

Teaching for Mastery

Questions, tasks and activities to support assessment

Year 5

Mike Askew, Sarah Bishop, Clare Christie,
Sarah Eaton, Pete Griffin and Debbie Morgan

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

Explore 1 million:

- Write 1 million in digits.
- Write down the number that is 1 more than 1 million.
- Write down the number that is 10 more than 1 million.
- Write down the number that is 100 more than 1 million.

In June 2014 the population of the UK was approximately 64 100 000.

Round this number to the nearest million.

The temperature at 6 a.m. was recorded each day for one week.

Day	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Temp (°C)	1	-1	0	3	2	-2	-3

What was the coldest morning?

What was the warmest morning?

What is the difference in temperature between Monday and Tuesday?

Place the recorded temperatures in order from smallest to largest.

Notes:

Mastery

What can we say about 48 000?

It is less than 50 000.

It is made of 40 000 and together.

It is made of thousands.

It is made of hundreds.

It is made of tens.

Notes:

Mastery with Greater Depth

Explore 1 million:

- How large would a stadium need to be to hold one million people?
- How much would a million grains of rice weigh?

In June 2014 the population of the UK was approximately 64 100 000.

What is the current approximate population of the UK?

Is this number larger or smaller than 64 100 000?

How accurate is this figure in terms of the number of people in the UK at this moment?

The temperature at 6 a.m. was recorded each day for one week.

Day	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Temp (°C)	1	-1	0	3	2	-2	-3

What is the difference in temperature between the coldest day and the warmest day?

At what time of year do you think these temperatures were recorded?

Do you think it might have snowed during the week?

Explain your reasoning.

Notes:

Mastery with Greater Depth

Using all of the digits from 0 to 9, write down a 10-digit number.

What is the largest number you can write?

What is the smallest number you can write?

Write down the number that is one less than the largest number.

Write down the number that is one more than the smallest number.

Captain Conjecture says, 'Using the digits 0 to 9 we can write any number, no matter how large or small.'

Do you agree?

Explain your reasoning.



Notes:

Addition and Subtraction

Mastery

Set out and solve these calculations using a column method.

$$3254 + \square = 7999$$

$$2431 = \square - 3456$$

$$6373 - \square = 3581$$

$$6719 = \square - 4562$$

The table shows the cost of train tickets from different cities.

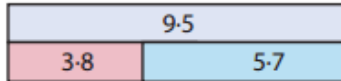
What is the total cost for a return journey to York for one adult and two children?
How much more does it cost for two adults to make a single journey to Hull than to Leeds?

		York	Hull	Leeds
Adult	Single	£13-50	£16-60	£11-00
	Return	£24-50	£30-00	£20-00
Child	Single	£9-75	£11-00	£8-00
	Return	£15-00	£18-50	£13-50

Notes:

Mastery

Write four number facts that this bar diagram shows.



$$\square + \square = \square$$

$$\square + \square = \square$$

$$\square - \square = \square$$

$$\square - \square = \square$$

Captain Conjecture says, 'When working with whole numbers, if you add two 2-digit numbers together the answer cannot be a 4-digit number.'

Do you agree?
Explain your reasoning.



Notes:

Mastery with Greater Depth

True or False?

- $3999 - 2999 = 4000 - 3000$
- $3999 - 2999 = 3000 - 2000$
- $2741 - 1263 = 2742 - 1264$
- $2741 + 1263 = 2742 + 1264$
- $2741 - 1263 = 2731 - 1253$
- $2741 - 1263 = 2742 - 1252$

Explain your reasoning.

Using this number statement, $5222 - 3111 = 5223 - 3112$ write three more pairs of equivalent calculations.

Pupils should not calculate the answer to these questions but should look at the structure and relationships between the numbers.

Sam and Tom have £67.80 between them.

If Sam has £6.20 more than Tom, how much does Tom have?

The bar model can help children solve these type of problems, please visit ncetm.org for further information on how to build understanding.



$$£67.80 - £6.20 = £61.60$$

$$£61.60 \div 2 = £30.80$$

Tom has £30.80

Notes:

Mastery with Greater Depth

Use this number sentence to write down three more pairs of decimal numbers that sum to 3:

$$1.6 + 1.4 = 3$$

Captain Conjecture says, 'If you keep subtracting 3 from 397 you will eventually reach 0.'

Do you agree?

Explain your reasoning.



Notes:

Multiplication and Division.

Mastery

8 is a multiple of 4 and a factor of 16

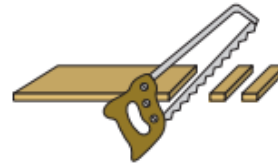
6 is a multiple of 3 and a factor of

is a multiple of 5 and a factor of

is a multiple of and a factor of

A 50 cm length of wood is cut into 4 cm pieces.

How many 4 cm pieces are cut and how much wood is left over?



Fill in the blanks to represent the problem as division:

$$\square \div \square = \square \text{ remainder } \square$$

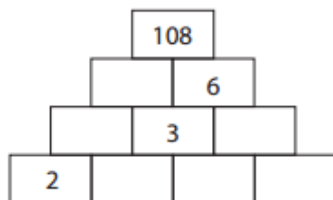
Fill in the blanks to represent the problem as multiplication:

$$\square \times \square + \square = 50$$

Notes:

Mastery

Fill in the missing numbers in this multiplication pyramid.



Fill in the missing numbers:

$$8 \div 2 = \square \div 4 = 32 \div \square = 64 \div \square$$

Sally's book is 92 pages long.

If she reads seven pages each day, how long will she take to finish her book?

Notes:

Mastery with Greater Depth

Captain Conjecture says, 'Factors come in pairs so all numbers have an even number of factors.'

Do you agree?
Explain your reasoning.



A 1 m piece of ribbon is cut into equal pieces and a piece measuring 4 cm remains.

What might the lengths of the equal parts be?

In how many different ways can the ribbon be cut into equal pieces?



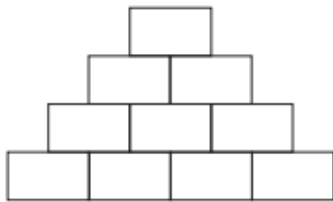
Notes:

Mastery with Greater Depth

Put the numbers 1, 2, 3 and 4 in the bottom row of this multiplication pyramid in any order you like.

What different numbers can you get on the top of the number pyramid? How can you make the largest number?

Explain your reasoning.



Fill in the missing numbers:

$$\square \div 120 = 117 \div 13 = 10800 \div \square = 234 \div \square$$

A 5p coin has a thickness of 1.7 mm. Ahmed makes a tower of 5p coins worth 50p.

Write down the calculation you would use to find the height of the tower.



Notes:

Fractions.

Mastery

Make each number sentence correct using =, > or <.

$$\frac{3}{4} \bigcirc \frac{1}{2}$$
$$\frac{3}{8} \bigcirc \frac{1}{2}$$
$$\frac{3}{4} \bigcirc \frac{3}{8}$$

$$1\frac{3}{4} \bigcirc 2\frac{1}{2}$$
$$\frac{3}{2} \bigcirc 1\frac{1}{2}$$
$$3\frac{3}{4} \bigcirc 3\frac{3}{8}$$

$$\frac{2}{4} \bigcirc \frac{1}{2}$$
$$\frac{2}{5} \bigcirc \frac{4}{10}$$
$$\frac{2}{5} \bigcirc \frac{5}{10}$$

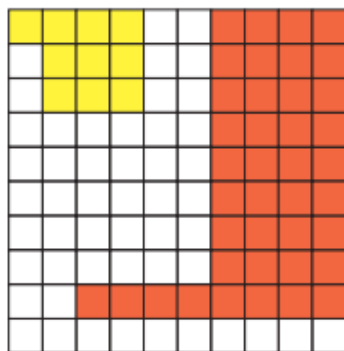
Krysia wanted to buy a coat that cost £80. She saw the coat on sale in one shop at $\frac{1}{5}$ off. She saw the same coat on sale in another shop at 25% off.

Which shop has the coat at a cheaper price?

Explain your reasoning.

Express the yellow section of the grid in hundredths, tenths, as a decimal and as a percentage of the whole grid.

Do the same for the red section.



Notes:

Mastery

Each bar of toffee is the same. On Monday, Sam ate the amount of toffee shown shaded in A. On Tuesday, Sam ate the amount of toffee shown shaded in B.

How much more, as a fraction of a bar of toffee, did Sam eat on Tuesday?



Using the numbers 5 and 6 only once, make this sum have the smallest possible answer:

$$\frac{\square}{15} + \frac{\square}{10} =$$

Graham is serving pizzas at a party. Each person is given $\frac{3}{4}$ of a pizza. Graham has six pizzas.

How many people can he serve? Draw on the pizzas to show your thinking.



Write your answer as a multiplication sentence.

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:

Notes:

Mastery with Greater Depth

Russell says $\frac{3}{8} > \frac{3}{4}$ because $8 > 4$.

Do you agree?

Explain your reasoning.

Which is closer to 1?

$\frac{7}{8}$ or $\frac{23}{24}$

Explain how you know.

Chiz and Caroline each had two sandwiches of the same size.

Chiz ate $1\frac{1}{4}$ of his sandwiches.

Caroline ate $\frac{5}{4}$ of her sandwiches.

Fred said Caroline ate more because 5 is the biggest number.

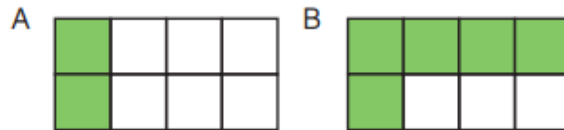
Tammy said Chiz ate more because she ate a whole sandwich.

Explain why Fred and Tammy are both wrong.

Notes:

Mastery with Greater Depth

Each bar of toffee is the same. On Monday, Sam ate the amount of toffee shown shaded in A. On Tuesday, Sam ate the amount of toffee shown shaded in B.



Sam says he ate $\frac{7}{8}$ of a bar of toffee.

Jo says Sam ate $\frac{7}{16}$ of the toffee.

Explain why Sam and Jo are both correct.

Using the numbers 3, 4, 5 and 6 only once, make this sum have the smallest possible answer:

$$\frac{\square}{\square} + \frac{\square}{\square} =$$

Graham is serving pizzas at a party. Each person is given $\frac{3}{4}$ of a pizza.

Fill in the table below to show how many pizzas he must buy for each number of guests.

Guests	Pizzas
4	
6	
8	
10	

When will he have pizza left over?

Notes:

Measurement.

Mastery

Complete this:

$$\frac{1}{2} \text{ kg} = \text{ ____ g}$$

$$\frac{1}{4} \text{ kg} = \text{ ______ g}$$

Which has the greater mass?

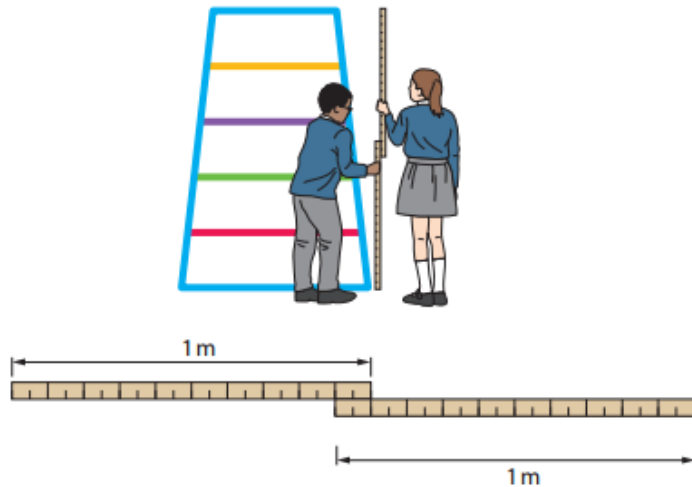
$$\frac{1}{5} \text{ kg or } \frac{1}{10} \text{ kg}$$

Explain why.

The weight of a football is 400 g. How much do five footballs weigh in kilograms?

Joe and Kate are using two metre sticks to measure the height of the climbing frame. Their measurements are shown in the diagram.

How tall is the climbing frame?

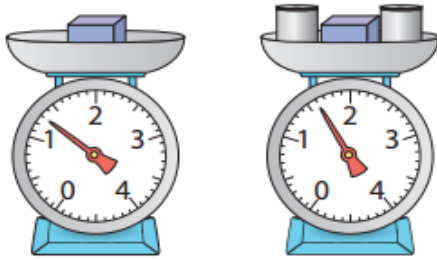


Notes:

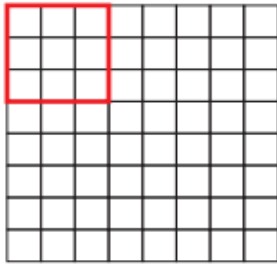
Mastery

A box weighs 1.3 kg. A box and two tins weigh 1.6 kg.

How much does one tin weigh in grams?



Here is a picture of a square drawn on cm^2 paper.



Draw another rectangle with the same perimeter as this square.

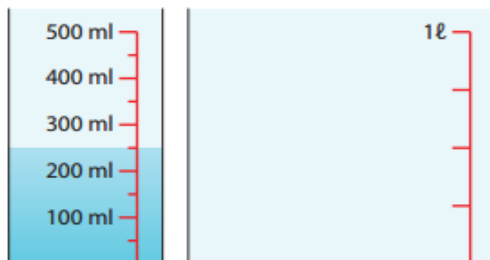
Do the two rectangles have the same area?

Is this always, sometimes or never true of other pairs of rectangles with the same perimeter?

Explain your reasoning.

Hamsa has some juice in a jug and he pours it into a different jug.

Draw the level of the juice in the jug on the right.



Notes:

Mastery with Greater Depth

True or false?

$$1.5 \text{ kg} + 600 \text{ g} = 2.1 \text{ kg} + 300 \text{ g}$$

$$32 \text{ cm} + 1.05 \text{ m} = 150 \text{ cm} - 0.13 \text{ m}$$

$$\frac{3}{4} \ell + 0.05 \ell = \text{half of } 1.6 \ell$$

Explain your reasoning.

A football weighs 0.4 kg.

Three footballs weigh the same as eight cricket balls.

How many grams does a cricket ball weigh?

A 1.2 m ribbon and a 90 cm ribbon are joined by overlapping the ends and gluing them together. The total length of ribbon needs to be 195 cm long.

How much should the two pieces overlap?

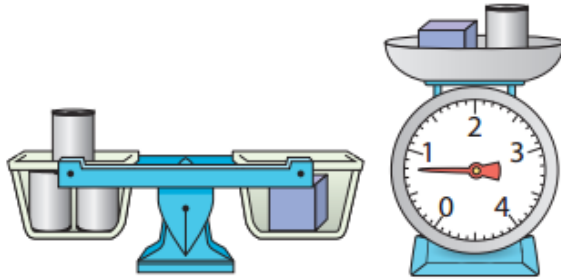


Notes:

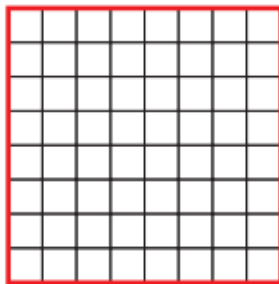
Mastery with Greater Depth

Here are some tins and boxes on two different scales.

How many grams does a tin weigh? How many grams does the box weigh?



Here is a picture of a square drawn on cm^2 paper.



How many other rectangles are there with the same perimeter as the square, where the sides are a whole number of cm ?

Show your workings.

A litre of water is approximately a pint and three quarters.

How many pints are equivalent to 2 litres of water?

Using the approximation, when will the number of litres and the equivalent number of pints be whole numbers?

Notes:

Geometry.

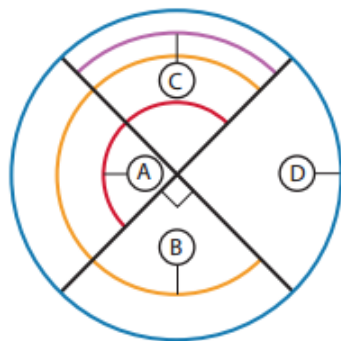
Mastery

The circle is divided into quarters by the two diameter lines and four angles A, B, C and D are marked.

Are the statements below true or false?

- Angle C is the smallest angle.
- Angle D is the largest angle.
- All the angles are the same size.
- Angle B is a right angle.
- Angle B is an obtuse angle.

Explain your reasoning.



Identify the regular and irregular quadrilaterals.



Pupils should recognise that a square is the only regular quadrilateral and there are two within this set.

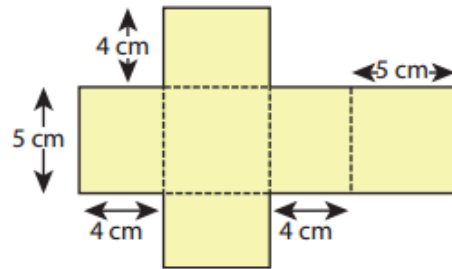
Notes:

Geometry.

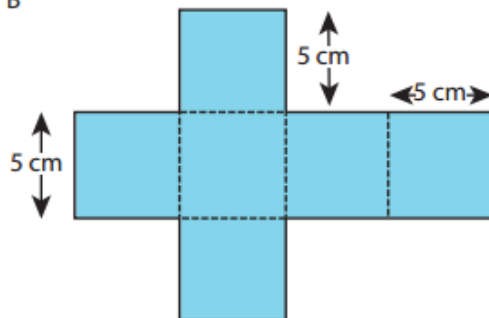
Mastery

What shapes do you make when these 2-D representations (nets) are cut out and folded up to make 3-D shapes?

A



B



Notes:

Mastery with Greater Depth

In the questions, below all of Harry's movement is in a clockwise direction.

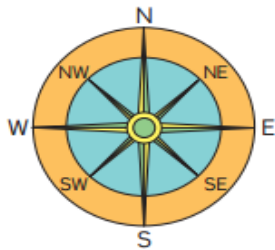
If Harry is facing North and turns through 180 degrees, in which direction will he be facing?

If Harry is facing South and turns through 180 degrees, in which direction will he be facing?

What do you notice?

If Harry is facing North and wants to face SW how many degrees must he turn?

From this position how many degrees must he travel through to face North again?

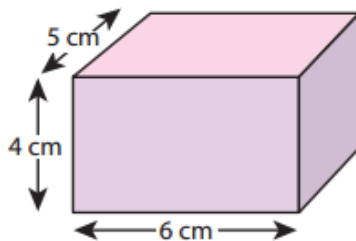


Which of these statements are correct?

- A square is a rectangle.
- A rectangle is a square.
- A rectangle is a parallelogram.
- A rhombus is a parallelogram.

Explain your reasoning.

Draw the 2-D representation (net) that will make this cuboid when cut out and folded up.



Notes:

Statistics.

Mastery

	Bus Timetable					
Highway Rd	06:50		07:25	08:45	09:10	09:45
Rain Rd	07:00	07:25	07:41	08:55	09:19	09:53
Coldcot Rd	07:11	07:41	07:51	09:04	09:28	10:02
Westland Rd	07:18	07:59	07:59	09:11	09:38	10:11
Bod Rd	07:29	08:12	08:09	09:16	09:47	10:16
Kingswell Rd	07:33	08:15	08:14	09:20	09:53	10:21
Long Rd	07:45	08:30	08:30		10:05	10:40

Use the bus timetable to answer the following questions:

On the 6:50 bus how long does it take to get from Highway Rd to Westland Rd?

Can you travel to Long Rd on the 8:45 bus?

Which journey between Rain Rd and Kingswell Rd takes the longest time, the bus that leaves Rain Rd at 7:25 or the bus that leaves Rain Rd at 7:41?

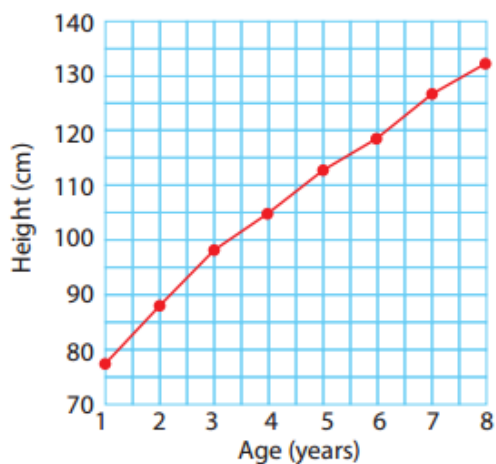
Explain your reasoning.

Use the line graph to answer the following questions:

Approximately how much does the average child grow between the ages of 1 and 2?

Do they grow more between the ages of 1 and 2 or 7 and 8?

The growth of children between the ages of 1 and 8



Notes:

Mastery with Greater Depth

	Bus Timetable					
Highway Rd	06:50		07:25	08:45	09:10	09:45
Rain Rd	07:00	07:25	07:41	08:55	09:19	09:53
Coldcot Rd	07:11	07:41	07:51	09:04	09:28	10:02
Westland Rd	07:18	07:59	07:59	09:11	09:38	10:11
Bod Rd	07:29	08:12	08:09	09:16	09:47	10:16
Kingswell Rd	07:33	08:15	08:14	09:20	09:53	10:21
Long Rd	07:45	08:30	08:30		10:05	10:40

Use the bus timetable to answer the following questions:

If you needed to travel from Coldcot Rd and arrive at Kingswell Rd by 8:20, which would be the best bus to catch?

Explain why.

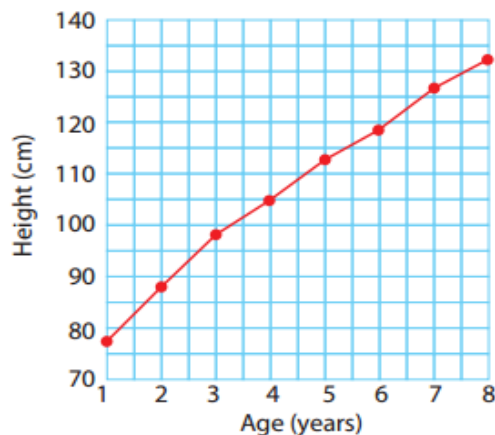
Which journey takes the longest time?

Use the line graph to answer the following questions:

From the graph can you predict the approximate height of an average 10 year old? Explain how.

Consider what might be the similarities and differences between this graph and a graph of the average height of teenagers.

The growth of children between the ages of 1 and 8



Notes:

