Gnosall St. Lawrence C.E Primary Academy

Working together, with Jesus beside us, to achieve our full potential.

Expectations in Mathematics

Year 5

Number and Place Value

What does my child need to be able to do?
Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.

What does this mean?
Children know the value of each digit in numbers with up to 6 digits. For example: The 4 in 934,206 has a value of 4000.
Children can compare numbers with up to 6 digits using < > =.
Children can write numbers from smallest to largest/ largest to smallest using their understanding of the value of each digit.

What does this look like in context?

177,000, 187,000, 197,000, 217,000

What is wrong with this sequence of numbers?

Number and Place Value

What does my child need to be able to do?
Round numbers to nearest 10, 100, 100, 1000, 10,000, 100,000

What does this mean?

Children can round numbers to nearest 10, 100, 100 etc.
Children apply the rule: *5 or more- round up; 4 or less- round down.*
Children know which digit to look at to decide whether to round up or down.

What does this look like in context?

Possible answers
A number rounded to the nearest thousand is 76,000. What is the largest possible number?
A number rounded to the nearest thousand is 89,000. What is the smallest possible number?
A number rounded to the nearest thousand is 56,000. What are the largest and smallest numbers possible?

Number and Place Value

What does my child need to be able to do?

Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

What does this mean?

Children can recognise ascending and descending number patterns that involve both positive and negative numbers.

Solve calculations that involve counting on or back from negative numbers.

Solve problems using negative number- for example reading and calculating temperatures.

What does this look like in context?

True or false?

The temperature is -5°C, it gets 2°C warmer. It is now -5°C.

Number and Place Value

What does my child need to be able to do?

Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

What does this mean?

I	1	XXX	30
II	2	XL	40
III	3	L	50
IV	4	LX	60
V	5	LXX	70
VI	6	LXXX	80
VII	7	XC	90
VIII	8	C	100
IX	9	D	500
X	10	M	1,000
XX	20	MD	1,500

Children use an understanding of these numerals to write numbers to atleast 1000. For example, ***2018*** would be written: ***MMXVIII***

What does this look like in context?

Write the next Roman numeral

1. LXXXI
2. XLVII
3. CXXXVII
4. CXVI
5. CXC
6. CCXXII

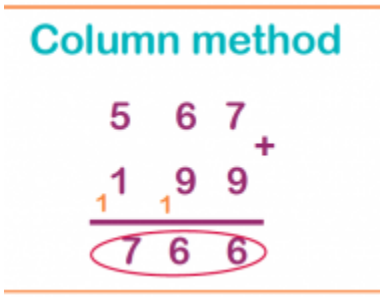
Addition and Subtraction

What does my child need to be able to do?

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).

What does this mean?

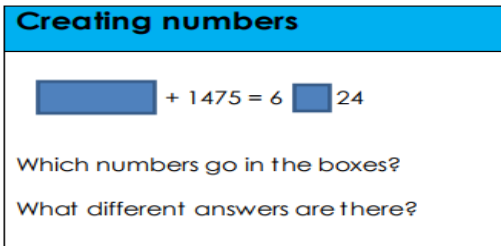
Using the column method for addition and subtraction:



	T	Th	Th	H	T	O
		7	$^{4}\cancel{5}$,	$^{1}5$	$^{2}\cancel{3}$	$^{1}2$
-		2	2,	6	2	3
		5	2,	9	0	9

Children must have a secure understanding of using carrying and exchanging between columns when using addition and subtraction. Children must apply these methods in context.

What does this look like in context?



Addition and Subtraction

What does my child need to be able to do?

Add and subtract numbers mentally with increasingly large numbers. Use rounding to check answers to calculations and levels of accuracy.

What does this mean?
Adding and subtracting without using a formal written method, for example:
550 + 250
550 – 350
Children must have a secure understanding of number bonds to add and subtract mentally.

What does this look like in context?
Which of these number sentences have the answer that is between 0.5 and 0.6?
11.74 - 11.18
33.3 – 32.71

Addition and Subtraction

What does my child need to be able to do?

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

What does this mean?

Children can solve word problems that require more than one calculation. These problems will be given contexts that can link across the curriculum.
Children need to be able to extract key information from given word problems.

What does this look like in context?

American cities		
The table below shows the changes that have happened to the population of large American cities.		
Cities	**Present Population (m)**	**Population in 1990 (m)**
New York	8.34	7.32
Los Angeles	3.86	3.49
Chicago	2.71	2.78
Houston	2.16	1.63
Philadelphia	1.55	1.58
Phoenix	1.49	0.98
Work out whether Los Angeles or Houston has grown more since 1990.		
Two of the cities' populations have become smaller and four cities' populations have grown. Work out by how much the total populations of each of the six cities have grown or become smaller since 1990. (Set out each city and state whether it has grown or become smaller by using a + or – sign on the table below.)		
City	**Population difference**	
New York		
Los Angeles		
Chicago		
Houston		
Philadelphia		
Phoenix		

Multiplication and division

What does my child need to be able to do?

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers

What does this mean?

Factors are numbers that divide **exactly** into another number.

The factors of 12, for example, are 1, 2, 3, 4, 6 and 12.

Factors can be shown in **pairs**. The factors of 12 can be shown:

- 1 and 12 1 x 12 = 12
- 2 and 6 2 x 6 = 12
- 3 and 4 3 x 4 = 12

Each pair multiplies to make 12.

Multiples

Multiples are extended times tables.

- The **multiples of 2** are all the numbers in the 2 times table:
  2, 4, 6, 8, 10 and so on.
  Multiples of 2 always end with a 2, 4, 6, 8 or 0. You can tell 2286, for example, is a multiple of 2 because it ends with a 6.

- The **multiples of 5** are all the numbers in the 5 times table:
  5, 10, 15, 20, 25 and so on.
  Multiples of 5 always end with a 5 or a 0. You can tell 465, for example, is a multiple of 5 because it ends with a 5.

- The **multiples of 10** are all the numbers in the 10 times table:
  10, 20, 30, 40, 50 and so on.
  Multiples of 10 always end with a 0. You can tell 3780, for example, is a multiple of 10 because it ends with a 0.

What does this look like in context?

Challenge

Factor trees are a great way of finding the factors of a number:

Here we can see that some of the factors of 42 are, 2,3,6,7,21.

a. Can you find any more by starting another factor tree for **42**? Show your working out here:

Multiplication and division

What does my child need to be able to do?

Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19.

What does this mean?

Children must know that a prime number is only divisible by itself and one: it has no other factors.

What does this look like in context?

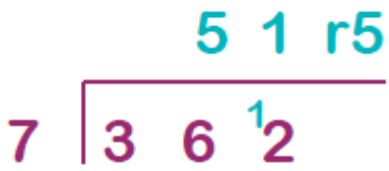
Is it always, sometimes or never true that multiplying a number always makes it bigger?
Is it always, sometimes or never true that prime numbers are odd? Is it always, sometimes or never true that when you multiply a whole number by 9, the sum of its digits is also a multiple of 9?
Is it always, sometimes or never true that a square number has an even number of factors?

Multiplication and division

What does my child need to be able to do?
Multiply numbers with up to 4 digits by a 1- or 2-digit number using a formal written method. Divide numbers with up to 4 digits by a 1-digit number using the formal written method of short division.

What does this mean?

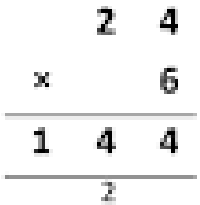
362 ÷ 7 =



362 ÷ 7 = 51 r5

Short multiplication

24 × 6 becomes



Answer: 144

What does this look like in context?

Use the inverse to check if the following calculations are correct: 4321 x 12 = 51852
507 ÷ 9 = 4563

Multiplication and division

What does my child need to be able to do?
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

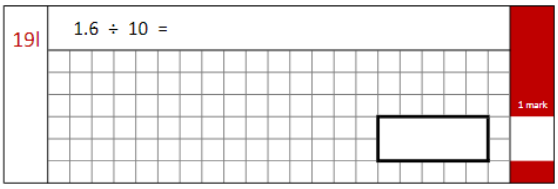
What does this mean?

Children have a secure understanding of place value to allow them to move numbers through a place value grid when multiplying and dividing by 10, 100, 1000. For example, when you multiply a decimal number by 1,000 you move all the digits three places to the left. The number becomes 1,000 times bigger. Example: 2.63 × 1,000 = 2,630

TTh	Th	H	T	U		$\frac{1}{10}$	$\frac{1}{100}$
				2	.	6	3
	2	6	3	0			

TTh = tens of thousands
Th = thousands
H = hundreds
T = tens
U = units

What does this look like in context?



Multiplication and division

What does my child need to be able to do?
Recognise and use square and cube numbers, and the notation for squared and cubed.

What does this mean?
A squared number is a whole number multiplied by itself.
Example: 4 × 4 = 16, so 16 is a square number.
The first 6 squared numbers are:
0(=0×0) 1(=1×1) 4(=2×2) 9(=3×3) 16(=4×4) 25 (=5×5)

A cubed number is a number multiplied by itself 3 times eg.
3 x 3 x 3= 27

What does this look like in context?

Remember:
When we see a little digit next to a whole number, this is called a power. It means we need to multiply the number by itself the given number of times. It is to save you writing out long calculations like this:

$3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$

Instead, we would write 3^6, which means 3 to the power of 6 or $3 \times 3 \times 3 \times 3 \times 3 \times 3$.

When the power is ^{2}, we call this a square number because it can be expressed as a 2D square (it has length and width).

When the power is ^{3}, we call this a cube number because it can be expressed as a 3D cube (it has length, width and height).

$3^2 = 9$

$3^3 = 27$

Calculate these square numbers:

1) 8^2 _____
2) 9^2 _____
3) 11^2 _____
4) 12^2 _____
5) 10^2 _____

Calculate these cube numbers:

1) 4^3 _____
2) 2^3 _____
3) 5^3 _____
4) 10^3 _____
5) 100^3 _____

Fractions

What does my child need to be able to do?

Compare and order fractions whose denominators are all multiples of the same number. Add and subtract fractions with the same denominator and multiples of the same number.

What does this mean?

When Two Fractions Have Different Denominators

First, find the smallest common denominator (smallest whole number that has both denominators as factors). Rewrite the fractions with that denominator then add or subtract. When working with mixed numbers, add or subtract the whole numbers too.

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

$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6} \qquad \frac{5}{10} - \frac{2}{10} = \frac{3}{10}$$

Mixed number: number containing both a whole number and a fraction e.g. 1 ½.

Children can use their understanding of multiples to ensure given fractions or mixed numbers have the same denominator (bottom number)

Children understand that only fractions with the same denominator can be added or subtracted.

What does this look like in context?

Order of fractions
Imran put these fractions in order starting with the smallest. Are they in the correct order? Two fifths, three tenths, four twentieths How do you know?

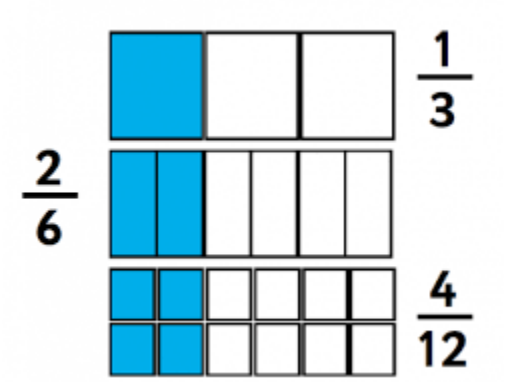
Fractions

What does my child need to be able to do?

Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.

What does this mean?

Children can create and identify equivalent fractions using multiples of the denominator. Children understand that when creating equivalent fractions, the same operation must be used on the numerator and denominator.



What does this look like in context?

Odd one out			
Which is the odd one out in each of these collections of 4 fractions			
6/10	3/5	18/20	9/15
30/100	3/10	6/20	3/9
Why?			

Fractions

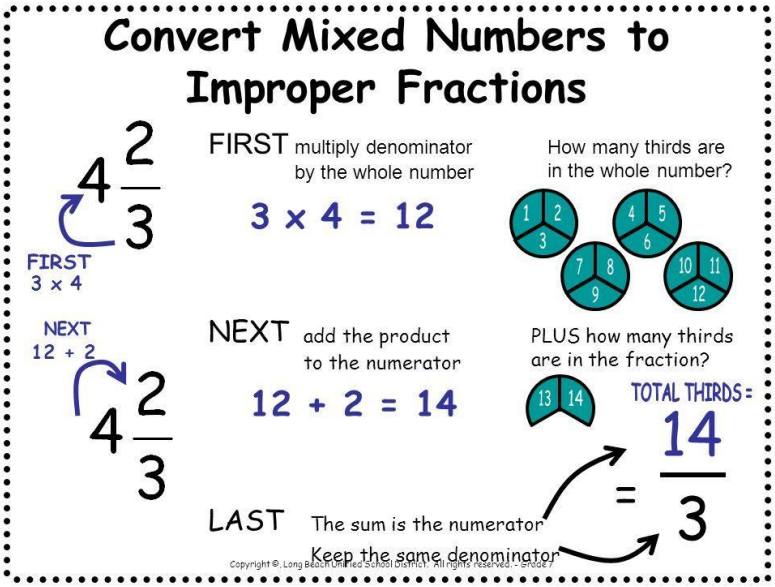
What does my child need to be able to do?

Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.

What does this mean?

Mixed number: number containing both a whole number and a fraction e.g. 1 ½.

Improper fraction: a fraction with a greater numerator than denominator.



What does this look like in context?

Converting Improper Fractions to Mixed Numbers

1)	$\frac{15}{7}$ = ___	2)	$\frac{26}{4}$ = ___	3)	$\frac{51}{9}$ = ___
4)	$\frac{27}{5}$ = ___	5)	$\frac{30}{9}$ = ___	6)	$\frac{5}{2}$ = ___
7)	$\frac{35}{8}$ = ___	8)	$\frac{22}{6}$ = ___	9)	$\frac{54}{10}$ = ___
10)	$\frac{22}{10}$ = ___	11)	$\frac{24}{5}$ = ___	12)	$\frac{71}{10}$ = ___
13)	$\frac{23}{3}$ = ___	14)	$\frac{25}{10}$ = ___	15)	$\frac{37}{5}$ = ___

Fractions

What does my child need to be able to do?

Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.

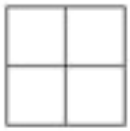
What does this mean?

$\frac{1}{3} \times 2 = \frac{2}{3}$

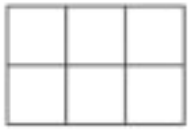
1. $\frac{1}{4} \times 2 =$

2. $\frac{1}{3} \times 3 =$

6. $\frac{1}{4} \times 3 =$



7. $\frac{1}{6} \times 5 =$



What does this look like in context?

Continue the pattern

¼ x 3 =
¼ x 4 =
¼ x 5 =

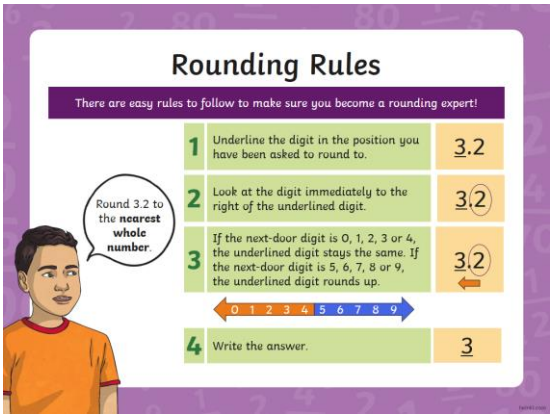
Continue the pattern for five more number sentences. How many steps will it take to get to 3?

Fractions

What does my child need to be able to do?

Round decimals with two decimal places to the nearest whole number and to one decimal place.

What does this mean?



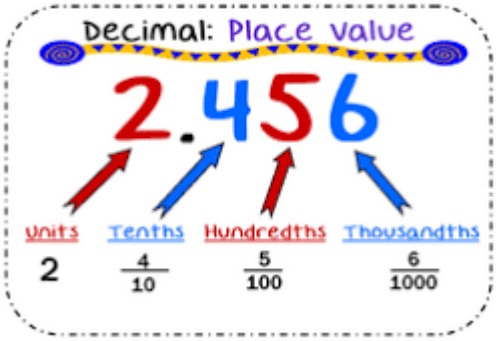
What does this look like in context?

Round 8.6 to the nearest whole number.

What is 4.579 rounded to 1 decimal place?

Fractions

What does my child need to be able to do?
Read, write, order and compare numbers with up to three decimal places. Solve problems involving number up to three decimal places.



What does this mean?
Children should have a secure understanding of the value of each digit in decimal numbers. They should be able to identify tenths, hundredths and thousandths in a decimal number.

What does this look like in context?

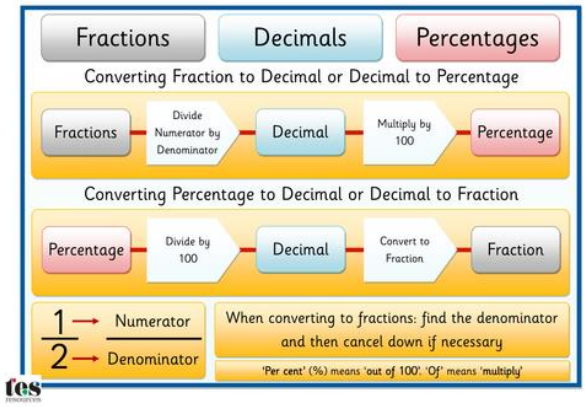
What comes next?
1.173, 1.183, 1.193

Fractions

What does my child need to be able to do?
Write percentages as a fraction. Solve problems which require knowing percentage and decimal equivalents of ½, ¼, ⅕, ⅖, ⅘ and those with a denominator of a multiple of 10 or 25.

What does this mean?

Decimal	Percentage	Fraction
0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$
0.75	75%	$\frac{3}{4}$
0.2	20%	$\frac{1}{5}$
0.1	10%	$\frac{1}{10}$
$0.\dot{3}$	$33.\dot{3}\%$	$\frac{1}{3}$



Children need to know ½ ¼ equivalents off by heart and should be able to use above methods to convert other fractions, decimals and percentages.

What does this look like in context?

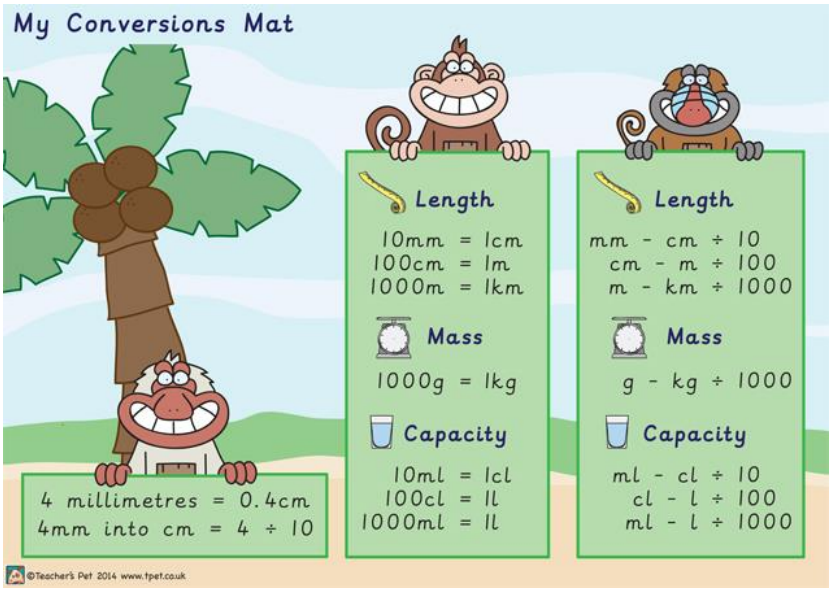
Complete the pattern					
$\frac{71}{100}$	$\frac{X}{100}$	$\frac{X}{100}$	$\frac{39}{100}$	$\frac{19}{100}$	$\frac{83}{100}$
0.71	0.81	0.17			

Complete the table.

Measures

What does my child need to be able to do?

Convert between different units of metric measure (e.g. km & m; cm & m; cm & mm; g & kg; l & ml). Use approximate equivalences between metric and imperial units (e.g. inches, pounds & pints).



What does this mean?

Children should use their understanding of place value to help them convert units of measure

by multiplying and dividing by 10, 100, 1000.

What does this look like in context?
Apples weigh approximately 170g each. How many apples would you expect to get in a 2kg bag?

Measures

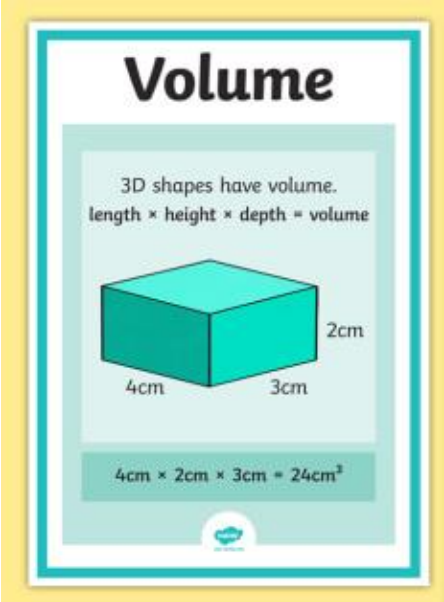
What does my child need to be able to do?
Measure and calculate the perimeter of composite rectilinear shapes in cm/m. Calculate the area of squares/rectangles using standard units, square cm/m and estimate the area of irregular shapes.

What does this mean?
Composite rectilinear shapes are 2D shapes that can be broken down into rectangles. Once the shape has been broken into separate shapes, the perimeter can be calculated.

What does this look like in context?

Testing conditions
Shape A is a rectangle that is 4m long and 3m wide. Shape B is a square with sides that are 3m. The rectangles and squares are put together side by side to make a path which has perimeter between 20 and 30m. Draw some other arrangements where the perimeter is between 20 and 30 metres.

Measures



What does my child need to be able to do?
Estimate volume (e.g. using 1 cm blocks to build cubes/cuboids) and capacity (e.g. using water).

What does this mean?
Volume deals with 3D shape and the area they take up. Volume can be calculated using the shown method.

What does this look like in context?
Mrs Hennessy needs to fill buckets of water. A large bucket holds 6 litres and a small bucket holds 4 litres. If a jug holds 250 ml and a bottle holds 500 ml suggest some ways of using the jug and bottle to fill the buckets.

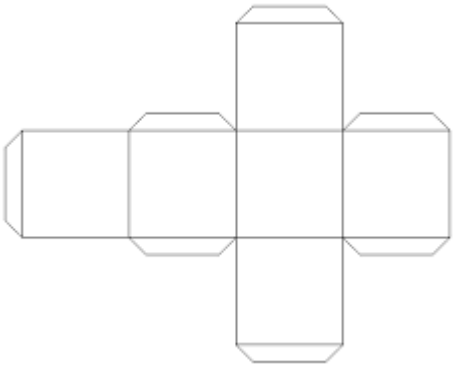
Measures

What does my child need to be able to do?
Solve problems involving converting between units of time. Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.

What does this mean?
Children need to apply their understanding of measures and conversion in a variety of contexts.

What does this look like in context?
Put these lengths of time in order starting with the longest time. 105 minutes
1 hour 51 minutes
6360 seconds

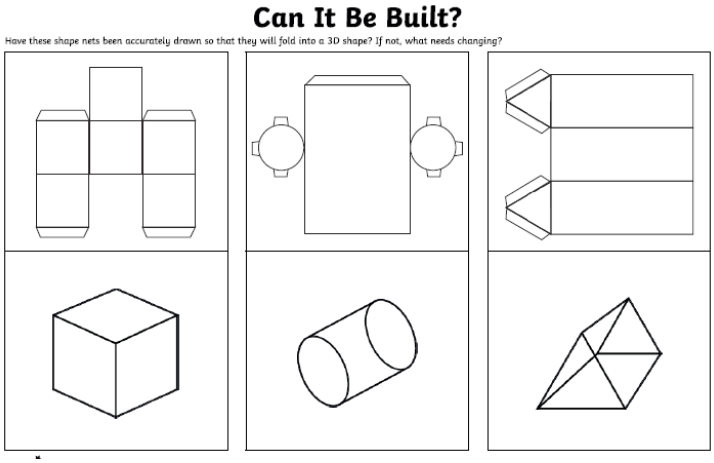
Geometry



What does my child need to be able to do?
Identify 3D shapes, including cubes and other cuboids, from 2D representations.

What does this mean?
3D relates to three-dimensional shapes. These shapes can be represented in 2D form using nets. Children need to recognize these nets and the 3D shapes they represent.

What does this look like in context?



Geometry

What does my child need to be able to do?

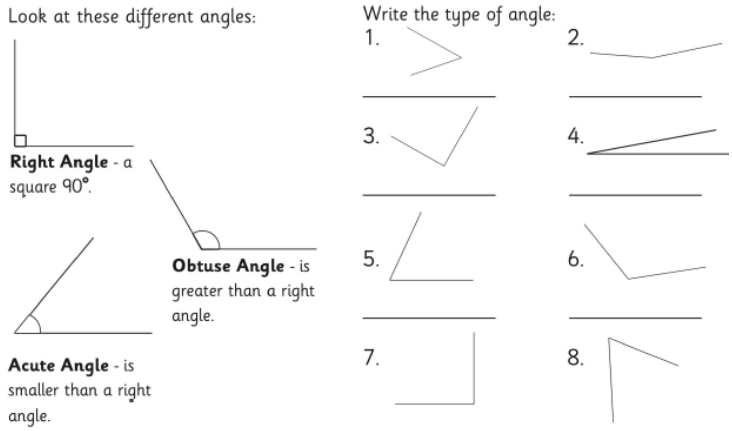
Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees.

What does this mean?

Acute- less than 90°
Obtuse- between 91° and 180°
Reflex- greater than 180°

Children are able to identify these types of angles, both by sight and through accurate measuring using a protractor.
Children can use a protractor to draw and measure given angles.

What does this look like in context?



Geometry

What does my child need to be able to do?
Identify: angles at a point and one whole turn (total 360⁰); angles at a point on a straight line and ½ a turn (total 180⁰); other multiples of 90⁰.

What does this mean?
Children recognise that the angle of a full turn is 360° is a full turn, 180° is the angle of half a turn or a straight line and 90° is the angle of a right angle or quarter turn.

What does this look like in context?

Angles of a clock

What is the angle between the hands of a clock at four o clock?
At what other times is the angle between the hands the same?
Convince me.

Geometry

What does my child need to be able to do?
Use the properties of rectangles to deduce related facts and find missing lengths and angles.

What does this mean?
Children know that rectangles have 4 sides (2 pairs of equal lengths) and 90° angles in the 4 corners.

What does this look like in context?
A rectangular field has a perimeter between 14 and 20 metres. What could its dimensions be?

Geometry

What does my child need to be able to do?

Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

What does this mean?

Children understand that the properties of a shape does not change during translation or reflection; just its position.
Reflection involves using a line of symmetry to reflect the shape and create a mirror image. Translation involves moving the shape- which is kept in the same orientation- to a different point on the given grid.

What does this look like in context?

Always, sometimes, never
Is it always, sometimes or never true that the number of lines of reflective symmetry in a regular polygon is equal to the number of its sides?
always sometimes never

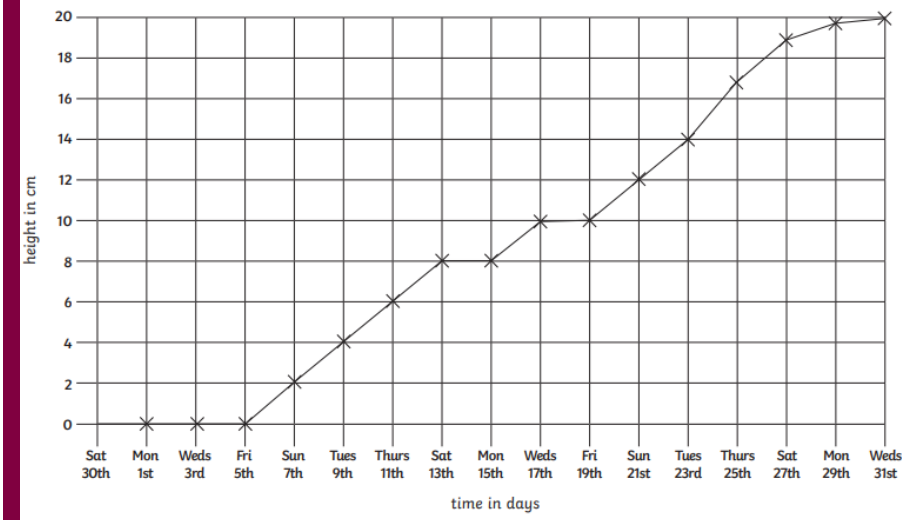
Statistics

What does my child need to be able to do?

Solve comparison, sum and difference problems using information presented in a line graph.

Sunflower Line Graph

Here is a line graph showing a sunflower's growth. It was planted on Saturday 30th and its height was measured every 2 days.



What does this mean?

Children must use line graphs to solve problems. They need to read scales to enable them to interpret the information shown. An example of a line graph is pictured above.

What does this look like in context?

Sunflower Line Graph

Questions

1. How many days did the plant take to grow 8cm?

_____

2. What is the height difference between Wednesday 17th and Tuesday 23rd?

_____

3. What is the height of the plant on these days:

a) Thursday 11th [ ]

b) Friday 19th [ ]

c) Monday 29th [ ]

4. Why do you think there is no measurement in the first week?

_____

Statistics

What does my child need to be able to do?

Complete, read and interpret information in tables, including timetables.

What does this mean?

Children must show an understanding of using tables to obtain information. These may be result tables, time tables etc.
Children need to show an understanding of using the column and row titles to help interpret the data shown.

What does this look like in context?

Bus timetable

The table below gives the times buses travel towards South Wales from London. No bus goes the full route. Answer the questions that follow.

Bus	A	B	C	D
London Paddington	1152	1200	1250	1303
Reading	1222	1230	1321	1333
Swindon	1252	1303	1353	1354
Cardiff Central		1412		1501
Swansea		1504		1558

Which is the fastest bus to take you between London Paddington and Swansea?

Which is the fastest bus between Reading and Swindon

If you miss Bus B from London Paddington and take the next bus how much later will you be getting to Swindon?