Teaching for Mastery

Questions, tasks and activities to support assessment

Year 4

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Mastery Check

Please note that the following columns provide indicative examples of the sorts of tasks and questions that provide evidence for mastery and mastery with greater depth of the selected programme of study statements. Pupils may be able to carry out certain procedures and answer questions like the ones outlined, but the teacher will need to check that pupils really understand the idea by asking questions such as 'Why?', 'What happens if …?', and checking that pupils can use the procedures or skills to solve a variety of problems.

Assessment Booklet.

Name:

Class:

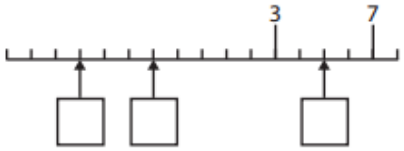
D.O.B

Please note, the assessments contained within can all be found on the www.ncetm.com website.

Number and Place Value

Mastery

Write the missing numbers in the boxes.



Kiz has these numbers:

1330 1303 1033 1003 1030

He writes them in order from smallest to largest.

What is the fourth number he writes?

Gemma counts on in 25s from 50.

Circle the numbers that she will say:

990 550 125 755 150

Match 4600 to numbers with the same value.

460 tens

460 hundreds

46 hundreds

4600 ones

46 tens

Notes:

Mastery

What temperature is 20 degrees lower than 6 degrees Celsius?

Using these 4 digits:

1	7	3	0

What is the smallest number you can make?

What is the largest number you can make?

Notes:

Mastery with Greater Depth

The sea level is usually taken as zero.
Look at the picture of the lighthouse.
If the red fish is at –5 m (5 metres below sea level):
Where is the yellow fish?
Where is the green fish?

Can you draw a fish at –35 m?

Can you draw a seagull at 20 m above sea level?

What would the position of your fish and the seagull be if each of the intervals on the lighthouse represented 7 m?

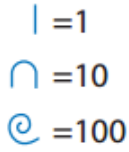
Here is a sequence of numbers:
20, 30, 40, 50

What will the nineteenth number in the sequence be?
What will the hundredth number in the sequence be?

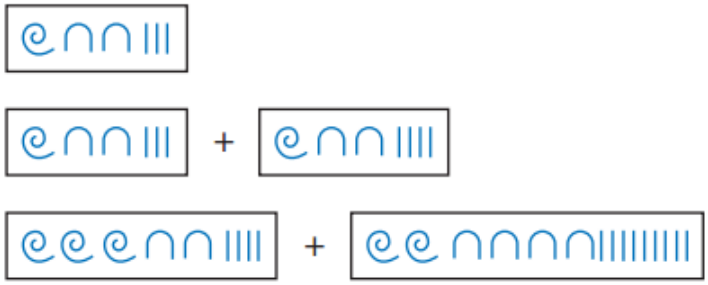
Notes:

Mastery with Greater Depth

5000 years ago Egyptians carved number symbols on their tombs:



What is the value of these Egyptian numbers?



How many different ways can you write 5510?

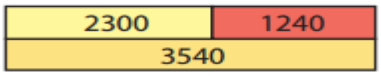
Pupils should suggest answers such as:
551 tens
55 hundreds and 1 ten
5 thousands and 510 ones

Notes:

Addition and Subtraction

Mastery

Write down the four relationships you can see in the bar model.



□ + □ = □

□ + □ = □

□ − □ = □

□ − □ = □

Decide on a mental or written strategy for each of these calculations and perform them with fluency.

- 64 + 36
- 640 + 360
- 64 + 79 + 36
- 378 + 562
- 876 + 921
- 999 + 999
- 1447 + 2362
- 1999 + 874

Ali and Sarah calculate 420 + 221 + 280 using different strategies.

This is Sarah's strategy:	This is Ali's strategy:
420 + 221 + 280 420 + 221 = 641 641 + 280 = 921 Answer = 921	420 + 221 + 280 420 + 280 = 700 700+ 221 = 921 Answer = 921

Which do you prefer?

Explain your reasoning.

Now calculate 370 + 242 + 130 using your preferred strategy.

Notes:

Mastery

Fill in the missing numbers.

352 + ☐ = 480

70 + 99 + ☐ = 270

☐ – 55 = 84

☐ – 3000 = 600

What do you notice about the calculations below?
Can you find easy ways to calculate?

5000 + 4000 =	5230 + 400 =	5023 + 28 =
4000 + 5000 =	4230 + 500 =	4023 + 28 =
3000 + 6000 =	3230 + 600 =	3023 + 28 =
2000 + 7000 =	2230 + 700 =	2023 + 28 =
1000 + 8000 =	1230 + 800 =	1023 + 48 =

Fill in the empty boxes to make the equations correct.

7 ☐ 1 + ☐ 3 ☐ = 999

7 ☐ 1 + ☐ 3 ☐ = 1000

Notes:

Mastery with Greater Depth

Identify the missing numbers in these bar models. They are not drawn to scale.

1000		
	353	354

2000		
493		754

Select your own numbers to make this bar model correct.

5000		

Write three calculations where you would use mental calculation strategies and three where you apply a column method.

Explain the decision you made for each calculation.

Write >, = or < in each of the circles to make the number sentence correct.

1023 + 24 + 24 ◯ 1023 + 48

1232 – 232 ◯ 1355 – 252

1237 – 68 + 32 ◯ 1242 – 69 + 31

Pupils should reason about the numbers and relationships, rather than calculate.

Notes:

Mastery with Greater Depth

Fill in the missing digits.

1 ☐ 3 + 6 ☐ = 200

1 ☐ 5 ☐ + 300 = 1557

5 ☐ 28 – 44 ☐ = 4788

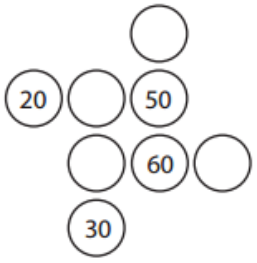
☐ ☐ ☐ 0 – 2468 = 5092

Find the missing numbers.

What do you notice?

Make 9999	Make 9998	Make 9990
5000 + ☐ = 9999	5230 + ☐ = 9998	5023 + ☐ = 9990
4000 + ☐ = 9999	4230 + ☐ = 9998	4023 + ☐ = 9990
3000 + ☐ = 9999	3230 + ☐ = 9998	3023 + ☐ = 9990
2000 + ☐ = 9999	2230 + ☐ = 9998	2023 + ☐ = 9990
1000 + ☐ = 9999	1230 + ☐ = 9998	1023 + ☐ = 9990

Complete this diagram so that the three numbers in each row and column add up to 140.



Now create your own diagram with a total of 250.

Notes:

Multiplication and Division.

Mastery

Use your knowledge of multiplication tables to complete these calculations.

$7 \times 6 =$	$12 \times 6 =$
$7 \times 2 \times 3 =$	$13 \times 6 =$
$8 \times 7 =$	$12 \times 12 =$
$2 \times 4 \times 7 =$	$12 \times 13 =$
$2 \times 2 \times 2 \times 7 =$	$12 \times 0 =$

Which calculations have the same answer? Can you explain why?

By the end of the year pupils should be fluent with all table facts up to 12 × 12 and also be able to apply these to calculate unknown facts, such as 12 × 13.

What do you notice about the following calculations? Can you use one calculation to work out the answer to other calculations?

$2 \times 3 =$	$6 \times 7 =$	$9 \times 8 =$
$2 \times 30 =$	$6 \times 70 =$	$9 \times 80 =$
$2 \times 300 =$	$6 \times 700 =$	$9 \times 800 =$
$20 \times 3 =$	$60 \times 7 =$	$90 \times 8 =$
$200 \times 3 =$	$600 \times 7 =$	$900 \times 8 =$

Notes:

Three children calculated 7×6 in different ways.
Identify each strategy and complete the calculations.

Annie	Bertie	Cara used the commutative law
$7 \times 6 = 7 \times 5 + \square$ $= \square$	$7 \times 6 = 7 \times 7 - \square$ $= \square$	$7 \times 6 = \square \times \square$ $= \square$

Now find the answer to 6×9 in three different ways.

Tom ate 9 grapes at the picnic. Sam ate 3 times as many grapes as Tom.
How many grapes did they eat altogether?

The bar model is a useful scaffold to develop fluency in this type of question.

Notes:

Mastery with Greater Depth

True or false?

$7 \times 6 = 7 \times 3 \times 2$

$7 \times 6 = 7 \times 3 + 3$

Explain your reasoning.

Can you write the number 30 as the product of 3 numbers?

Can you do it in different ways?

Place one of these symbols in the circle to make the number sentence correct:
>, < or =.

Explain your reasoning.

$8 \times 50 \bigcirc 50 \times 8$

$8 \times 50 \bigcirc 80 \times 5$

$300 \times 3 \bigcirc 5 \times 200$

Notes:

Mastery with Greater Depth

Multiply a number by itself and then make one factor one more and the other one less. What happens to the product?

E.g.

$4 \times 4 = 16$ $6 \times 6 = 36$

$5 \times 3 = 15$ $7 \times 5 = 35$

What do you notice? Will this always happen?

Sally has 9 times as many football cards as Sam. Together they have 150 cards.
How many more cards does Sally have than Sam?

The bar model is a useful scaffold to develop fluency in this type of question.

Notes:

Fractions.

Mastery

Put these fractions on the number line:

$\frac{2}{3}, \frac{1}{2}, \frac{3}{6}, \frac{4}{9}$

0 ——— 1

Put these fractions on the number line:

$\frac{4}{5}, \frac{7}{10}, \frac{5}{10}, \frac{2}{5}$

0 ——— 1

What's the same? What's different?

Children should be able to express the ideas that:

- *They are all divided into 4 equal parts.*
- *Each part represents a quarter of the whole.*
- *Each of the parts in the triangle are the same shape and area (congruent).*
- *The shapes in the square are different but each has the same area (not congruent).*
- *The bananas represent fractions of quantities.*

Draw diagrams to show two fractions that are equivalent to $\frac{2}{8}$.

8 girls share 6 bars of chocolate equally.
12 boys share 9 bars of chocolate equally.
Who gets more chocolate to eat, each boy or each girl? How do you know?

Draw a diagram to explain your reasoning.

Notes:

Mastery

Find:

$\frac{1}{10}$ of 10

$\frac{1}{10}$ of 20

$\frac{1}{10}$ of 30

$\frac{1}{10}$ of 40

$\frac{1}{10}$ of 50

What do you notice?

If the picture represents $\frac{2}{12}$ of a rectangle, draw a picture of the whole rectangle.

Can you draw it in two different ways?

True or false?

$\frac{1}{5}+\frac{2}{5}=\frac{3}{5}$

$\frac{1}{5}+\frac{2}{5}=\frac{3}{10}$

$\frac{1}{5}+\frac{2}{5}=\frac{6}{10}$

Explain your reasoning.

Notes:

Mastery

Match each fraction to its decimal equivalent.

$\frac{1}{2}$	$\frac{4}{10}$	$\frac{3}{4}$	$\frac{1}{4}$
0·25	0·75	0·4	0·5

Circle the equivalent fraction to 0·25.

$\frac{2}{5}$ $\frac{5}{2}$ $\frac{25}{100}$ $\frac{100}{25}$

Round to the nearest whole number.

$8\frac{3}{8}$ 8·38 8·83

A soup recipe uses $\frac{3}{4}$ as many onions as carrots. Jo is making the soup and has 8 carrots.

How many onions does Jo use?

Notes:

Mastery with Greater Depth

Insert the symbol >, < or = to make each statement correct.

$\frac{2}{5}$ of 5 ◯ $\frac{1}{4}$ of 4

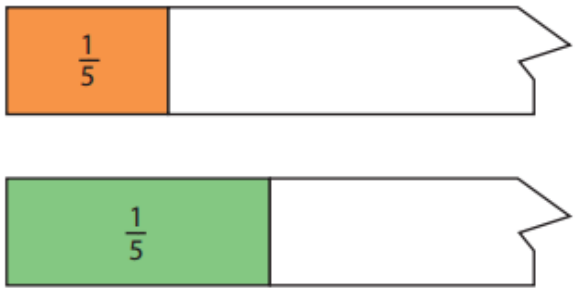
$\frac{1}{7}$ of 7 ◯ $\frac{2}{7}$ of 14

$\frac{2}{3}$ of 9 ◯ $\frac{1}{3}$ of 18

Make up three similar statements using >, < or =.

Two paper strips are ripped. Identify which original paper strip is longer.

Explain your answer.



How many ways can you express $\frac{2}{8}$ as a fraction?

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8 girls share 6 bars of chocolate equally.
12 boys share 9 bars of chocolate equally.

Clare says each girl got more to eat as there were fewer of them.
Rob says each boy got more to eat as they had more chocolate to share.

Explain why Clare and Rob are both wrong.

Notes:

Mastery with Greater Depth

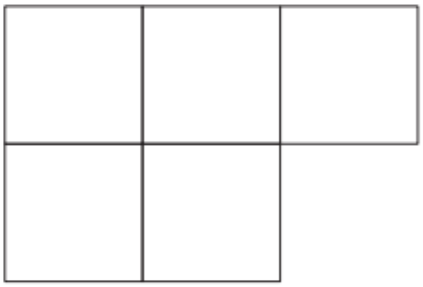
Captain Conjecture says,

'To find a tenth of a number I divide by 10 and to find a fifth of a number I divide by 5.'

Do you agree?

Explain your reasoning.

If the picture represents $\frac{1}{3}$ of a shape, draw the whole shape.



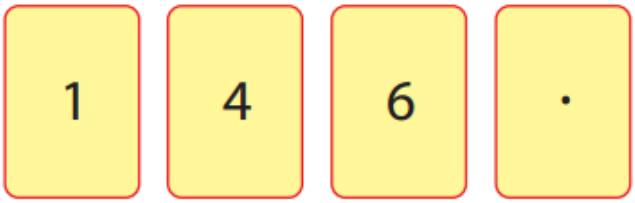
Peter wrote down two fractions. He subtracted the smaller fraction from the larger and got $\frac{1}{8}$ as the answer.
Write down two fractions that Peter could have subtracted.

Can you find another pair?

Notes:

Mastery with Greater Depth

Using these cards can you make a number between 4·1 and 4·61?



What is the smallest number you can make using all four cards?

What is the largest number you can make using all four cards?

A soup recipe uses $\frac{3}{4}$ as many onions as carrots.

Complete the table below.

Carrots	Onions
1	
2	
3	
4	
5	
6	

Explain how you worked out the number of onions. Did you use the same method each time?

Notes:

Measurement.

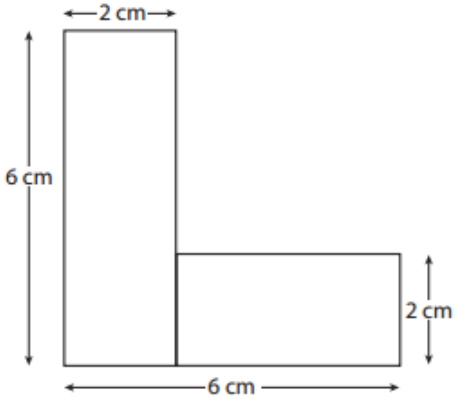
Mastery

The shape below is made from two rectangles.

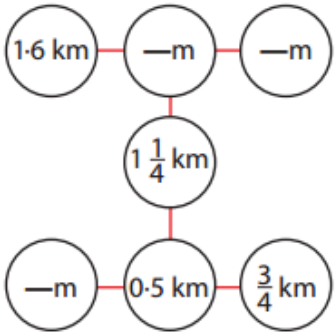
Identify the perimeter of each of the two rectangles.

How many 1 cm squares would fit into the smaller rectangle?

How many more squares fit into the larger rectangle?



Complete the missing measures so that each line of three gives a total distance of 2 km.



An empty box weighs 0·5 kg. Ivy puts 10 toy bricks inside it and the box now weighs 2 kg.

How much does each brick weigh?

Notes:

Mastery

Which would you rather have, 3 × 50p coins or 7 × 20p coins?

Explain your reasoning.

Put these amounts in order starting with the largest.

- Half of 3 litres
- Quarter of 2 litres
- 300 ml

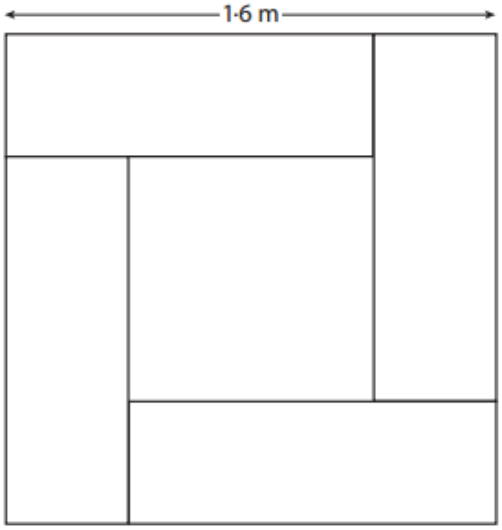
Explain your thinking.

Notes:

Mastery with Greater Depth

The rectangular tiles here are three times as long as they are wide.

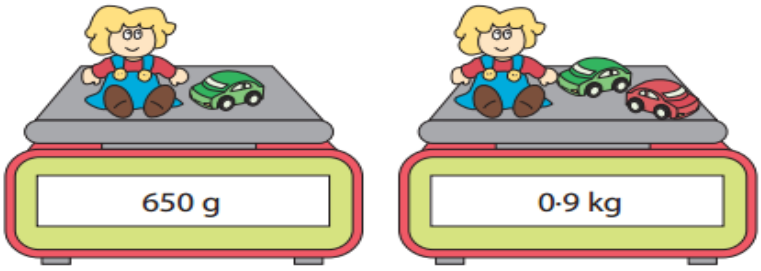
What is the perimeter of the centre square?



In total Sam and Tom together cycle a distance of 120 km. Sam cycles twice the distance that Tom cycles. How far does Sam cycle?

How much does the car weigh in grams?

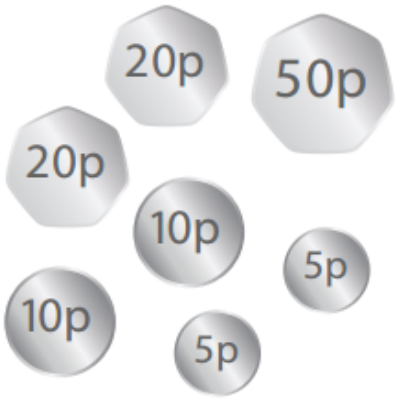
How much does the doll weigh in grams?



Notes:

Mastery with Greater Depth

Sid and Sam share some money. Sid gets twice as much as Sam. Tick the coins which Sid might take.



Is there more than one way of sharing the coins?

Fill in the missing boxes so that the amounts are in order from smallest to greatest.

$\frac{1}{2}$ a litre	☐ millilitres	$\frac{1}{3}$ of 2 litres	☐ millilitres	$\frac{1}{4}$ of 3 litres

Notes:

Geometry.

Mastery

Below are five quadrilaterals: a rectangle, a rhombus, a square, a parallelogram and an unnamed quadrilateral.

Write the names of each of the quadrilaterals.

Draw lines from each shape to match the properties described in the boxes below.

All sides equal	Has an acute angle	Opposite sides are of equal length	All 4 angles are equal	Has an obtuse angle

Draw some 2-D shapes that have:

- no lines of symmetry
- 1 line of symmetry
- 2 lines of symmetry.

Notes:

Mastery with Greater Depth

Captain Conjecture says that a rectangle is a regular shape because it has four right angles.

Do you agree?

Explain your reasoning.

Captain Conjecture says that a quadrilateral can sometimes only have three right angles.

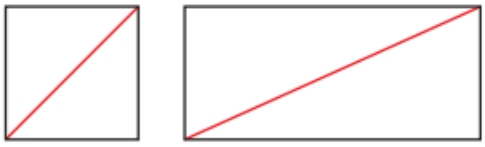
Do you agree?

Explain your reasoning.

Tom says, 'In each of these shapes the red line is a line of symmetry.'

Do you agree?

Explain your reasoning.



Notes:

Statistics.

Mastery

Here is a table of the average temperature for each month of last year:

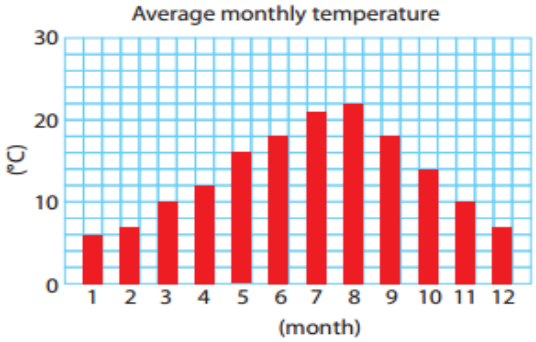
Month	1	2	3	4	5	6	7	8	9	10	11	12
Average Temp (°C)	6	7	10	12	16	18	21	22	18	14	10	7

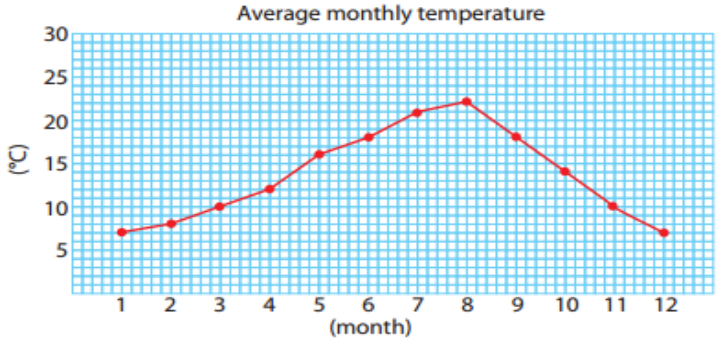
Answer the questions below and explain your reasoning:

- On average what was the hottest month of the year?
- In which months was the average temperature below 10°C?
- In which months would you choose to go outside without your coat on?

Choose another way to represent the data.

These two graphs represent the same data.
What's the same? What's different?





Which graph is better?

Explain your reasoning.

Notes:

Mastery with Greater Depth

Here is a table of the average temperature for each month of last year:

Month	1	2	3	4	5	6	7	8	9	10	11	12
Average Temp (°C)	6	7	10	12	16	18	21	22	18	14	10	7

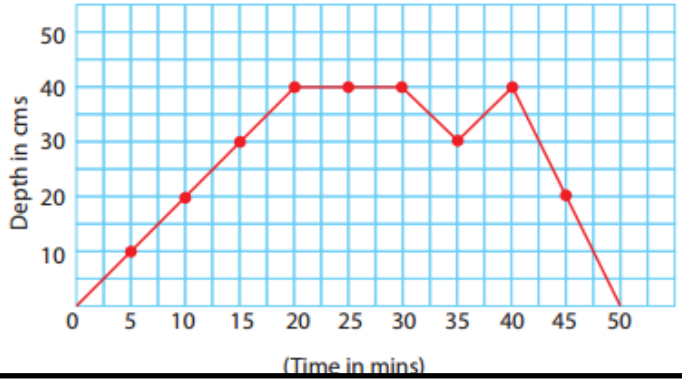
Write the word 'true', 'false' or 'unknown' next to each statement, giving an explanation for each response.

- I would need to wear my coat outside in January.
- The hottest day of the year was in August.
- A temperature of –2 was recorded in January.

Choose two other ways to represent the data.

Mastery with Greater Depth

Make up a story that fits the graph.



Notes: