverse relationships between addition and subtraction and use this to check calculations and work out missing number problems (e.g. Δ − 14 = 28).
- The pupil can recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables to solve simple problems, demonstrating an understanding of commutativity as necessary (e.g. knowing they can make 7 groups of 5 from 35 blocks and writing 35 ÷ 5 = 7; sharing 40 cherries between 10 people and writing 40 ÷ 10 = 4; stating the total value of six 5p coins).
- The pupil can identify $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{4}$ and knows that all parts must be equal parts of the whole.

Continued on the next page

Working at the expected standard *(continued)*

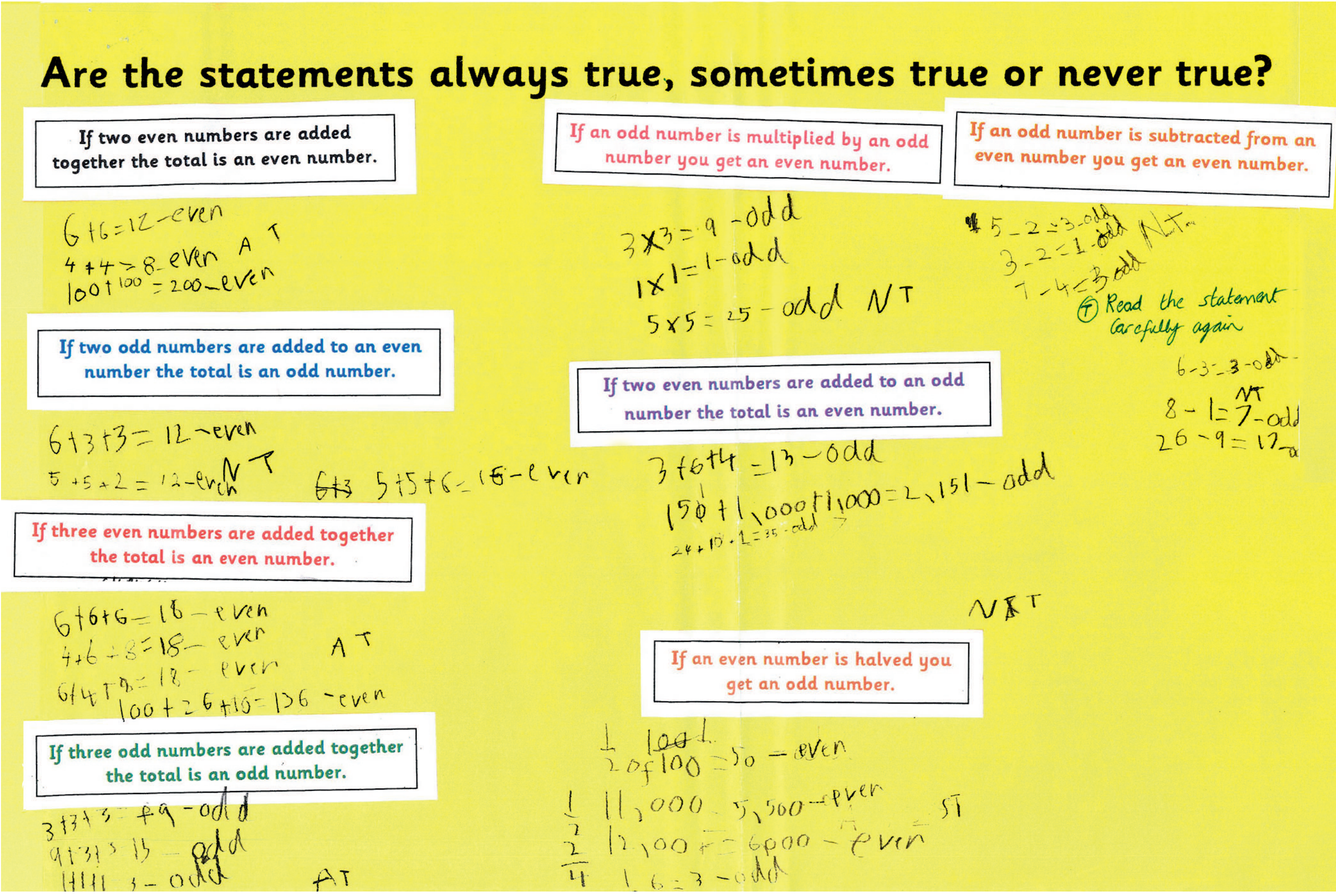
- The pupil can use different coins to make the same amount (e.g. pupil uses coins to make 50p in different ways; pupil can work out how many £2 coins are needed to exchange for a £20 note).
- The pupil can read scales in divisions of ones, twos, fives and tens in a practical situation where all numbers on the scale are given (e.g. pupil reads the temperature on a thermometer or measures capacities using a measuring jug).
- The pupil can read the time on the clock to the nearest 15 minutes.
- The pupil can describe properties of 2-D and 3-D shapes (e.g. the pupil describes a triangle: it has 3 sides, 3 vertices and 1 line of symmetry; the pupil describes a pyramid: it has 8 edges, 5 faces, 4 of which are triangles and one is a square).

Working at greater depth within the expected standard

- The pupil can reason about addition (e.g. pupil can reason that the sum of 3 odd numbers will always be odd).
- The pupil can use multiplication facts to make deductions outside known multiplication facts (e.g. a pupil knows that multiples of 5 have one digit of 0 or 5 and uses this to reason that 18 × 5 cannot be 92 as it is not a multiple of 5).
- The pupil can work out mental calculations where regrouping is required (e.g. 52 – 27; 91 – 73).
- The pupil can solve more complex missing number problems (e.g. $14 + \square - 3 = 17$; $14 + \Delta = 15 + 27$).
- The pupil can determine remainders given known facts (e.g. given 15 ÷ 5 = 3 and has a remainder of 0, pupil recognises that 16 ÷ 5 will have a remainder of 1; knowing that 2 × 7 = 14 and 2 × 8 = 16, pupil explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left).
- The pupil can solve word problems that involve more than one step (e.g. which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?).
- The pupil can recognise the relationships between addition and subtraction and can rewrite addition statements as simplified multiplication statements (e.g. 10 + 10 + 10 + 5 + 5 = 3 × 10 + 2 × 5 = 4 × 10).
- The pupil can find and compare fractions of amounts (e.g. $\frac{1}{4}$ of £20 = £5 and $\frac{1}{2}$ of £8 = £4 so $\frac{1}{4}$ of £20 is greater than $\frac{1}{2}$ of £8).
- The pupil can read the time on the clock to the nearest 5 minutes.
- The pupil can read scales in divisions of ones, twos, fives and tens in a practical situation where not all numbers on the scale are given.
- The pupil can describe similarities and differences of shape properties (e.g. finds 2 different 2-D shapes that only have one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices but can describe what is different about them).

Statement

The pupil can reason about addition (e.g. pupil can reason that the sum of 3 odd numbers will always be odd).



Are the statements always true, sometimes true or never true?

If two even numbers are added together the total is an even number.

6+6=12-even
4+4=8-even AT
100+100=200-even

If two odd numbers are added to an even number the total is an odd number.

6+3+3=12-even
5+5+2=12-even NT
~~6+3~~ 5+5+6=16-even

If three even numbers are added together the total is an even number.

6+6+6=18-even
4+6+8=18-even AT
6+4+2=12-even
100+26+10=136-even

If three odd numbers are added together the total is an odd number.

3+3+3=9-odd
9+3+3=15-odd
1+1+1=3-odd AT

If an odd number is multiplied by an odd number you get an even number.

3×3=9-odd
1×1=1-odd
5×5=25-odd NT

If two even numbers are added to an odd number the total is an even number.

3+6+4=13-odd
150+1,000+1,000=2,151-odd
24+10+1=35-odd

NT

If an even number is halved you get an odd number.

1/2 of 100=50-even
1/2 11,000 5,500-even ST
1/2 12,000=6000-even
1/4 16=3-odd

If an odd number is subtracted from an even number you get an even number.

5-2=3-odd NT
3-2=1-odd
7-4=3 odd
(T) Read the statement carefully again
6-3=3-odd
8-1=7-odd NT
26-9=17-odd

½ 6 = 3 – odd

Context

Pupils had to work in pairs, taking statements from the middle of the table and deciding whether they were always true, sometimes true or never true. There was no supporting apparatus available to the class. This pupil was able to clearly explain how they worked through the task and knew that they needed to try several calculations for each statement before they could decide whether it was always, sometimes or never true. Although they have initially evaluated the top right-hand statement incorrectly they were able to correctly evaluate it after a prompt from the teacher; otherwise all statements are correctly interpreted and evaluated.

Statement

The pupil can reason about addition (e.g. pupil can reason that the sum of 3 odd numbers will always be odd).

Investigating odd numbers

1 3 5 7 9

Choose any pair of odd numbers to add. Try a few examples. What do you notice?

3+5=8 9+5=14 9+9=18 7+9=16

7+5=12 1+3=4 1+1=2 3+3=6 5+5=10

7+1=8 7+3=10 that all of them end in even numbers

Now choose 3 odd numbers to add. Try a few examples. What do you notice?

9+9+9=27 7+7+7=21

5+9+3=17 3+3+3=9 5+5+5=15

that they are all odd 1+1+1=3 9+9+7=25

What about adding 4 odd numbers together? What do you notice?

9+9+9+9=36 they are all even

1+1+1+1=4

3+3+3+3=12 5+5+5+5=20

Have you noticed a pattern? Can you predict what might happen if you add 5 odd numbers? I think It will be odd because five is odd.

Context

The pupil realised that adding an odd number of odd numbers resulted in an odd answer, and adding an even number of odd numbers made an even answer. The pupil knew that if they chose 5 odd numbers the answer would be odd.

Statement

The pupil can use multiplication facts to make deductions outside known multiplication facts (e.g. a pupil knows that multiples of 5 have one digit of 0 or 5 and uses this to reason that 18 × 5 cannot be 92 as it is not a multiple of 5).

Reasoning about numbers

In each case choose a number that could reasonably be correct.

Then explain why you chose that number.

19 x 5 = 84 95 93 Its 95 because it ends in a five or 0 when you count in fives.	It's 95 because it ends in a five or 0 when you count in fives.
19 x 2 = 35 33 38 Its 38 because if counting in 2s it should be even.	It's 38 because if counting in 2s it should be even.
19 x 10 = 190 185 192 I think its 190 because when you count in tens its all ways ends in a 0.	I think it's 190 because when you count in tens its all ways in a 0.
28 + 38 = 63 66 70 Its because 8 + 8 = 16	It's because 8 + 8 = 16
47 + 45 = 90 95 92 Its 92 because 5 + 7 = 12	It's 92 because 5 + 7 = 12

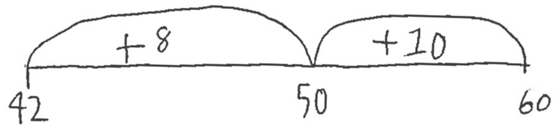
Context

The pupil used their knowledge of multiplication facts and associated number patterns to rule out options and select a possible answer.

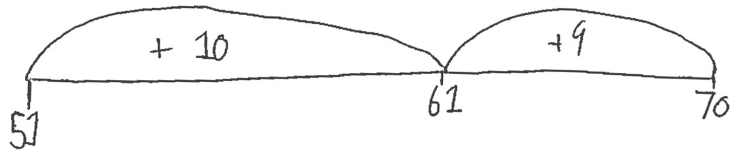
Statement

The pupil can work out mental calculations where regrouping is required (e.g. 52 – 27; 91 – 73).

$42 + \boxed{18} = 60$



$51 + \boxed{19} = 70$



$67 + \boxed{13} = 80$

$83 + \boxed{17} = 100$

$57 + \boxed{13} = 70$

Context

The pupils had been working on missing number addition questions and finding the answer using a range of methods.

Pupil A added 8 to 42, as they knew this made 50, then added 10 to create 60. Pupil B explained that if they added 10 to 67 , then added 3 that this would make 80. The remaining pupils were also able to correctly complete similar missing number addition questions.

Statement

The pupil can solve more complex missing number problems (e.g. 14 + $\boxed{}$ – 3 = 17; 14 + Δ = 15 + 27).

L.I. To solve missing number problems

$\boxed{28}$ + 11 = 25 + 14 ✓

28	11	=39
25	14	=39

17 + 15 = $\boxed{20}$ + 12 ✓

17	15	=32
20	12	=32

8 + 18 + 5 = 3 + $\boxed{13}$ + 15 ✓

8	5	18	=31
3	13	15	=31

Context

The pupil was confident with using simple missing number equations and so was asked to solve the missing number addition equivalence questions that required 2 steps, e.g. ? + 9 = 25 + 14. The pupil had to find a total for one side of the equivalence before calculating the missing number. They used bar representation to help with this concept, as well a mental strategies to find the solution.

Statement

The pupil can determine remainders given known facts (e.g. given 15 ÷ 5 = 3 and has a remainder of 0, pupil recognises that 16 ÷ 5 will have a remainder of 1; knowing that 2 × 7 = 14 and 2 × 8 = 16, pupil explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left).

5 pairs of socks = $\boxed{10}$ **socks altogether**

BBBB DBBB DB

6 pairs of socks = $\boxed{12}$ **socks altogether**

BB BB BBBB BB BB

If I have 11 socks, how many pairs of socks would I have?

There would be 5 pairs of socks and one sock left over.

There would be 5 pairs of socks and one sock left over.

9 pairs of socks = $\boxed{18}$ **socks altogether**

9+9=18

+9 +9 18

10 pairs of socks = $\boxed{20}$ **socks altogether**

10+10=20

+10 +10 20

If I have 19 socks, how many pairs of socks would I have?

there are nine pairs of socks and one sock left I would have nineteen socks altogether.

There are nine pairs of socks and one sock left. I would have nineteen socks altogether.

6 pairs of socks = $\boxed{12}$ **socks altogether**

7 pairs of socks = $\boxed{14}$ **socks altogether**

7+7=14

If I have 13 socks, how many pairs of socks would I have?

There are 6 pairs of socks and one sock left I would have 13 socks together.

There are 6 pairs of socks and one sock left. I would have 13 socks together.

Context

The pupil worked quickly and confidently through the task, without the use of any practical equipment, and clearly explained their understanding when questioned. For example, when explaining that there would be 9 pairs of socks and 1 sock left over if there were 19 socks altogether, she said ‘I already know that 9 pairs of socks is 18 socks and 10 pairs of socks is 20 socks, so there must be 9 pairs of socks with 1 sock left as there aren’t enough socks to make 10 pairs. I would need 1 more sock as you need 2 socks for a pair.’

Statement

The pupil can solve word problems that involve more than one step (e.g. which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?).

The pupil can find and compare fractions of amounts (e.g. $\frac{1}{4}$ of £20 = £5 and $\frac{1}{2}$ of £8 = £4 so $\frac{1}{4}$ of £20 is greater than $\frac{1}{2}$ of £8).

Problem solving with halves and quarters (2)

1) I have 24 sweets in a bag. I share them with my friend. How many do we get each?

$\frac{1}{2}$ of 24 = 12 ✓

2) Tom has 30 marbles. He loses half of them in a game. How many does he have left?

$\frac{1}{2}$ of 30 = 15 ✓

3) Dad made 28 buns. He put half away in a tin. How many buns are left?

$\frac{1}{2}$ of 28 = 14 ✓

4) 16 children went to a party. One quarter of them of them don't like pizza . How many children is that? So how many DO like pizza?

$\frac{1}{4}$ of 16 = 4 so 12 like pizza ✓

5) There were 40 chocolates in a box. We ate one quarter of them. How many are left now?

$\frac{1}{4}$ of 40 = 10 so 30 are left ✓

6) There are 32 balloons in a packet. We blew up half of them. How many is that?

$\frac{1}{2}$ of 32 = 16 ✓

7) Mum bought 12 apples. When she got home, she found that a quarter of them were bad. How many good apples were there?

$\frac{1}{4}$ of 12 = 3 so 9 are good ✓

8) There are 24 footballs in the basket. One quarter of them are flat. How many are not flat?

$\frac{1}{4}$ of 24 = 6 so 18 are blown up ✓

9) 16 cars are in the car park. $\frac{1}{4}$ of them are red. How many cars are not red?

$\frac{1}{4}$ of 16 = 4 so 12 arent red ✓

10) There are 20 children in Class 2. One quarter of them wear glasses. How many children don't wear glasses?

$\frac{1}{4}$ of 20 = 5 so 15 dont wear glasses ✓

Context

This demonstrates the pupil's understanding of fractions of amounts and their confidence with 2 step problems.

Statement

The pupil can solve word problems that involve more than one step (e.g. which has the most biscuits, 4 packets of biscuits with 5 in each packet or 3 packets of biscuits with 10 in each packet?).

My grandmother gave me £5 for the sweet shop and I bought 3 bags of sweets for 60p each and 2 lollies for 20p each.
How much will it cost me in total?
How much change will I get back?

3 x 60p = £1.80
2x20p = £0.40

£2.20

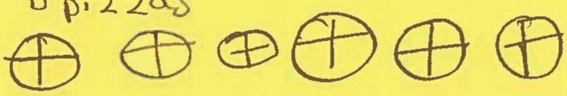
£5.00 − £2.20 = £2.80

Mum buys some pizzas for my party and cuts each one into quarters. If she buys 6 pizzas, how many pieces is that? If there are 8 children at the party, how many pieces do they each eat?

8 children

 = 3 each

6 pizzas



6 x 4 = 24 pieces
so they get 3 pieces each

How many more apples are needed when you buy 6 bags of 5 apples and you need 32 apples for a school trip?

6x5 = 30

32 − 30 = 2

I need 2 more apples

Context

Pupils were given several tasks to choose from and the pupil chose this task.

The pupil correctly used repeated addition and multiplication facts and was also aware that 'remainders' existed for some examples.

Statement

The pupil can recognise the relationships between addition and subtraction and can rewrite addition statements as simplified multiplication statements (e.g. 10 + 10 + 10 + 5 + 5 = 3 × 10 + 2 × 5 = 4 × 10).

I have £1.00 to spend. I buy a mix of ice creams (10p), lollies (5p) and ice pops (2p).

Show 3 different ways of spending **exactly** £1.00.

= 7 X 10 = 70p
4 x 5p = 20p
5 X 2 = 10p
= £1.00

---

6 X 10p = 60p
5 x 2p = 10p
6 x 5p = 30p
= £1.00

---

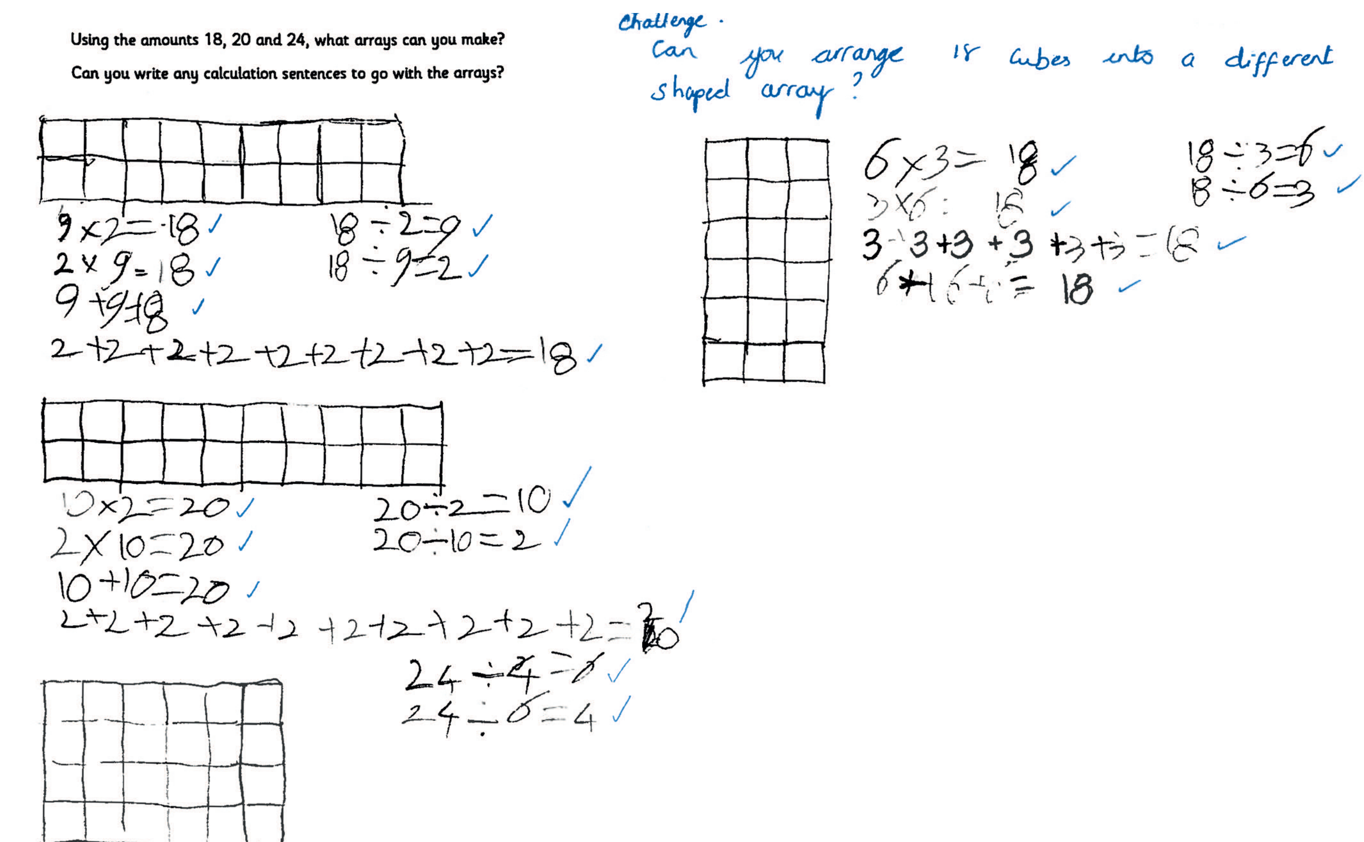
5 x 10p = 50p
6 x 5p = 30p
10 x 2p = 20p
= £1.00

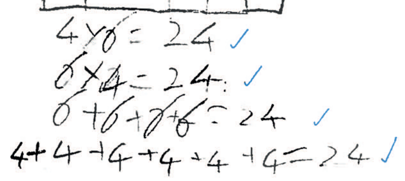
Context

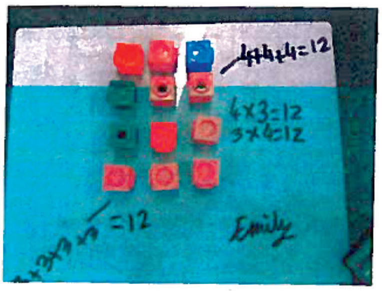
The pupil produced different correct scenarios and recorded their answers as multiplication statements.

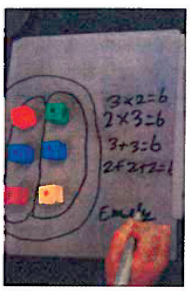
Statement

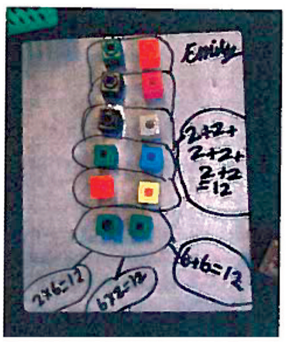
The pupil can recognise the relationships between addition and subtraction and can rewrite addition statements as simplified multiplication statements (e.g. 10 + 10 + 10 + 5 + 5 = 3 × 10 + 2 × 5 = 4 × 10).











Context

Pupils had looked at a range of arrays. They had experience of making the arrays themselves with cubes as well as describing the arrays, showing progression from talking about repeated addition to recording multiplication calculation sentences.

The pupils were able to create arrays using cubes for each amount and then record those arrays. The pupils worked independently to record repeated addition calculations and simplified them as multiplication statements.

Statement

The pupil can find and compare fractions of amounts (e.g. $\frac{1}{4}$ of £20 = £5 and $\frac{1}{2}$ of £8 = £4 so $\frac{1}{4}$ of £20 is greater than $\frac{1}{2}$ of £8).

Can I calculate and compare fractions?

Read each statement carefully. Show your working out each time then ring the correct answer.

Which is greater...... $\frac{1}{2}$ of 16 or $\frac{1}{4}$ of 20?	
1/2 of 16 = 8 ✓	1/4 of 20 = 5 ✓
Which is longer...... $\frac{1}{4}$ of 1 metre or $\frac{1}{2}$ of 60cm ? ✓	
1/4 of 100 = 25 cm ✓	1/2 of 60 = 30 cm ✓
Who has more.....Tom has $\frac{1}{2}$ of £10 and Ben has $\frac{1}{4}$ of £24 ?	
1/2 of £10 = £5 ✓	$\frac{1}{4}$ of £24 = £6 ✓
Which is greater...... $\frac{1}{2}$ of 100 or $\frac{3}{4}$ of 80 ? ✓	
1/2 of 100 = 50 ✓	3/4 of 80 = 60 ✓
Which is shorter...... $\frac{1}{2}$ of 30cm or $\frac{1}{4}$ of 60cm ? ✓	
1/2 of 30cm = 15cm ✓ both same	1/4 of 60 = 15cm ✓

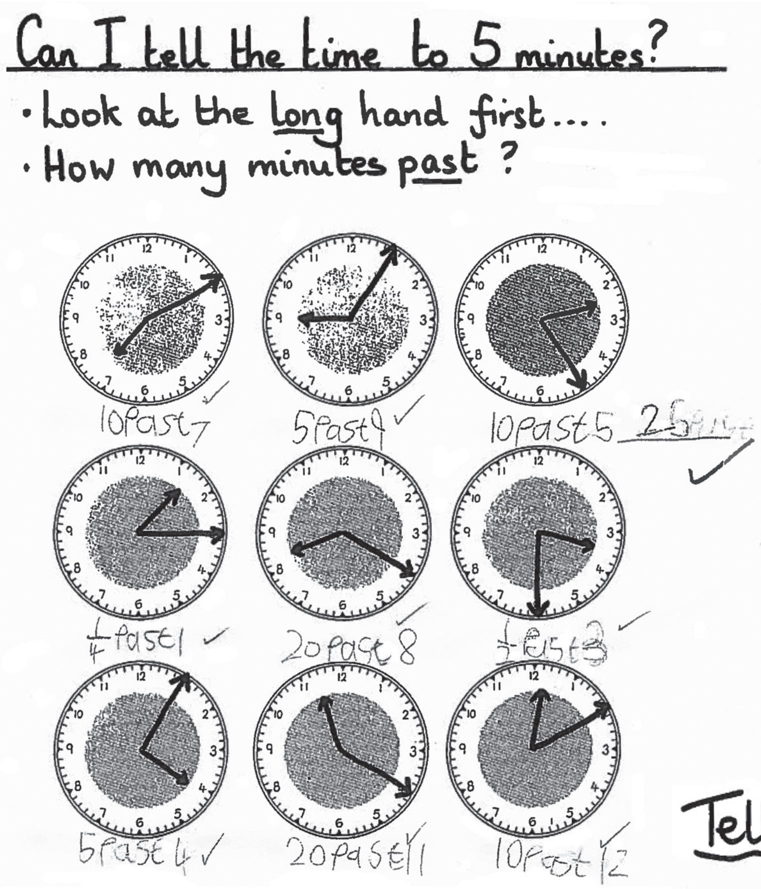
Context

A pair of pupils worked together on this, discussing the questions and how they could work out the calculations. They used multiplication facts, doubles and halves to help solve the questions.

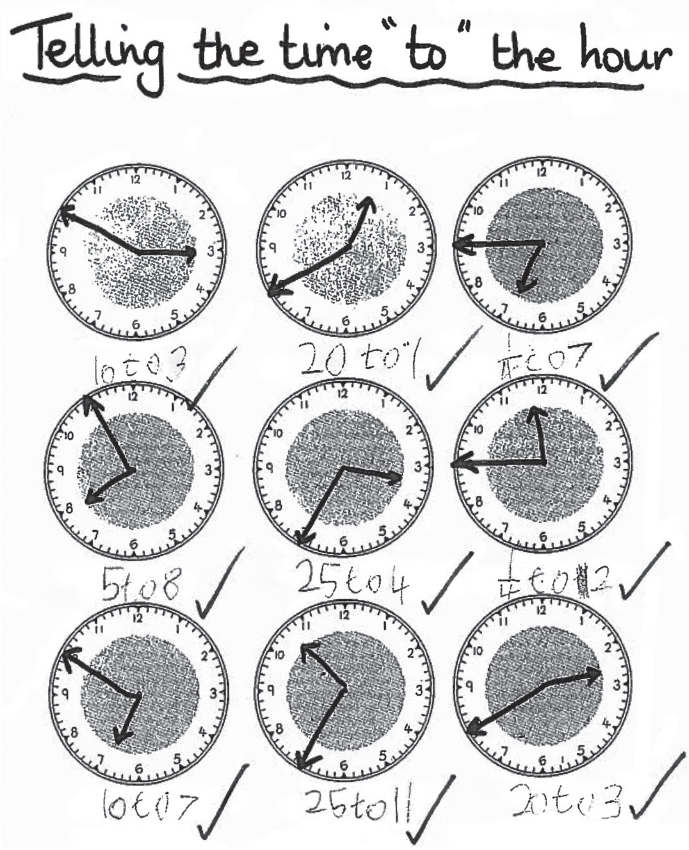
The pupils needed minimal input and little support to work out these problems.

Statement

The pupil can read the time on the clock to the nearest 5 minutes.



25 past 2



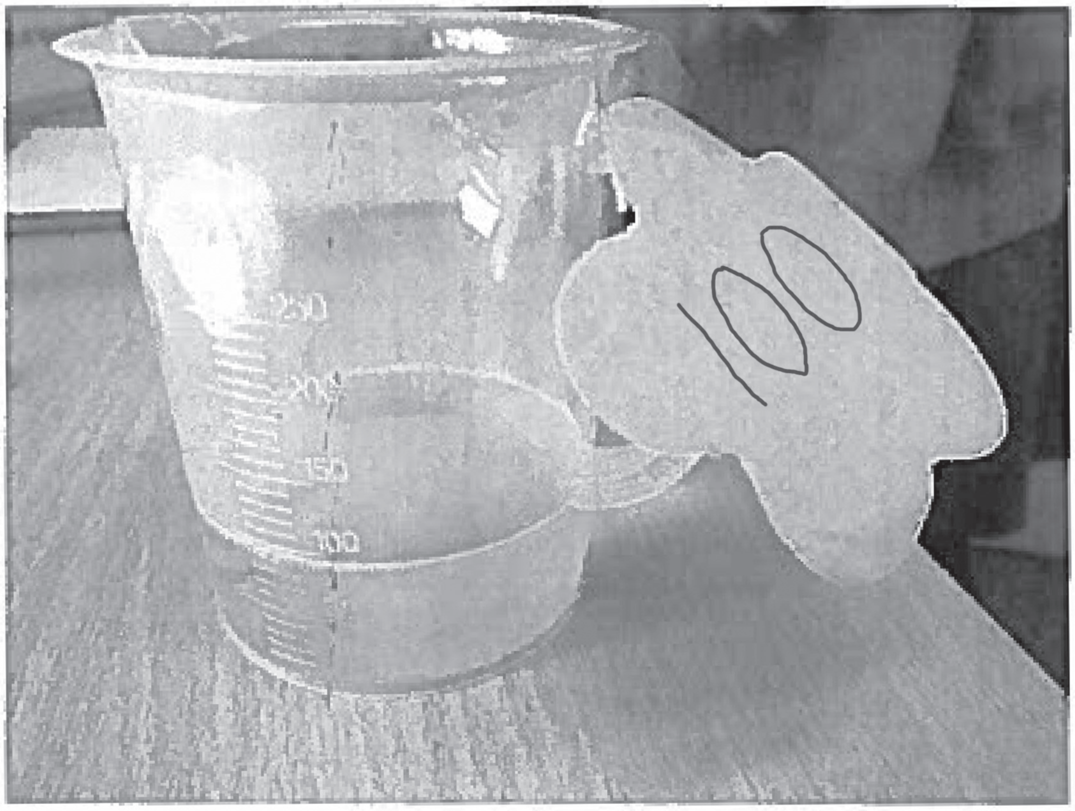
Context

The pupil worked independently and understood the language of time. Although they made one mistake in the first row of clocks, there is ample evidence to show the pupil can tell the time, understanding the concept of 'past' and 'to' the hour.

Statement

The pupil can read scales in divisions of ones, twos, fives and tens in a practical situation where not all numbers on the scale are given.

She also accurately read the scales on the measuring jug, recording her measurements.



Context

Pupils were given 4 containers with water in and asked to write down how much water was in each container. They then had to label each one with the measurement and place them onto a chart titled 'How much does each container hold?'.

2 pupils sorted the headings for each section on their chart with ease, using the terminology 'less than' and 'greater than' appropriately in their explanations for choosing where to place them.

Statement

The pupil can describe similarities and differences of shape properties (e.g. finds 2 different 2-D shapes that only have one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices but can describe what is different about them).

The cube has 8 vertics and so does the cuboid but the cylinder as none.
The cuboid have 12 eges and the cube has 12 aswell
The cylinder has 2 eges and its curved and the others have all straight eges.
The cube has squre faces there are six of them
The cuboid has 2 squre faces and 4 rectangle faces.

The cube has ~~a~~8 vertus and so does t the cuboid but the cylinder as none.
The cuboid have 12 ~~faces~~ eges and the cube has 12 ~~as~~ as well
The cylinder has 2 eges and its ~~~~ curved and the others have all straight eges.
The cube has squre faces there are six of them
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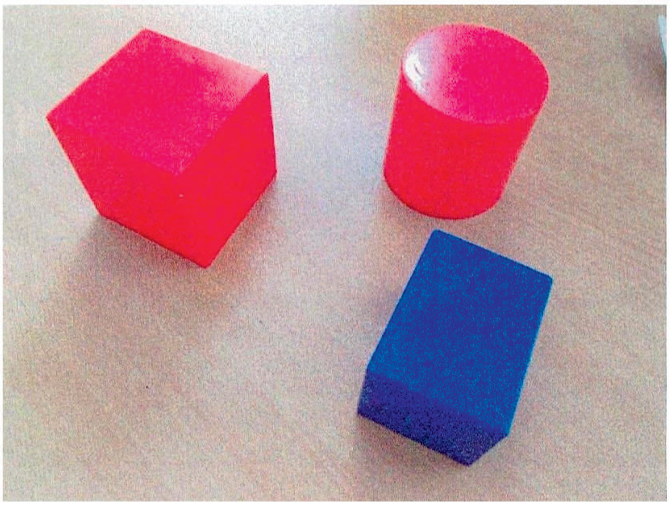

Context

Pupils could name the shapes and had a clear understanding of the geometrical language of 'edges', 'vertices', 'faces', 'curved' and 'straight'.

They were working in a group of 4, to encourage interactive discussion about the shapes, but then worked independently to record the statements.

The teacher observed the pupils' discussion, the way they handled shapes and counted the properties. The pupils also used shape language confidently and corrected each other if the wrong terminology was used. Along with the recorded evidence, the pupils' discussion showed a clear understanding of the shape properties.

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