Pallister Park Primary
Maths Overview for Parents
March 2015

(Examples taken from NCETM website)

Overview of Expectations in Maths in Year 1

The national expectations for Year 1 children are as follows:

Number & Place Value

§ **count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number**

- count forwards from 80 to 110
- count backwards from 105

§ **count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens**

- Find p 39 in a book
- Make a label to show how many things were in your collection
- Count groups of 10 each of 2p, 5p and 10p coins

§ **given a number, identify one more and one less**

- There are twenty nine beads in this pot. I am putting one more bead in the pot. How many are in there now? How did you know? How can you check?
- This time there are forty beads in the pot. I take out one bead. How many beads are left in the pot? How did you know? How can you check?
- Start with a different number of beads in the pot. Ask your partner to put another bead in or take one out and then say how many there are in the pot. How will you know if your partner is right?

§ **identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least**

- I'm giving each of you a strip of card with some numbers on [five numbers at random from 0 to 30].
- Point to the number which is worth most. Now point to the number which is worth least.
- Make these numbers using tens and ones apparatus and put them in order.
- Why have you put this number there?

§ **read and write numbers from 1 to 20 in numerals and words.**

- Make some labels for collections using numbers and words.

Addition & Subtraction

§ read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs

- Use the vocabulary add, subtract, minus, equals, is the same value as, total, more than, fewer/less than.
- Explain that things on both sides of the equals sign have the same value
- Know that the 'total' can be presented on either side of the equals sign
- Complete 'empty box' number sentences

§ represent and use number bonds and related subtraction facts within 20

- I'm thinking of a number. I've subtracted 6 and the answer is 8. What number was I thinking of? Explain how you know.
- I'm thinking of a number. I've added 7 and the answer is 18. What number was I thinking of? Explain how you know.
- I know that 6 and 4 is 10. How can I find 7 + 4? How could you work it out?

§ add and subtract one-digit and two-digit numbers to 20, including zero

- What is 37 subtract 10? How did you work that out? How could you show that using cubes/a number line/a 100-square? What would 37 subtract 20 be?
- Make up some difference questions with the answer 5. Can you show how to solve them using counters? Can you show how to find the answer on a number line?

§ solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.

- Make up some additions with the answer 15. Try to put them in different ways, like this: 10 + 5 = 15. The total of 10 and 5 is 15. 10 and 5 more makes 15.
- How many ways can you show me that 9 subtract 3 is 6?
- Make up some subtractions with the answer 5. Try to put them in different ways, like this: 11 – 6 = 5. The difference between 6 and 11 is 5.

Multiplication & Division

§ solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

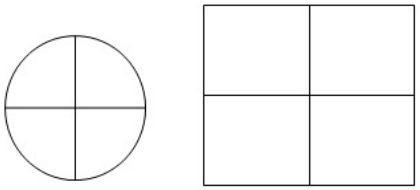
- Use practical apparatus, arrays and images to help solve multiplication and division problems such as:
- Ben had 5 football stickers. His friend Tom gave him 5 more, how many does he have altogether?
- Share 12 sweets between two children. How many do they each have?
- Find half of and double a number or quantity: 16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?
- I think of a number and halve it. I end up with 9, what was my original number?

Fractions

§ recognise, find and name a half as one of two equal parts of an object, shape or quantity
§ recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

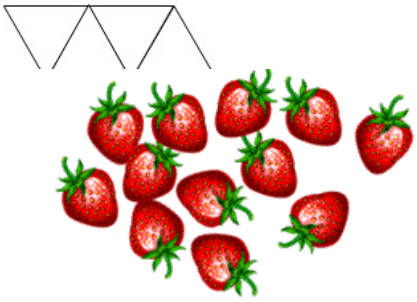
Here is a set of 12 pencils. How many is half the set?

Shade one quarter of each shape.



Four Children share 12 strawberries into equal parts.

How many strawberries will each child have?



Measurement

§ compare, describe and solve practical problems for:
§ lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]

- Use their experience of standard units to make realistic estimates, answering questions such as:
  - Is the table taller or shorter than a metre?
  - Is this doll taller or shorter than one of the class rulers?

§ mass/weight [for example, heavy/light, heavier than, lighter than]
§ capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
They use a litre jug to measure how much more the washing-up bowl holds than the cola bottle.
§ time [for example, quicker, slower, earlier, later]
§ measure and begin to record the following:
§ lengths and heights
Use standard units to measure and compare objects. For example, they place metre sticks end-to-end to find out how much wider the hall is than the classroom.
§ mass/weight
Which of these things do you think will weigh less than a kilogram?
§ capacity and volume
Does this bottle hold more or less than the litre jug?
§ time (hours, minutes, seconds)
§ recognise and know the value of different denominations of coins and notes

- Distinguish coins by sorting them and start to understand their value. They begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1. They play money games and collect 1p or 2p coins to the value of 10p and begin to count up 'how much this is altogether'. They extend their activities in the classroom shop, paying for items that cost 1p, 3p, 5p, 7p or 9p using only 2p coins, and receiving the appropriate amount of change in 1p coins. They use coins to help them to respond to questions such as:
    - Michael had £5. He spent £3. How much did he have left?
    - Rosie had a 10p coin. She spent 3p. How much change did she get?
    - How much altogether is 1p and 2p and 5p?
    - Sunita spent 5p and 6p on toffees. What did she pay altogether?
    - Chews cost 2p each. How much do three chews cost?
    - An apple costs 12p. Which two coins would pay for it? What combinations of 3 coins would pay for it?

§ sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]

- Continue to develop the concept of time in terms of time passing and sequencing events in familiar story or day-to-day routines.
    - They use terms such as morning, afternoon and evening, yesterday and tomorrow.
    - They learn to order the days of the week and learn that weekend days are Saturday and Sunday.
    - They listen to stories and rhymes about time, such as The Very Hungry Caterpillar or The Bad-Tempered Ladybird by Eric Carle, Monster Monday by Susanna Gretz or Hard Boiled Legs by Michael Rosen and Quentin Blake.

§ recognise and use language relating to dates, including days of the week, weeks, months and years
order the months of the year and make a 12-page classroom calendar with pictures of each month, writing significant events underneath, such as Divali, Pancake Day or Midsummer's Day, or the dates of their birthdays.
§ tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

- Read time to the hour and half hour on a clock with hands and recognise half past the hour in day-to-day routines. They use time lines or clocks to help them to respond to questions such as:
    - It's half past seven. What time will it be in four hours' time? What time was it two hours ago?
    - John went to the park at 9 o'clock. He left at half past eleven. How long was he at the park?

Geometry – Shapes

§ recognise and name common 2-D and 3-D shapes, including:
§ 2-D shapes [for example, rectangles (including squares), circles and triangles]
§ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

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Geometry – Position & Direction

§ describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Overview of Expectations in Maths in Year 2

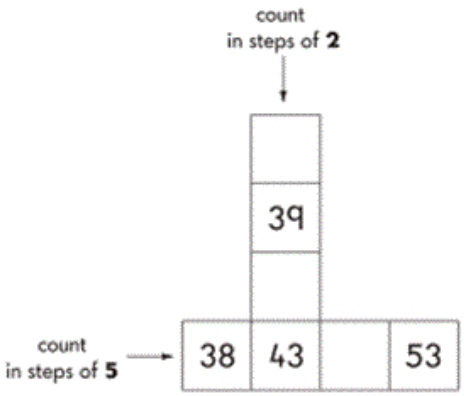
The national expectations for Year 2 children are as follows:

Number & Place Value

§ count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward

Use their knowledge of counting on from or back to zero in steps of 2, 3, 5 and 10 to answer multiplication and division questions such as 7 × 2 and 40 ÷ 5. They understand that one way to work out 40 ÷ 5, for example, is to find out how many fives make 40. They know that this can be done by counting forwards in fives from zero or backwards in fives from 40.

Write the missing numbers in each of these patterns.



§ recognise the place value of each digit in a two-digit number (tens, ones)

Look at these numbers. **37 12 45 60 72 27**

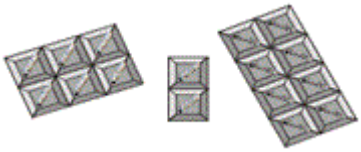
Which of these numbers is the largest?
Which of these numbers is between 10 and 20?

What is the value of … ? (point to digits in the list above)

§ identify, represent and estimate numbers using different representations, including the number line

Children should be able to represent numbers using equipment such as bundles of ten and single art-straws, 10p and 1p coins and number lines.

Look at the squares of chocolate



There are 16 squares

Tick(☐) the sum that matches the picture

5+2+9=16

5+6+5=16

6+6+4=16

6+2+8=16

8+3+5=16

§ compare and order numbers from 0 up to 100; use <, > and = signs

Here are two signs 

Use these signs to make these correct

52 ☐ 17

18 ☐ 91

50 ☐ 34

Children should be able to order a set of two-digit numbers, such as 52, 25, 5, 22, 2, 55. They explain their decisions. They understand and use the < and > symbols; for example, they write a two-digit number to make the statement 56 > ☐ true.

§ read and write numbers to at least 100 in numerals and in words
Children should be able to answer questions, such as:
What numbers can you make using two of these digits: 3, 6, 0?
Write down each number you make. Read those numbers to me. Can you write the largest of the numbers in words?

§ use place value and number facts to solve problems.

Addition & Subtraction

§ solve problems with addition and subtraction:
§ using concrete objects and pictorial representations, including those involving numbers, quantities and measures
§ applying their increasing knowledge of mental and written methods

- Use partitioning, counting strategies and knowledge of number bonds to add or subtract a one-

digit number or a multiple of 10 to any two-digit number. To work out 86 – 50, for example, they might partition and calculate:

86 – 50 = 80 + 6 – 50 = 80 – 50 + 6 = 30 + 6 = 36

- Similarly, to find the total number of people on a bus with 14 people on the top deck and 8 below, they might use:

  14 + 8 = 14 + 6 + 2 = 20 + 2 = 22

- Children add or subtract two-digit numbers using practical and informal methods and their knowledge of the relationships between operations. For example, they count back along a number line to find 64 – 25 or count up from 67 to find the answer to 94 – 67. They represent such calculations as number sentences. They calculate the value of an unknown in a number sentence such as □ ÷ 2 = 6 or 85 – □ = 29. They recognise, for example, that to answer 85 – □ = 29 they could use the related addition 29 + □ = 85

§ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

- Extend their knowledge and use of number facts, and use partitioning and number bonds to add and subtract numbers mentally to answer questions such as 60 – □ = 52 or 35 = 20 + □. They make jottings where appropriate to support their thinking.
- Answer problems such as:
  - Look at this number sentence: □ + □ = 20. What could the two missing numbers be? What else?
  - Can you tell me all the pairs of numbers that make 20?

§ add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
§ a two-digit number and ones
§ a two-digit number and tens
§ two two-digit numbers
§ adding three one-digit numbers
§ show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

Understand that addition can be done in any order and use this to solve an addition by rearranging the numbers to simplify the operation. They need to understand that two numbers can be taken away from each other but that the answers will not be the same.

§ recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

- Check their addition and subtraction with a calculation that uses the inverse operation.
- Answer questions, such as:
- Look at this number sentence: 74 – 13 = 61
- Write three more number sentences using these numbers. How do you know, without calculating, that they are correct?
- What addition facts can you use to help you calculate these?
- 12 – 5, 19 – 8
- Explain how the addition facts helped you.
- I think of a number, I subtract 19 and the answer is 30. What is my number? How do you know?

<u>Multiplication & Division</u>

§ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

The children should be able to:

Recognise a multiple of 2, 5 or 10 and use their knowledge of multiplication facts to find corresponding division facts. They can say which numbers are odd and which are even.

e.g. 2 x 5 = 10, show me three more number facts using these numbers.

Is 34 an odd number? How do you know?

§ calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

Children should be able to:

Find missing numbers or symbols in a calculation:

4 x __ = 20, __ ÷ 10 = 3

Anna has 3 boxes of cakes. Each box contains 5 cakes. How many cakes does she have altogether? Show how you worked this out.

§ show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Children should be able to:

Use their knowledge of triangles of numbers to show related number facts.

e.g. If 6 x 2 = 12 then 2 x 6 = 12 and 12 ÷ 6 = 2.

§ solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Children should be able to:

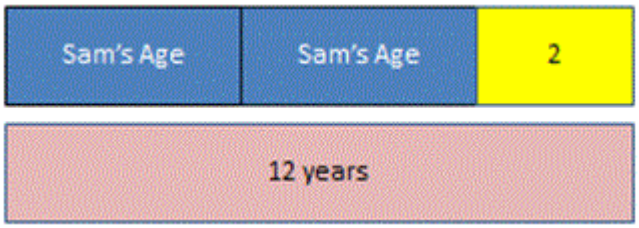
Use various methods and apparatus to help them solve word problems such as:

There are 10 lollies in a bag. Charlie needs 30 lollies for his party. How many bags does he need to buy? Show how you worked this out.

Fractions

§ recognise, find, name and write fractions 1/3, ¼, 2/4, ¾ of a length, shape, set of objects or quantity
§ write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of 2/4 and ½

Using bar models to represent and unpick a fraction word problem

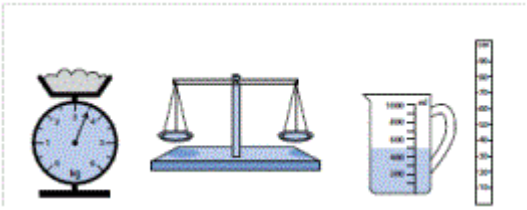


Harrison and sam were talking and Harrison said that if he doubled Sam's age and added 2 he would get 12

Would a chocolate lover rather have ½ or $^{3}/_{5}$ of this bar of chocolate? Explain your answer.

Measurement

§ choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
§ compare and order lengths, mass, volume/capacity and record the results using >, < and =



- Suggest sensible units you might use to measure: the height of your table; how much water is in a cup; the weight of my reading book; how long it takes me to wash my hands.
- Choose a piece of equipment to help you measure: the weight of your shoe; how long the classroom is; how long this lesson lasts; how much water a cup holds.
- How long is this line? Now draw a line 2 cm longer than this one.

  How much water is in this measuring jug?

- Find an object in the classroom that you think is about 10 cm long.

  About how heavy do you think your pencil case is?

- If I programme my floor turtle to go forward three metres is there enough room in the classroom? How could you measure to find out?

Megan and Jack are growing beans. Megan's plant is 25 cm tall. Jack's is 38 cm tall. Whose plant is the taller? By how much? Can you compare them using > or < ?

§ recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
§ find different combinations of coins that equal the same amounts of money

- Holly has these coins.

  Harry has the same amount of money but has six coins. What are they? Is there only one possible answer?

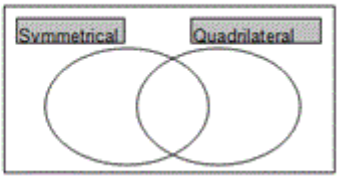
§ solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
Jess has saved 62p. She spends 15p. How much money does she have left? She pays with a 50p piece. How much change does she get?

§ compare and sequence intervals of time
§ tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
§ know the number of minutes in an hour and the number of hours in a day.

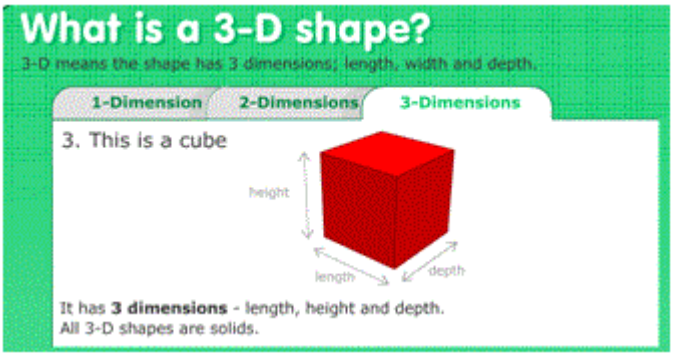
- What time does this clock show?
- Draw a clock showing the time five minutes later.
- Show your school day on clock faces: when do you leave home, have breaks, go back home, etc.?

Geometry – Shapes

§ identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line

I can sort shapes describing how I have classified them	Place the shapes below in the correct place in the Venn diagram. 	
I can identify whether shapes are symmetrical	Make one shape of your own to add to each section of the diagram.	

§ identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces



§ identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
§ compare and sort common 2-D and 3-D shapes and everyday objects.

Write the missing numbers in the 2 empty boxes.

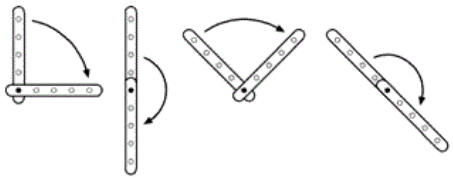
	number of square faces	number of triangular faces	number of circular faces
cylinder	0	0	
cube		0	0
pyramid	1	4	0

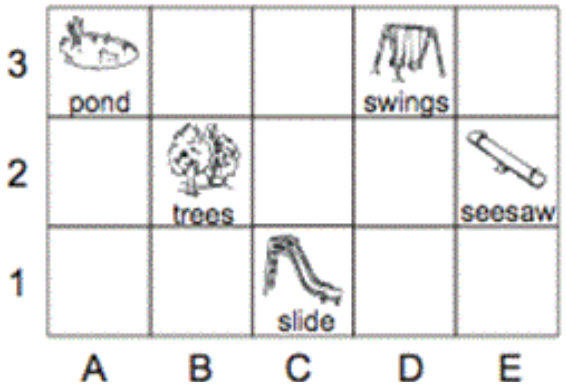
Children can sort two sets of 2D and 3D shapes in 2 or more different ways using different criteria each time. For example, they might choose ‘dimensions’ or ‘right angled’

Geometry – Position & Direction

§ order and arrange combinations of mathematical objects in patterns and sequences
Describe the patterns in sequences and predict what comes next in the sequence and continue the pattern.
§ use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).

- Recognise whole, half and quarter turns. They describe turns and give and follow instructions to turn. For example, they give instructions to a friend to follow a route around the playground. They make and draw half and quarter turns from the same starting point using, for example, two geostrips.





Use the grid to help you complete this table.

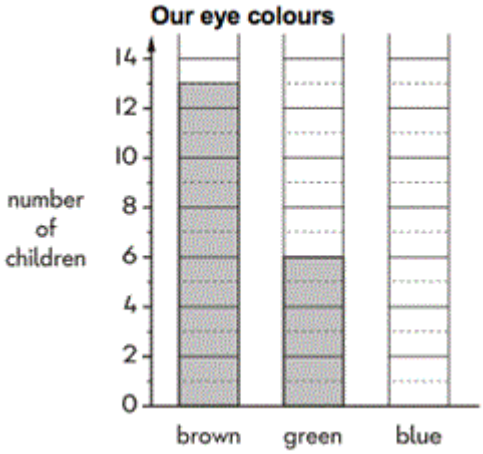
trees	B2

slide	
seesaw	
	A3

Statistics

§ interpret and construct simple pictograms, tally charts, block diagrams and simple tables

- Class 2 make a graph

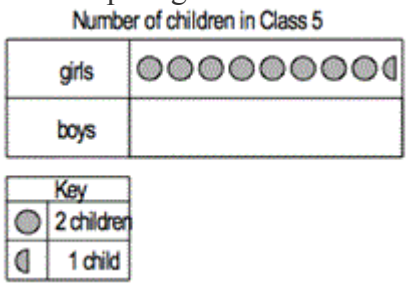


5 children have blue eyes. Show this on a graph. More children have brown eyes than green eyes.

How many more?

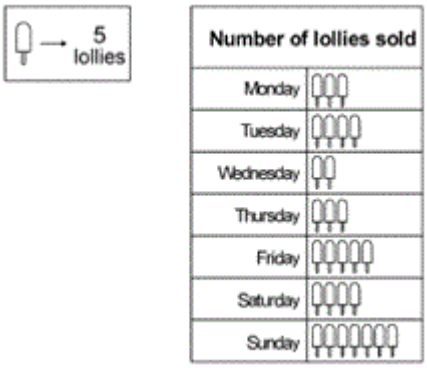
§ ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity

- Look at this pictogram



There are 12 boys in class 5.
Show this on a pictogram.

- A shop sold 10 ice lollies on Wednesday.

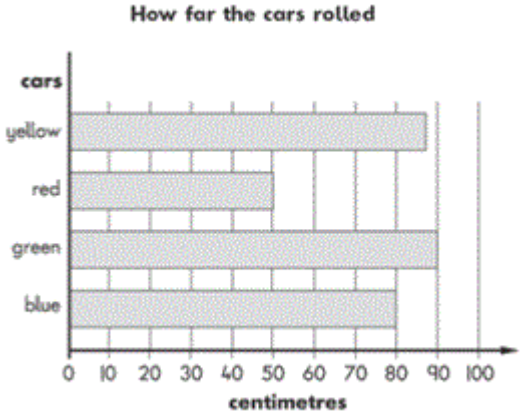


How many lollies were sold on Monday?

How many more lollies were sold on Tuesday than on Wednesday?

§ ask and answer questions about totalling and comparing categorical data.

- Some children rolled toy cars down a slope

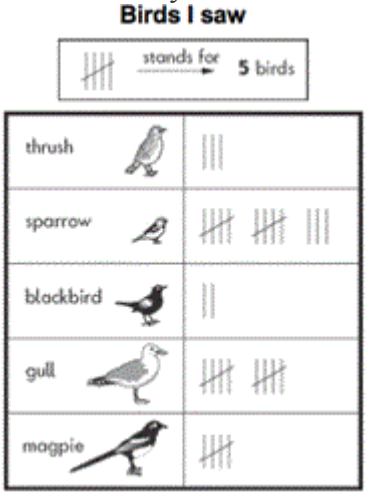


How far did the blue car roll?

How much further did the green car roll than the red car?

additional questions:

  - Which car rolled the furthest?
  - Make up a question about the red car and the yellow car.
- Jane made a tally chart



How many more gulls than blackbirds did she see?

Additional questions:

- Make up a question comparing the numbers of sparrows and blackbirds that Jane saw?
- How many fewer thrushes than magpies did she see:-
  - 12
  - 2
  - 10
  - 3

- Some children were asked to choose their favourite animal in the zoo.This table shows the results.

	Girls	Boys
zebra	9	3
lion	4	9
giraffe	7	4
monkey	8	7
elephant	6	5

How many more girls than boys chose the giraffes?

How many more boys chose lions than elephants?

Which animal was chosen by the greatest number of children

Overview of Expectations in Maths in Year 3

The national expectations for Year 3 children are as follows:

Number & Place Value

§ count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number

- Count on from zero in steps of 2, 3, 4, 5, 8, 50, 100;
- Give me the number 100 less than 755
- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)

§ recognise the place value of each digit in a three-digit number (hundreds, tens, ones)

- For each of these numbers: 428, 205, 130, 25, 7, 909. Tell me: How many hundreds? How many tens it has? How many ones?

§ compare and order numbers up to 1000

- Sort these numbers into ascending order: 95, 163, 8, 740, 25, 0, 400, 303

§ identify, represent and estimate numbers using different representations

- Show me 642 on a number line, with Dienes apparatus, with place value cards, on a Gattegno grid;
- What number is halfway between 65 and 95? How do you know?

§ read and write numbers up to 1000 in numerals and in words

- Read these numbers 428, 205, 130, 25, 7, 909

§ solve number problems and practical problems involving these ideas.

- Jack walks 645 metres to school. Suzy walks 100 metres less. How far does Suzy walk?
- What is 1 more than 485? Than 569? Than 299?
- What number needs to go into each triangle? Explain why?
- 642 = 600 + Δ + 2 967 = Δ + 60 + 7

Addition & Subtraction

§ add and subtract numbers mentally, including:

- § a three-digit number and ones
- § a three-digit number and tens
- § a three-digit number and hundreds

§ add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

§ estimate the answer to a calculation and use inverse operations to check answers

§ solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

- Examples below, addressing combinations of the requirements above, are taken from a variety of publications.
- What number is 27 more than 145? What number is 19 more than 145? Explain how you worked out these two calculations.
- Work out the missing digits: 3□ + □2 = 85
- Work out these subtraction calculations:
- 72 – 5 372 – 68 270 – 3
  82 – 15 132 – 28 70 – 66
- Did you use the same method for each calculation? If not, why not? Explain your methods to a friend and compare your methods with theirs.
- Paul says 172 – 15 = 163. Write down an addition calculation that you could do to check this. Paul's working is: 170 – 10 = 160 and 5 – 2 = 3 so 172 – 15 = 163. Can you identify where Paul has gone wrong?
- Layla has 45p in her money bank and 28p in her purse. How much more money does she need to buy a comic that costs £1?

- Ben and Jess are answering this problem: Mary has collected 61 key rings, Jo has 45. How many more key rings does Mary have than Jo? Ben does the calculation 61 + 45. Jess does the calculation 61 – 45. Who is correct? Explain how you know.
- Josh buys one coconut and half a kilogram of bananas. What does he pay?

- Coconut 78p
  Bananas £1.50 per kg
- A film starts at 6:30 pm and ends at 8:10 pm. How many minutes does the film last?
- I travel on a journey lasting 1 hour 25 minutes. The train leaves the station at 7:45 am. What time does the train arrive?
- What number is 199 more than 428?
- What is the difference between 1999 and 4003?

Multiplication & Division

§ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

- multiply seven by three; what is four multiplied by nine? Etc.
- Circle three numbers that add to make a multiple of 4
- 11 12 13 14 15 16 17 18 19
- Leila puts 4 seeds in each of her pots. She uses 6 pots and has 1 seed left over. How many seeds did she start with?
- At Christmas, there are 49 chocolates in a tin and Tim shares them between himself and 7 other members of the family. How many chocolates will each person get?

§ write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

- One orange costs nineteen pence. How much will three oranges cost?
- Mark drives 19 miles to work every day and 19 miles back. He does this on Mondays, Tuesdays, Wednesdays, Thursdays and Fridays. How many miles does he travel to work and back in one week?

§ solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

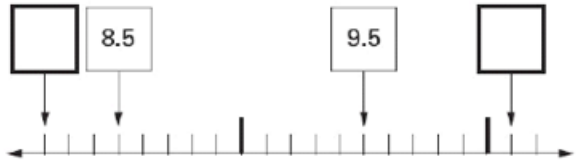
- Miss West needs 28 paper cups. She has to buy them in packs of 6. How many packs does she have to buy?

Fractions

§ count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10

- Use decimal notation for tenths
- Divide single digits or whole numbers by 10
- Explain how finding 1/10 is the same as dividing by 10

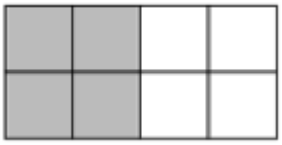
Here is part of a number line. Write in the numbers missing from the two empty boxes.



§ recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators

- Recognise and write unit and non-unit fractions of shapes.
- Understand that the number on the bottom of a fraction tells me how many pieces the whole is divided into

What fraction of this shape is shaded? How do you know? Is there another way that you can describe the fraction?



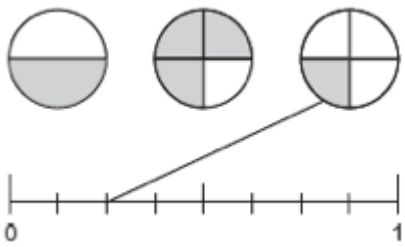
- Find fractions of amounts

Here are 21 apples. Put a ring around one third of them.

§ recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators

- Position fractions on a number line; eg. mark fractions such as ½, 3 ½ and 2 3/10 on a number line marked from zero to 5.

A fraction of each shape is shaded. Match each fraction to the correct place on the number line. One has been done for you.



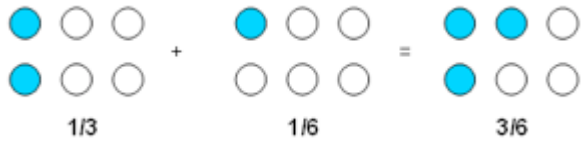
§ recognise and show, using diagrams, equivalent fractions with small denominators

- Identify pairs of fractions that total 1.
- Circle two fractions that have the same value.

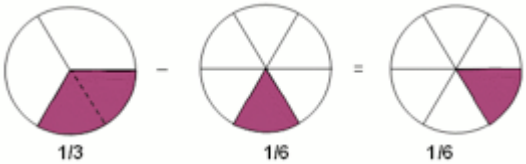
§ add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7]

- This could also be done by using drawings and in the array form:

For addition:



and for subtraction:

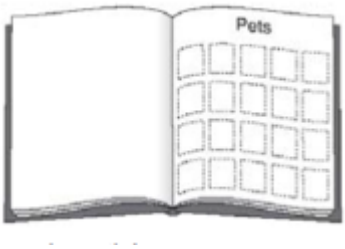


§ compare and order unit fractions, and fractions with the same denominators

- Would you rather have 1/3 of 30 sweets or 1/5 of 40 sweets? Why?

§ solve problems that involve all of the above.

- 15 grapes are shared equally onto five plates. What fraction of the grapes is on each plate?
- Meg has 20 pet stickers to go on this page:



1/4 of them are dog stickers, 1/2 of them are cat stickers. The rest are rabbit stickers. How many rabbit stickers does she have?

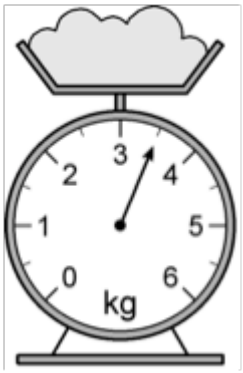
<u>Measurement</u>

§ measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)

Length: Show something that they think is just shorter/longer than a metre/centimetre/millimetre. They should be able to check whether they are right.

Mass: Say which object in the classroom is heavier than 100 g/kilogram/half-kilogram and know how to check if they are correct.

Read scales such as this:



Capacity: Find a container that they think would hold one litre and check to find out if they were correct.

§ measure the perimeter of simple 2-D shapes

- Measure the sides of regular polygons in centimetres and millimetres and find their perimeters in centimetres and millimetres?

§ add and subtract amounts of money to give change, using both £ and p in practical contexts

- Jake wants to buy a comic that costs £1. He saves 25p one week and 40p the next. How much more money does he need to buy the comic?
- Add these prices: £6.73, £9.10 and £7.00 to find the total. Find out how much they need to add to get £23?

§ tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks

Read times like this in analogue and digital formats, including those with Roman numerals.

Solve problems such as: Ben's clock says 7:50 when he gets up. Place the hands on this clock to show this time.

§ estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight

- Kevin leaves home at quarter past 8 and arrives in school at 20 to 9. How long is his journey? How did you work this out?

- How long is it between the times shown on these two clocks? How did you work it out?

§ know the number of seconds in a minute and the number of days in each month, year and leap year

Solve problems such as: Milly has a 100 ml bottle of medicine. She takes one fifth of the medicine each day. How many days does she take the medicine for? How much medicine does she take each day? What calculation did you do to work this out?

§ compare durations of events [for example to calculate the time taken by particular events or tasks].

- Estimate how long your favourite TV programme lasts. Use a television guide to work out how close your estimation was.
- It takes 35 minutes to walk from home to school. I need to be there by 8.55 am. What time do I need to leave home?
- How much does it cost to hire a rowing boat for three hours?

Boat Hire	
Motor boats £1.50 for 15 minutes	Rowing boats £2.50 for 1 hour

- Sasha pays £3.00 to hire a motor boat. She goes out at 3:20 pm. By what time must she return? Explain how you solved this problem. Could you have done it in a different way?
- Sally and Maria both went to the gym on Saturday. Sally was there from 2 pm until 3.30pm. Maria was there from 12.30 pm until 3.15 pm. Who spent the longer time at the gym? How much longer was she there than her friend?

Geometry – Shapes

§ draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
§ recognise angles as a property of shape or a description of a turn
§ identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
§ identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

The requirements for Year 3 in Geometry: Properties of Shapes are quite explicit and exemplars are not particularly helpful. It is helpful, however, to understand that, in Year 3, pupils should be expected to demonstrate understanding in this area by:

- using appropriate mathematical vocabulary to describe the features of common 2-D and 3-D shapes including semicircles, hemispheres and prisms
- sorting and classifying collections of 2-D shapes in different ways using a range of properties including: ‘all sides are of equal length,’ ‘has at least one right angle’ or ‘has at least one line of symmetry’
- recording their classifications on Venn and Carroll diagrams, including diagrams involving more than one criterion.

Statistics

§ interpret and present data using bar charts, pictograms and tables

- Process, present and interpret data to pose and answer questions. They use all representations such as Venn and Carroll diagrams, bar charts, pictograms. They collect data quickly onto a class tally chart. Children recognise that a tally involves grouping in fives and that this helps them to count the frequencies quickly and accurately. They produce a simple pictogram and/or bar chart, where a symbol represents 2 units.
- Children sort and classify objects, numbers or shapes according to two criteria, and display this work on Venn and Carroll diagrams.

§ solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

- Collect, represent and interpret data in order to answer a question that is relevant to them, for example:
    - What new addition to the school play equipment would you like?
    - Which class race shall we choose for sports day?
- They decide on the information they need to collect and collect it efficiently. They collate the information on a tally chart or frequency table, then use this to make simple frequency diagrams such as bar charts, using ICT where appropriate. They discuss the outcomes, responding to questions such as:
    - Which items had fewer than five votes?
    - Would the table be the same if we asked Year 6?
    - How might the table change if everyone had two votes?
- Children present their conclusions to others, identifying key points that should be included. They make suggestions as to how this data could be used; for example, they may decide that they need to investigate the price of different equipment or discuss what they need to do to prepare for their chosen race.

Overview of Expectations in Maths in Year 4

The national expectations for Year 4 children are as follows:

Number & Place Value

§ count in multiples of 6, 7, 9, 25 and 1000

- Explain how to work out the 6 times-table from the 3 times-table or the 9 times-table from the 3 times-table.
- Know that 9 × 8 = 72 so that 72 ÷ 9 = 8 and deduce 720 ÷ 9.
- Explain the relationship between 8 × 7 = 56, 6 × 7 = 42 and 14 × 7 = 98.

§ find 1000 more or less than a given number

- Answer questions such as, what is the missing number in the number sentence and how do you know? 5742 + ≤ = 9742

§ count backwards through zero to include negative numbers

- Create a sequence that includes the number –5 and then describe the sequence to the class.
- Explain how to find the missing numbers in a sequence eg. _ *–9, –5, –1,* _ and explain the rule.
- Answer questions such as, What number can you put in the box to make this statement true? __ < –2

§ recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)

- Give the value of a digit in a given number e.g. the 7 in 3 274
- Write in figures a given number e.g. four thousand and twenty.
- Recognise a number partitioned like this: 4 000 + 200 + 60 + 3 and be able to read and write the number.
- Create the biggest and smallest whole number with four digits eg. 3, 0, 6, 5
- Find missing numbers in a number sentence e.g. _ +_ = 1249

§ order and compare numbers beyond 1000

- Find numbers that could go in the boxes to make these correct, □ + □ < 2000, 3000 > □ – □

§ identify, represent and estimate numbers using different representations

- Answer questions such as, which of these numbers is closest to the answer of 342 – 119: 200 220 230 250 300
- Identify what the digit 7 represents in each of these amounts: £2.70, 7.35m, £0.37, 7.07m

§ round any number to the nearest 10, 100 or 1000

- Explain tips to give someone who is learning how to round numbers to the nearest 10, or 1000.
- Answer questions such as, I rounded a number to the nearest 10. The answer is 340. What number could I have started with? Know what to look for first when you order a set of numbers and know which part of each number to look at to help you.

§ solve number and practical problems that involve all of the above and with increasingly large positive numbers

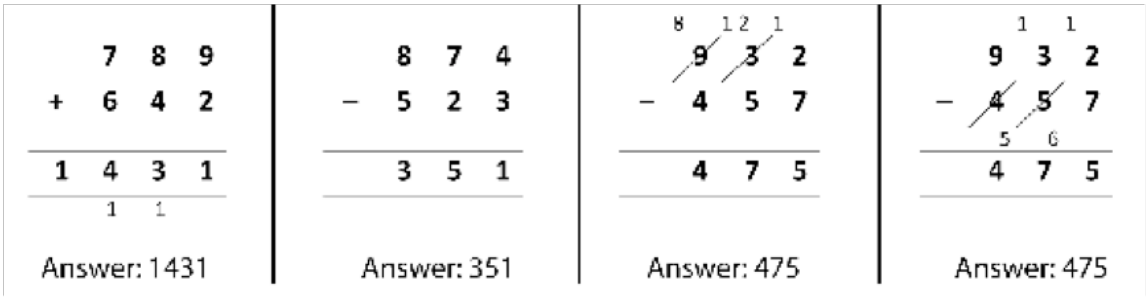
- Sort problems into those they would do mentally and those they would do with pencil and paper and explain their decisions. Answer questions such as, There are 70 children. Each tent can accommodate up to 6 children. What is the smallest number of tents they will need?
- The distance to the park is 5 km when rounded to the nearest kilometre. What is the longest/shortest distance it could be? How would you give somebody instructions to round distances to the nearest kilometre?

§ read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

- This is new content for the primary national curriculum in England. Suggestions for what children should be able to do include;
- Know what each letter represents in Roman numerals and be able to convert from Roman numeral to our current system (Arabic) and from Arabic to Roman e.g. 76 = _ *in Roman numerals, CLXIX* = _ Arabic numerals.
- Know that the current western numeral system is the modified version of the Hindu numeral system developed in India to include the concept of zero and place value.

Addition & Subtraction

§ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate



§ estimate and use inverse operations to check answers to a calculation

Tina has read the first 85 pages in a book that is 150 pages long. Which number sentence could Tina use to find the number of pages she must read to finish the book?

A 150 + 85 = ☐

B ☐ – 85 = 150

C 150 ÷85 = ☐

D 150 – 85 = ☐

§ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

- I have read 134 of the 512 pages of my book. How many more pages must I read to reach the middle?
- There are 8 shelves of books. 6 of the shelves hold 25 books each. 2 of the shelves have 35 books each. How many books altogether are on the shelves?
- I think of a number, subtract 17, and divide by 6. The answer is 20. What was my number?
- You start to read a book on Thursday. On Friday you read 10 more pages than on Thursday. You reach page 60. How many pages did you read on Thursday?

Multiplication & Division

§ recall multiplication and division facts for multiplication tables up to 12 × 12

- Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.
- *e.g. One orange costs nineteen pence. How much will three oranges cost?*
- *What is twenty-one multiplied by nine?*
- *How many twos are there in four hundred and forty?*

§ use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers

- Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 into 600 ÷ 3 = 200.
- *e.g. Divide thirty-one point five by ten.*
- *Ten times a number is eighty-six. What is the number?*

§ recognise and use factor pairs and commutativity in mental calculations

- Pupils write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 x 6 x 5 = 10 x 6.
- *e.g. Understand and use when appropriate the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:*
- *Example of commutative law 8 × 15 = 15 × 8*
- *Example of associative law 6 × 15 = 6 × (5 × 3) = (6 × 5) × 3 = 30 × 3 = 90*
- *Example of distributive law 18 × 5 = (10 + 8) × 5 = (10 × 5) + (8 × 5) = 50 + 40 = 90*

§ multiply two-digit and three-digit numbers by a one-digit number using formal written layout
§ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

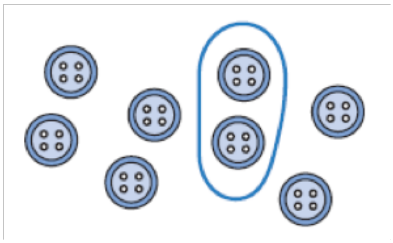
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.
- *e.g. 185 people go to the school concert. They pay £l.35 each. How much ticket money is collected?*
- *Programmes cost 15p each. Selling programmes raises £12.30. How many programmes are sold?*

<u>Fractions & Decimals</u>

§ recognise and show, using diagrams, families of common equivalent fractions

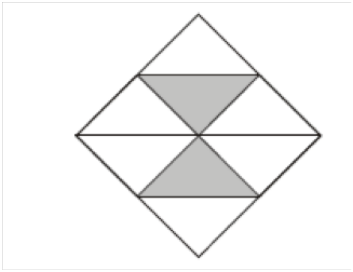
- Recognise that five tenths (⁵⁄₁₀) or one half is shaded.

- Recognise that two eighths (²⁄₈) or one quarter (¼) of the set of buttons is ringed

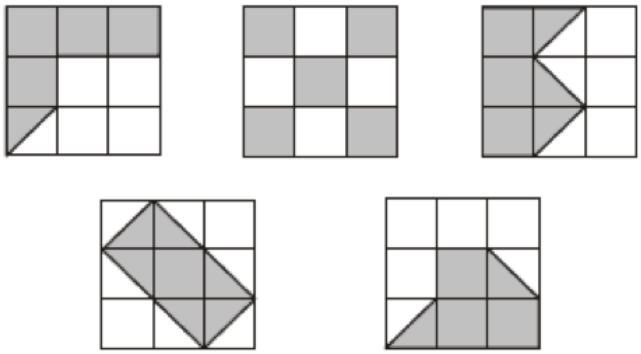


- Recognise that one whole is equivalent to two halves, three thirds, four quarters… For example, build a fraction ‘wall’ using a computer program and then estimate parts.

- Recognise patterns in equivalent patterns, such as:
- ½ = 2/4 = 3/6 = 4/8 = 5/10 = 6/12 = 7/14 and similar patterns for ⅓, ¼, ⅕, ⅙, 1/10.
- Here is a square.



- What fraction of the square is shaded?
- Here are five diagrams. Look at each one.
  Put a tick (✓) on the diagram is exactly ½ of it is shaded. Put a cross (✗) if it us not.

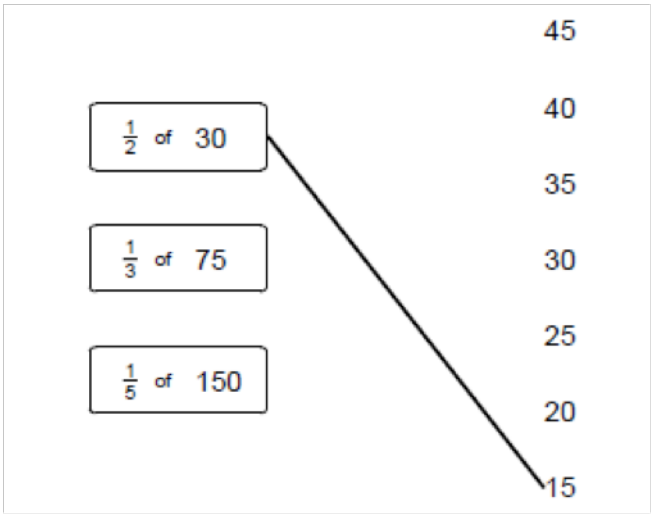


§ count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.

- Respond to questions such as:
- What does the digit 6 in 3.64 represent? The 4? What is the 4 worth in the number 7.45? The 5?
- Write the decimal fraction equivalent to:
- two tenths and five hundredths; twenty-nine hundredths; fifteen and nine hundredths.
- Continue the count 1.91, 1.92, 1.93, 1.94 ...
- Suggest a decimal fraction between 4.1 and 4.2
- Know how many 10 pence pieces equal a pound, how many 1 pence pieces equal a pound, how many centimetres make a metre.

§ solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number

- What is one-fifth of twenty-five?
- Write the missing number to make this correct.
- $\frac{1}{4}$ of 24 = $\frac{1}{2}$ of $\square$
- Match each box to the correct number. One has been done for you.



§ add and subtract fractions with the same denominator

- For example:

. ½ + ½, ¼ + ¾, ⅜ + ⅝, ⅗ + ⅘ + ⅕, $^{7}/_{10}$ + $^{3}/_{10}$ + $^{5}/_{10}$ + $^{8}/_{10}$, ¾ - ⅓, $^{6}/_{7}$- $^{4}/_{7}$, $^{9}/_{10}$ + $^{4}/_{10}$, – $^{3}/_{10}$

§ recognise and write decimal equivalents of any number of tenths or hundredths

- Recognise that, for example:
- 0.07 is equivalent to $^{7}/_{100}$ 6.35 is equivalent to 6 $^{35}/_{100}$
- Particularly in the contexts of money and measurement
- Respond to questions such as:

. Which of these decimals is equal to $^{19}/_{100}$? 1.9 10.19 0.19 19.1 Write each of these as a decimal fraction: $^{27}/_{100}$ $^{3}/_{100}$ 2 $^{33}/_{100}$

§ recognise and write decimal equivalents to ¼, ½, ¾

- Know that, for example
- 0.5 is equivalent to ½, 0.25 is equivalent to ¼, 0.75 is equivalent to ¾, 0.1 is equivalent to $^{1}/_{10}$
- Particularly in the context of money and measurement.

§ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

- Understand that:
- When you divide a number by 100, the digits move two places to the right.

- Write a two-digit number on the board. Keep dividing by 10 and record the answer. Describe the pattern.

26
2.6
0.26
0.026

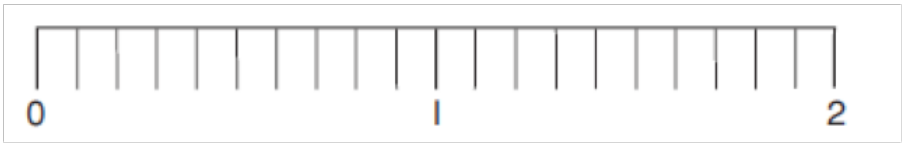
- How many times larger is 2600 than 26?
- How many £1 notes are in £120, £1200?
- Divide three hundred and ninety by ten.

§ round decimals with one decimal place to the nearest whole number

- Round these to the nearest whole number. For example:
- 9.7, 25.6, 148.3
- Round these lengths to the nearest metre:
- 1.5m, 6.7m, 4.1m, 8.9m
- Round these costs to the nearest £:
- £3.27, £12.60, £14.05, £6.50

§ compare numbers with the same number of decimal places up to two decimal places

- Place these decimals on a line from 0 to 2:
- 0.3, 0.1, 0.9, 0.5, 1.2, 1.9



- Which is lighter: 3.5kg or 5.5kg? 3.72kg or 3.27kg? Which is less: £4.50 or £4.05?
- Put in order, largest/smallest first:
- 6.2, 5.7, 4.5, 7.6, 5.2, 99, 1.99, 1.2, 2.1
- Convert pounds to pence and vice versa. For example: Write 578p in £.
- How many pence is £5.98, £5.60, £7.06, £4.00? Write the total of ten £1 coins and seven 1p coins (£10.07)
- Write centimetres in metres. For example, write: 125 cm in metres (1.25 metres)

§ solve simple measure and money problems involving fractions and decimals to two decimal places.

- A box of four balls costs £2.96. How much does each ball cost? Dean and Alex buy 3 boxes of balls between them. Dean pays £4.50. How much must Alex pay? KS2 Paper B level 3
- A full bucket holds 5½ litres. A full jug holds ½ a litre. How many jugs full of water will fill the bucket?
- Harry spent one quarter of his savings on a book. What did the book cost if he saved: £8…£10…£2.40…?
- Gran gave me £8 of my £10 birthday money. What fraction of my birthday money did Gran give me?
- Max jumped **2.25 metres** on his **second** try at the long jump. This was **75 centimetres** longer than on his **first** try. How far in **metres** did he jump on his **first** try?

<u>Measurement</u>

§ Convert between different units of measure [for example, kilometre to metre; hour to minute]

- Learn the relationships between familiar units of measurement. They learn that kilo means one thousand to help them remember that there are 1000 grams in 1 kilogram and 1000 metres in 1 kilometre. They respond to questions such as: A bag of flour weighs 2 kg. How many grams is this? They suggest suitable units to measure length, weight and capacity; for example, they suggest a metric unit to measure the length of their book, the weight of a baby, the capacity of a mug. They suggest things that you would measure in kilometres, metres, litres, kilograms, etc.
- Record lengths using decimal notation, for example recording 5 m 62 cm as 5.62 m, or 1 m 60 cm as 1.6 m. They identify the whole-number, tenths and hundredths parts of numbers presented in decimal notation and relate the whole number, tenths and hundredths parts to metres and centimetres in length.

§ measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres

- Measure the edges of a rectangle and then combine these measurements. They realise that by doing this they are calculating its perimeter. Given the perimeter of a rectangle they investigate what the lengths of its sides could be. They work out the perimeter of irregular shapes drawn on a centimetre square grid.

§ find the area of rectilinear shapes by counting squares

- For example, they draw irregular shapes on centimetre square grids, and compare their areas and perimeters.

§ estimate, compare and calculate different measures, including money in pounds and pence

- Draw on their calculation strategies to solve one- and two-step word problems, including those involving money and measures. They use rounding to estimate the solution, choose an appropriate method of calculation (mental, mental with jottings, written method) and then check to see whether their answer seems sensible. They throw a beanbag three times and find the difference between their longest and shortest throws. After measuring their height, they work out how much taller they would have to grow to be the same height as their teacher. They solve problems such as:

- Dad bought three tins of paint at £5.68 each. How much change does he get from £20?
- A family sets off to drive 524 miles. After 267 miles, how much further do they still have to go?
- Tins of dog food cost 42p. They are put into packs of 10. How much does one pack of dog food cost? 10 packs?
- A can of soup holds 400 ml. How much do 5 cans hold? Each serving is 200 ml. How many cans would I need for servings for 15 people?
- I spent £4.63, £3.72 and 86p. How much did I spend altogether?
- A string is 6.5 metres long. I cut off 70 cm pieces to tie up some balloons. How many pieces can I cut from the string?
- A jug holds 2 litres. A glass holds 250 ml. How many glasses will the jug fill?
- Dean saves the same amount of money each month. He saves £149.40 in a year. How much money does he save each month?

§ read, write and convert time between analogue and digital 12- and 24-hour clocks
§ solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

- Solve problems involving units of time, explaining and recording how the problem was solved. For example: Sarah got into the pool at 2:26 pm. She swam until 3 o'clock. How long did she swim? They count on to find the difference between two given times, using a number line or time line where appropriate and use the 24-hour clock to measure time.

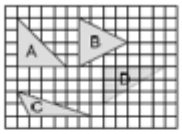
Geometry – Shapes

§ compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

- Pupils should be able to complete this sentence:
- All equilateral triangles have …

§ identify acute and obtuse angles and compare and order angles up to two right angles by size

Here are four triangles drawn on a square grid.

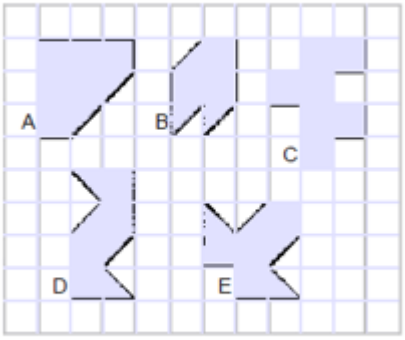


Write the letter for each triangle in the correct region of the sorting diagram. One has been done for you.

	has a right angle	has an obtuse angle	has an acute angle
is isosceles	A		
is not isosceles			

§ identify lines of symmetry in 2-D shapes presented in different orientations

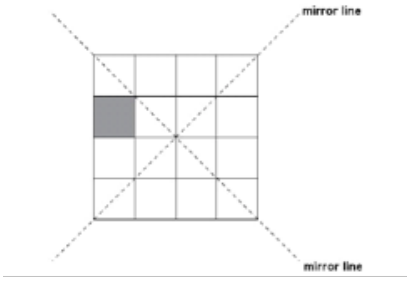
Here are five shapes on a square grid.



Write the letters of the two shapes which have a line of symmetry.

§ complete a simple symmetric figure with respect to a specific line of symmetry.

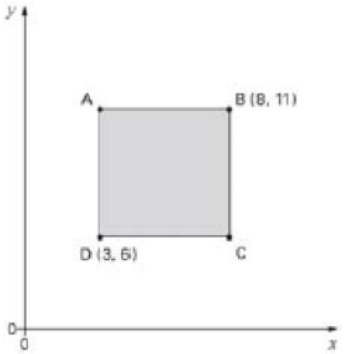
Here is a shaded square on a grid. Shade in 3 more squares so that the design is symmetrical in both mirror lines.



Geometry – Position & Direction

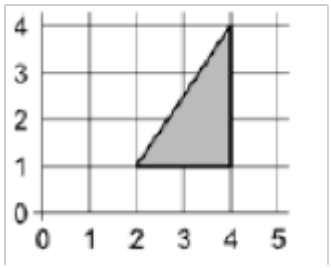
§ describe positions on a 2-D grid as coordinates in the first quadrant

Here is a shaded square.

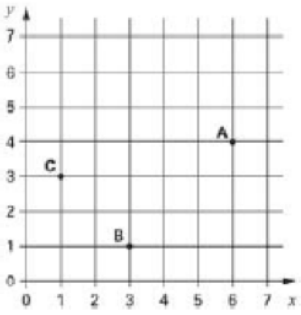


Write the coordinates for point A.

§ describe movements between positions as translations of a given unit to the left/right and up/down

I can describe where a shape will be after translation	This triangle is translated two squares to the left and one square down. Give the coordinates of its vertices in the new position.	

§ plot specified points and draw sides to complete a given polygon.



A, B and C are three corners of a rectangle. What are the coordinates of the fourth corner?

Statistics

§ interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

- Collect data, measuring where necessary. They work with a range of data, such as shoe size and width of shoe across the widest part of the foot, the number of letters in children's names, the width of their hand spans, the distance around their neck and wrist, data from nutrition panels on cereal packets, and so on.
- They decide on a suitable question or hypothesis to explore for each data set they work on. For example, 'We think that…boys have larger shoes than girls', '…our neck measurements are twice as long as our wrist measurements', '…girls' names have more letters than boys' names' or '…children in our class would prefer to come to school by car but they usually have to walk'.
- Children consider what data to collect and how to collect it. They collect their data and organise it in a table. They choose a Venn or Carroll diagram, or a horizontal or vertical pictogram or bar chart to represent the data. Where appropriate, they use the support of an ICT package. They justify their choice within the group so that they can present it.
- They understand that they can join the tops of the bars on the bar-line chart to create a line graph because all the points along the line have meaning.

§ solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

- Undertake one or more of three enquiries:
  - What vehicles are very likely to pass the school gate between 10:00 am and 11:00 am? Why? What vehicles would definitely not pass by? Why not? What vehicles would be possible but not very likely? Why? What if it were a different time of day? What if the weather were different?

- Does practice improve estimation skills? Children estimate the lengths of five given lines and record the estimate, measured length and difference. They repeat the activity with five more lines to see whether their estimation skills have improved after feedback.
- What would children in our class most like to change in the school? Children carry out a survey after preliminary research to whittle down the number of options to a sensible number, e.g. no more than five.
- Children identify a hypothesis and decide what data to collect to investigate their hypothesis. They collect the data they need and decide on a suitable representation. In groups, they consider different possibilities for their representation and explain why they have made their choice.
- In the first enquiry, children use tallies and bar charts. In the second, they use tables and bar charts to compare the two sets of measurements. In the third, they use a range of tables and charts to show their results, including Venn and Carroll diagrams. They use ICT where appropriate.

Overview of Expectations in Maths in Year 5

The national expectations for Year 5 children are as follows:

Number & Place Value

§ read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

- Explain what each digit represents in whole numbers and decimals with up to two places and partition, round and order these numbers.
- Answer problems such as
  - What is the value of the 7 in 3 274 105?
  - Write in figures forty thousand and twenty.
  - A number is partitioned like this:
    - 4 000 000 + 200 000 + 60 000 + 300 + 50 + 8
    - Write the number. Now read it to me.
  - A car costs more than £8600 but less than £9100. Tick the prices that the car might cost.
- £8569 □ £9090 □ £9130 □ £8999 □

§ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

- Count from any given number in powers of 10 and decimal steps extending beyond zero when counting backwards; relate the numbers to their position on a number line
- Answer problems such as:
  - Write the next number in this counting sequence: 110 000, 120 000, 130 000 …
  - Create a sequence that goes backwards and forwards in tens and includes the number 190. Describe your sequence.
  - Here is part of a sequence: 30, 70, 110, □, 190, □. How can you find the missing numbers?

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

- Count from any given number in whole-number and decimal steps extending beyond zero when counting backwards; relate the numbers to their position on a number line.

§ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000

- Explain what each digit represents in whole numbers and decimals with up to two places and partition round and order these numbers and answer questions such as: What is 4773 rounded to the nearest hundred?

§ solve number problems and practical problems that involve all of the above

- Partition decimals using both decimal and fraction notation for example recording 6.38 as 6 + $\frac{3}{10}$ + $\frac{8}{100}$ and as 6 + 0.3 + 0.08. They write a decimal given its parts: e.g. they record the number that is made from 4 wholes 2 tenths and 7 hundredths as 4.27. They apply their understanding in activities such as:
- Find the missing number in 17.82 – □ = 17.22.
- Play 'Zap the digit': In pairs choose a decimal to enter into a calculator e.g. 47.25. Take turns to 'zap' (remove) a particular digit using subtraction. For example to 'zap' the 2 in 47.25 subtract 0.2 to leave 47.05.
- The children explain how they work out calculations showing understanding of the place value that underpins written methods.

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

- Recognise Roman numerals in their historical context
- Read and write Roman numerals to one thousand

Addition & Subtraction

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

- Children should be able to use standard written methods for addition and subtraction,
- e.g. calculate 14 136 + 3258 + 487 or 23 185 – 2078
- Use written methods to find missing numbers in addition and subtraction calculations,
- e.g. 6432 + □ = 8025
- Use written methods to add and subtract numbers with different numbers of digits,
- e.g. Find all the different totals that can be made using any three of these five numbers: 14 721, 76, 9534, 788, 6

§ add and subtract numbers mentally with increasingly large numbers

- Children should be able to respond rapidly to oral or written questions, explaining the strategy used,
- e.g. 750 take away 255, take 400 from 1360, 4500 minus 1050, subtract 3250 from 7600, 1800 less than 3300, 4000 less than 11 580
- Derive quickly related facts,
- e.g. 80 + 50 = 130, 130 – 50 = 80, 800 + 500 = 1300, 1300 – 800 = 500
- Derive quickly number pairs that total 100 or pairs of multiples of 50 that total 1000,
- e.g. 32 + 68 = 100 or 150 + 850 = 1000
- Identify and use near doubles,
- e.g. work out 28 + 26 = 54 by doubling 30 and subtracting first 2, then 4, or by doubling 26 and adding 2
- Add or subtract the nearest multiple of 10, 100 or 1000 and adjust,
- e.g. adding or subtracting 9, 19, 29 ... to/from any two-digit number
- Work out mentally by counting up from a smaller to a larger number e.g. 8000 – 2785 is 5 + 10 + 200 + 5000 = 5215
- Understand and use language associated with addition and subtraction, e.g. difference, sum, total

§ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

- Children should be able to use rounding to approximate and check e.g. 2593 + 6278 must be more than 2500 + 6200, 2403 – 1998 is about 2400 – 2000
- Write approximate answers to calculations, e.g. write an approximate answer for 516 ÷ (15 + 36)

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

- Children should be able to choose the appropriate operations to solve multi-step problems, decide whether the calculations can be done mentally or using a written method and explain and record how the problem was solved using numbers, signs and symbols.
- e.g. 13 502 people were at the match last week and there are 2483 more this week, how many more people need to attend to bring the total to the club's target of 20 000 people?
- Identify and obtain the necessary information to solve the problem and determine if there is any important information missing,
- e.g. calculating total cost of a holiday for a family, given prices for adults and children and surcharges for particular resorts.

Multiplication & Division

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

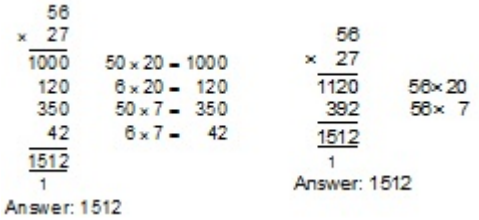
§ know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers

§ establish whether a number up to 100 is prime and recall prime numbers up to 19

- Use the vocabulary factor, multiple and product. They identify all the factors of a given number; for example, the factors of 20 are 1, 2, 4, 5, 10 and 20. They answer questions such as:
    - Find some numbers that have a factor of 4 and a factor of 5. What do you notice?
    - My age is a multiple of 8. Next year my age will be a multiple of 7. How old am I?
- They recognise that numbers with only two factors are prime numbers and can apply their knowledge of multiples and tests of divisibility to identify the prime numbers less than 100. They explain that 73 children can only be organised as 1 group of 73 or 73 groups of 1, whereas 44 children could be organised as 1 group of 44, 2 groups of 22, 4 groups of 11, 11 groups of 4, 22 groups of 2 or 44 groups of 1. They explore the pattern of primes on a 100-square, explaining why there will never be a prime number in the tenth column and the fourth column.

§ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

- Develop and refine written methods for multiplication. They move from expanded layouts (such as the grid method) towards a compact layout for HTO × O and TO × TO calculations. They suggest what they expect the approximate answer to be before starting a calculation and use this to check that their answer sounds sensible. For example, 56 × 27 is approximately 60 × 30 = 1800.



§ multiply and divide numbers mentally drawing upon known facts

- Rehearse multiplication facts and use these to derive division facts, to find factors of two-digit numbers and to multiply multiples of 10 and 100, e.g. 40 × 50. They use and discuss mental strategies for special cases of harder types of calculations, for example to work out 274 + 96,< 8006 – 2993, 35 × 11, 72 ÷ 3, 50 × 900. They use factors to work out a calculation such as 16 × 6 by thinking of it as 16 × 2 × 3. They record their methods using diagrams (such as number lines) or jottings and explain their methods to each other. They compare alternative methods for the same calculation and discuss any merits and disadvantages.

§ divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

- Extend written methods for division to include HTO ÷ O, including calculations with remainders. They suggest what they expect the approximate answer to be before starting a calculation and use this to check that their answer sounds sensible. They increase the efficiency of the methods that they are using.

§ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

- Recall quickly multiplication facts up to 10 × 10 and use them to multiply pairs of multiples of 10 and 100. They should be able to answer problems such as:
- the product is 400. At least one of the numbers is a multiple of 10. What two numbers could have been multiplied together? Are there any other possibilities?

§ recognise and use square numbers and cube numbers, and the notation for squared and cubed

- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes
- use knowledge of multiplication facts to derive quickly squares of numbers to 12 × 12 and the corresponding squares of multiples of 10. They should be able to answer problems such as:
- tell me how to work out the area of a piece of cardboard with dimensions 30 cm by 30 cm
- find two square numbers that total 45

Fractions, Decimals & Percentages

§ compare and order fractions whose denominators are all multiples of the same number

- Children should be able to circle the two fractions that have the same value, or choose which one is the odd one out and justify their decision.
  $\frac{6}{10}$, $\frac{3}{5}$, $\frac{18}{20}$, $\frac{9}{15}$

§ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths

§ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5]

- Put the correct symbol, < or >, in each box.
- 3.03 □ 3.3
  0.37 □ 0.327
  Order these numbers: 0.27 0.207 0.027 2.07 2.7
- (e.g. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$)
- How many halves in: 1 ½ 3 ½ 9 ½ …?
- How many quarters in 1 ¼ 2 ¼ 5 ¼ ….?

§ add and subtract fractions with the same denominator and denominators that are multiples of the same number

§ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

- What is $\frac{1}{10}$ of: 50, 20, 100…?
- What is $\frac{4}{5}$ of 50, 35, 100….?

§ read and write decimal numbers as fractions [for example, 0.71 = 71/100]

- What decimal is equal to 25 hundredths?
- Write the total as a decimal:
- $4 + \frac{6}{10} + \frac{7}{100} =$
- Children partition decimals using both decimal and fraction notation, for example, recording 6.38 as $6 + \frac{3}{10} + \frac{8}{100}$ and as 6 + 0.3 + 0.08.

§ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

- Recognise that
  0.007 is equivalent to $\frac{7}{1000}$
  6.305 is equivalent to $\frac{6305}{100}$

§ round decimals with two decimal places to the nearest whole number and to one decimal place

§ read, write, order and compare numbers with up to three decimal places

- Write these numbers in order of size, starting with the smallest. 1.01, 1.001, 1.101, 0.11

§ solve problems involving number up to three decimal places

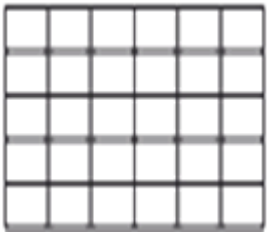
$$\begin{array}{r} 72.8 \\ +\ 54.6 \\ \hline 127.4 \\ \hline 1 \end{array}$$

§ recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal

- Write in the missing numbers. 30% of 60 is □
  30% of □ is 60

§ solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.

- Shade 10% of this grid.



- Which is bigger: 65% or ¾? How do you know?
- What percentage is the same as $\frac{7}{10}$? Explain how you know?
- What is $\frac{31}{100}$ as a percentage?
- Which is a better mark in a test: 61% , or 30 out of 50? How do you know?

Measurement

§ convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)

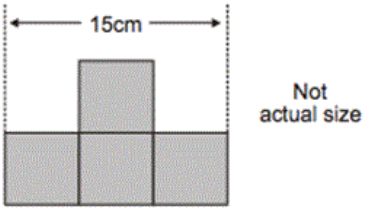
- What is two hundred and seventy six centimetres to the nearest metre?
- How many millimetres are in 3 centimetres?

§ understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

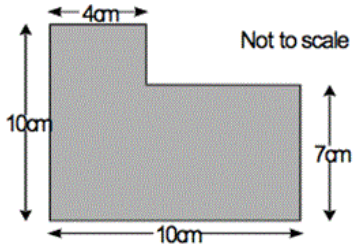
A bag of sugar weighs 1kg. Approximately how many pounds (lb) of sugar would fit into another empty bag of the same size as this one? Tick the correct answer: 20lb 14lb 2lb 4lb

§ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres

- This shape is made from 4 shaded squares



- Calculate the perimeter of the shape



§ calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes

- Calculate the area of a rectangle which is eleven metres long by 5 metres wide.
- Which has the greatest area – a square with sides 6 cm long or a rectangle which is 7 cm long by 5 cm? How much greater is the area?

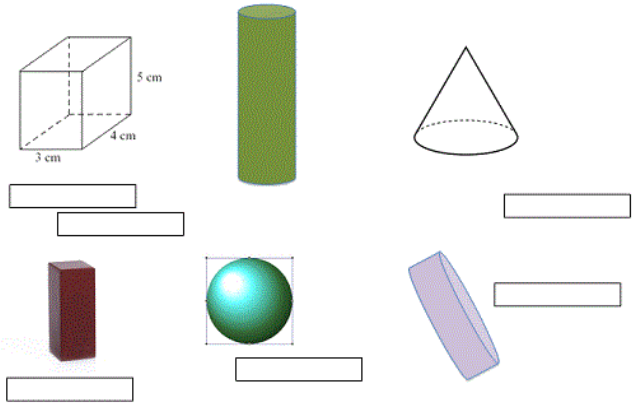
§ estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]

§ solve problems involving converting between units of time

§ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

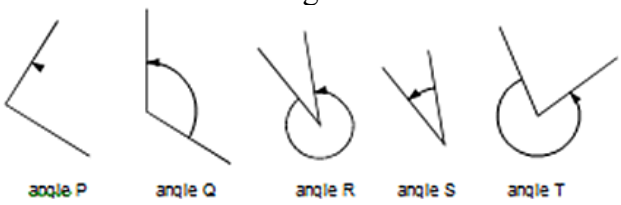
Geometry – Shapes

§ identify 3-D shapes, including cubes and other cuboids, from 2-D representations



§ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles

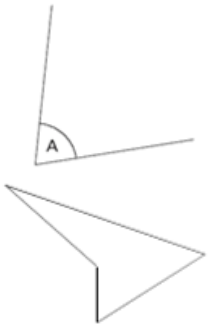
- Look at these angles.



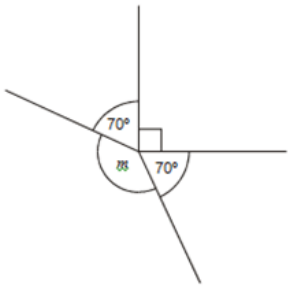
- Label each angle acute, obtuse or reflex. List the 5 angles in order from smallest to largest.

§ draw given angles, and measure them in degrees (o)

- Measure A accurately. Use a protractor (angle measurer).



- Measure accurately the smallest angle in the above shape. Use a protractor (angle measurer).
- This diagram is not drawn accurately. Calculate the size of angle m



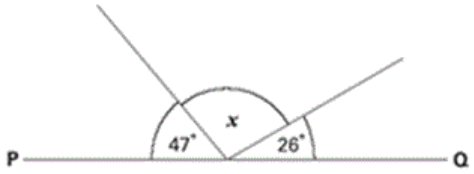
§ identify:

§ angles at a point and one whole turn (total 360o)

§ angles at a point on a straight line and ½ a turn (total 180o)

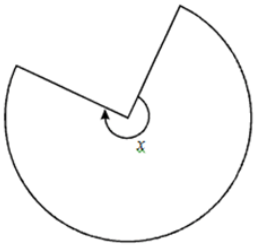
§ other multiples of 90o

- PQ is a straight line. Not drawn accurately

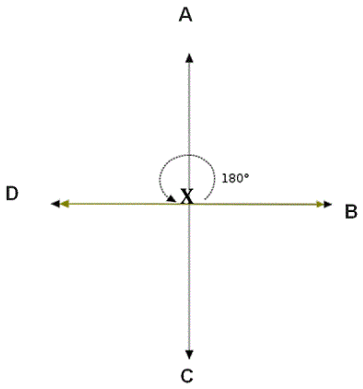


- Calculate the size of angle x. Do not use a protractor (angle measurer).

- This shape is three-quarters of a circle.

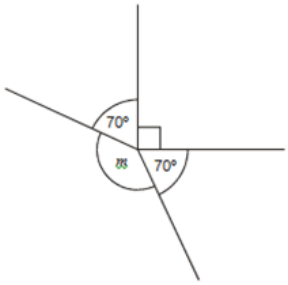


- How many degrees is angle x?
- In the diagram below, if you were standing at X, facing A, what angle would you turn through if you turn and face C?



§ use the properties of rectangles to deduce related facts and find missing lengths and angles

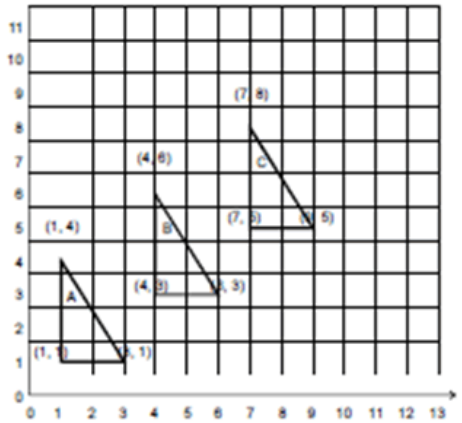
- This diagram is not drawn accurately. Calculate the size of angle m



§ distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

<u>Geometry – Position & Direction</u>

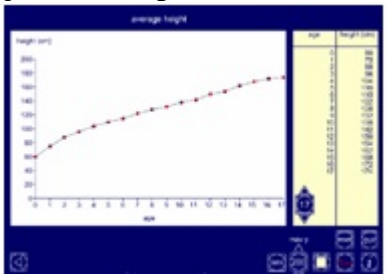
§ identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.



- Write the co-ordinates of the next triangle in the sequence.

Statistics

§ solve comparison, sum and difference problems using information presented in a line graph



- What is the average height of children of different ages?
- Are there differences for boys and girls?

§ complete, read and interpret information in tables, including timetables.

- I can find the information in a table or graph to answer a question

		Hull	York	Leeds
Adult	single	£12.50	£15.60	£10.25
	return	£23.75	£28.50	£19.30
Child	single	£8.50	£10.80	£8.25
	return	£14.90	£17.90	£14.75

- The table shows the cost of coach tickets to different cities.
- What is the total cost for a return journey to York for one adult and two children?

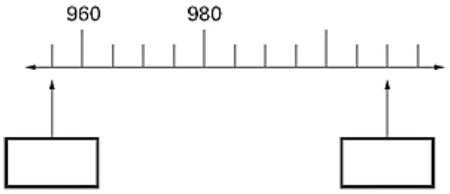
Overview of Expectations in Maths in Year 6

The national expectations for Year 6 children are as follows:

Number & Place Value

§ read, write, order and compare numbers up to 10 000 000 and determine the value of each digit

Children should be able to determine the steps used in different scales, and so complete activities such as;



§ round any whole number to a required degree of accuracy

Children should be able to circle the best estimate of the answer to questions such as;

72.34 ÷ 8.91

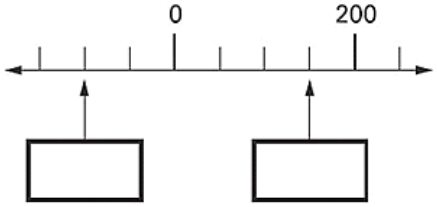
When given

6 7 8 9 10 11 as possible answers

Children should **estimate** the position of numbers on a number line. They should suggest which number lies about two-fifths of the way along a line from 0 to 1000, or a line from 0 to 1. They should be able to justify their decisions.

§ use negative numbers in context, and calculate intervals across zero

Children should be able to work with negative numbers in a similar way, determining values on a scale and estimating.



§ solve number and practical problems that involve all of the above.

Children should be able to use rounding and inverse operations to estimate and check calculations such as;

The temperature inside an aeroplane is 20°C The temperatures outside the aeroplane is -30°C. What is the difference between these temperatures?

Addition, Subtraction, Multiplication & Division

§ multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

- Look at long-multiplication calculations containing errors, identify the errors and determine how they should be corrected.
- Solve problems such as: Printing charges for a book are 3p per page and 75p for the cover. I paid £4.35 to get this book printed. How many pages are there in the book? Write down the calculations that you did. Seeds are £1.45 for a packet. I have £10 to spend on seeds. What is the greatest number of packets I can buy?

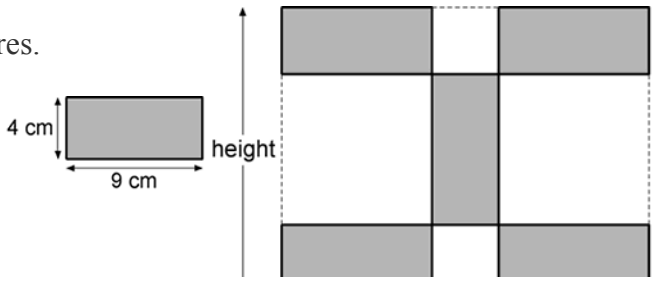
§ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
§ divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
Every day a machine makes 100 000 paper clips, which go into boxes. A full box has 120 paper clips. How many full boxes can be made from 100 000 paper clips?
Each paper clip is made from 9.2 centimetres of wire. What is the greatest number of paper clips that can be made from 10 metres of wire?
A DJ has two different sized storage boxes for her CDs. Small boxes hold 15 CDs. Large boxes hold 28 CDs. The DJ has 411 CDs. How could the DJ pack her CDs?
§ perform mental calculations, including with mixed operations and large numbers
Use mental strategies to calculate in their heads, using jottings and/or diagrams where appropriate. For example, to calculate 24 × 15, they multiply 24 × 10 and then halve this to get 24 × 5, adding these two results together. They record their method as (24 × 10) + (24 × 5). Alternatively, they work out 24 × 5 = 120 (half of 24 × 10), then multiply 120 by 3 to get 360.
§ identify common factors, common multiples and prime numbers

- Children should be able to answer questions such as:
  - How can you use factors to multiply 17 by 12?
  - Start from a two-digit number with at least six factors, e.g. 72. How many different multiplication and division facts can you make using what you know about 72? What facts involving decimals can you derive?
  - What if you started with 7.2? What about 0.72?
  - Which three prime numbers multiply to make 231?
  - use their knowledge of the order of operations to carry out calculations involving the four operations
- Children should be able to find answers to calculations such as 5.6 □ = 0.7 or 3 × 0.6, drawing on their knowledge of number facts and understanding of place value. They should be able to approximate, use inverses and apply tests of divisibility to check their results.
- Children should know the square numbers up to 12 × 12 and derive the corresponding squares of multiples of 10, for example 80 × 80 = 6400.

§ use their knowledge of the order of operations to carry out calculations involving the four operations
§ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
Two numbers have a difference of 1.583. One of the numbers is 4.728. What is the other? Is this the only answer?
§ solve problems involving addition, subtraction, multiplication and division
§ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

- Identify subtractions they can do without writing anything down
- Identify why it is possible to solve a calculation mentally, explain the clues they looked for and then solve it
- Peter has £10. He buys 3 kg of potatoes at 87p per kg and 750 g of tomatoes at £1.32 per kg. How much money does he have left?
- Each tile is 4 centimetres by 9 centimetres.

Calculate the width and height of the design.



Write down the calculations that you did

Children should be able to:

- Give the best approximation to work out 4.4 × 18.6 and explain why. Answer questions such as: roughly, what answer do you expect to get? How did you arrive at that estimate? Do you expect your answer to be greater or less than your estimate? Why?

Fractions, Decimals & Percentages

§ use common factors to simplify fractions; use common multiples to express fractions in the same denomination

Children should be able to recognise that a fraction such as $^{5}/_{20}$ can be reduced to an equivalent fraction of ¼ by dividing both numerator and denominator by the same number [cancelling] They should also be familiar with identifying fractions in different units. E.g. what fraction is 20 pence of two pounds? Of four pounds etc…

§ compare and order fractions, including fractions > 1

Children should be able to:

i] Position fractions on a number line; e.g. mark fractions such as $^{7}/_{5}$, $^{11}/_{20}$, $^{18}/_{12}$ on a number line graduated in tenths

ii] Answer questions such as: What number is half way between 5 ¼ and 5 ½ ?

iii] Which is larger, ⅓ or ⅖? Explain how you know.

§ add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

Children should be able to solve practical problems such as;

Here is a chocolate bar.

William eats 3 pieces and Amber eats 2 pieces. What fraction of the chocolate bar remains?

Joe has some pocket money. He spends three-quarters of it. He has fifty pence left. How much pocket money did he have?

§ multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ x ½ = 1/8]

Children should be able to:

i] Recognise that ¼ of 12, ¼ x 12 and 12 divided by 4 are equivalent

ii] Use cancellation to simplify the product of a fraction and an integer

eg ⅕ x 15 = 3

⅖ x 15 = 2 x ⅕ x 15 = 2x3 = 6

ii] Work out how many ½s in 15, how many ⅖s in 15, how many 2/5s in 1 etc.

§ divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]

Children should be able to:

Decide whether they would prefer to share ½ of a pizza with 2 people or ¾ of a pizza with 4 people and explain why.

§ associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]

Children should be able to find fractions of numbers and quantities;

i] What fraction of £1 is 35p, … 170p ?

ii] Write $^{23}/_{100}$ of 4 kilogrammes in grams

iii] What fraction of 1 litre is 413 ml?

Convert a fraction to a decimal using known equivalent fractions:

i] ¼ = 0.25

ii] ⅖ = 0.4

Children should be able to:

Explain how much pizza each person would get if they divided 4 pizzas between 5 people, as a fraction and a decimal

§ identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places

Children should be able to identify the value of each digit in the number 17.036 and multiply and divide this by 10.100 and 1000

§ multiply one-digit numbers with up to two decimal places by whole numbers

Children should be able to calculate the answer to questions such as;

What is 3.86 multiplied by nine?

§ use written division methods in cases where the answer has up to two decimal places

Children should be able to calculate 601 divided by 36, to two decimal places

§ solve problems which require answers to be rounded to specified degrees of accuracy

Children should be able to solve problems such as;

Four friends win £48,623. The money is to be shared equally between them – how much will each person receive?

107 pupils and teachers need to be taken to the theatre. How many 15-seater minibuses will be required?

How many boxes of 60 nails can be filled from 340 nails?

§ recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Children should be able to put a ring around the percentage that is equal to three-fifths;

20% 30% 40% 50% 60%

As well as circle the two fractions that are equivalent to 0.6.

$^{6}/_{10}$ $^{1}/_{60}$ $^{60}/_{100}$ $^{1}/_{6}$

Ratio & Proportion

§ solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

Answer problems such as:

- Here is a recipe for pasta sauce.

  Pasta sauce

  300 g tomatoes

  120 g onions

  75 g mushrooms

  Sam makes the pasta sauce using 900 g of tomatoes. What weight of onions should he use? What weight of mushrooms?

- A recipe for 3 portions requires 150 g flour and 120 g sugar. Desi's solution to a problem says that for 2 portions he needs 80 g flour and 100 g sugar. What might Desi have done wrong? Work out the correct answer.
- This map has a scale of 1 cm to 6 km.

The road from Ridlington to Carborough measured on the map is 6.6 cm long. What is the length of the road in kilometres?

§ solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison

Find simple percentages of amounts and compare them. For example:

- A class contains 12 boys and 18 girls. What percentage of the class are girls? What percentage are boys?
- 25% of the apples in a basket are red. The rest are green. There are 21 red apples. How many green apples are there?

§ solve problems involving similar shapes where the scale factor is known or can be found

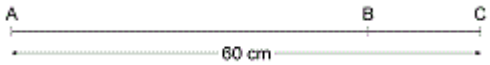
- Solve simple problems involving direct proportion by scaling quantities up or down, for example:

  Two rulers cost 80 pence. How much do three rulers cost?

- Use the vocabulary of ratio and proportion to describe the relationships between two quantities solving problems such as:

  Two letters have a total weight of 120 grams. One letter weighs twice as much as the other. Write the weight of the heavier letter.

The distance from A to B is three times as far as from B to C. The distance from A to C is 60 centimetres. Calculate the distance from A to B.



§ solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

Relate fractions to multiplication and division (e.g. 6 ÷ 2 = ½ of 6 = 6 × ½), simplify fractions by cancelling common factors, find fractions of whole-number quantities and solve problems such as:

- What fraction is 18 of 12
- What fraction is 500ml of 400ml?
- What is $^{14}/_{35}$ in its simplest form? ⅖
- What ⅓ × 15? What about 15 × ⅓? How did you work it out?
- What is two thirds of 66?
- What is three quarters of 500?

Algebra

§ generate and describe linear number sequences

Children should experience activities such as;

A number sequence is made from counters.

There are 7 counters in the third number.

How many counters in the 6th number? the 20th...?

Write a formula for the number of counters in the nth number in the sequence.
§ express missing number problems algebraically
§ use simple formulae

Children should be able to express a relationship in symbols, and start to use simple formulae. For example:

- Use symbols to write a formula for the number of months m in y years.
- Write a formula for the cost of c chews at 4p each.
- Write a formula for the nth term of this sequence: 3, 6, 9, 12, 15…
- The perimeter of a rectangle is 2 × (l + b), where l is the length and b is the breadth of the rectangle.
- What is the perimeter if l = 8 cm and b = 5 cm?
- The number of bean sticks needed for a row which is m metres long is 2m + 1. How many bean sticks do you need for a row which is 60 metres long?
- Plot the points which show pairs of numbers with a sum of 9.

§ find pairs of numbers that satisfy an equation with two unknowns
§ enumerate possibilities of combinations of two variables.

Children should be confident to answer questions such as;

Here are five number cards:

A and B stand for two different whole numbers.

The sum of all the numbers on all five cards is 30.

What could be the values of A and B?

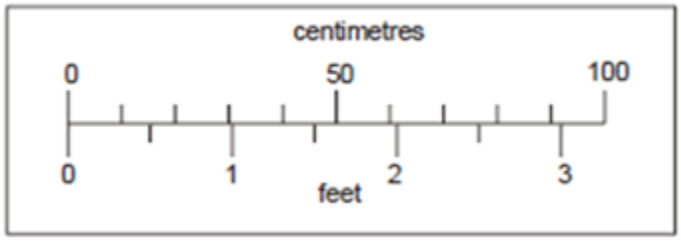
Measurement

§ solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

- Children should be able to draw a flow chart to help someone else convert between mm, cm, m and km.
- They should be able to answer questions such as: approximately how many litres are there in 3 gallons? Give your answer to the nearest litre.

§ use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places

This scale (not actual size) shows length measurements in centimetres and feet.



Look at the scale. Estimate the number of centimetres that are equal to 2 ½ feet.

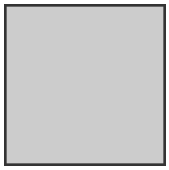
Estimate the difference in centimetres between 50 cm and 1 foot.

§ convert between miles and kilometres

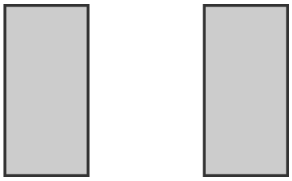
- Pupils should know the approximate equivalence between commonly used imperial units and metric units:
  e.g. 1 litre is approximately 2 pints (more accurately, 1 ¾ pints)
  4.5 litres is approximately 1 gallon or 8 pints
  1 kilogram is approximately 2 lb (more accurately, 2.2 lb)
  30 grams is approximately 1 oz
  8 kilometres is approximately 5 miles
- Children should be able to use conversion graphs that show miles/kilometres. They should be able to use it to estimate a distance of 95 miles in kilometres.

§ recognise that shapes with the same areas can have different perimeters and vice versa

The perimeter of a square is 72 centimetres.



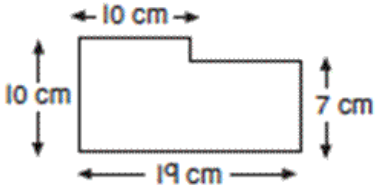
The square is cut in half to make two identical rectangles.



What is the perimeter of one rectangle?

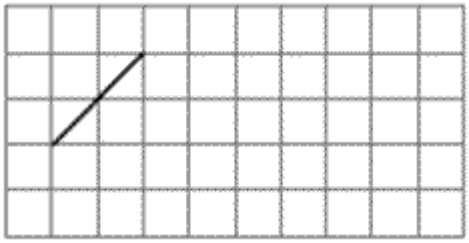
§ recognise when it is possible to use formulae for area and volume of shapes

Children should be able to calculate the perimeters of compound shapes that can be split into rectangles. For example,



§ calculate the area of parallelograms and triangles

This is a centimetre grid. Draw 3 more lines to make a parallelogram with an area of $10cm^2$. Use a ruler.



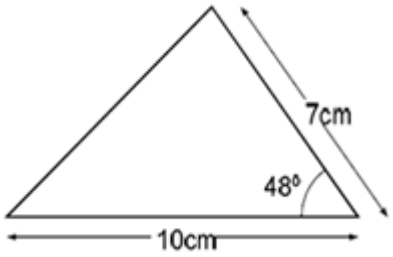
§ calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].

<u>Geometry – Shapes</u>

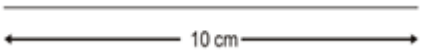
§ draw 2-D shapes using given dimensions and angles

Children should be able to construct a triangle given two sides and the included angle

Here is a sketch of a triangle. (It is not drawn to scale).



Draw the full size triangle accurately, below. Use an angle measurer (protractor) and a ruler. One line has been drawn for you.



§ recognise, describe and build simple 3-D shapes, including making nets

Children should be able to identify, visualise and describe properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to draw 2-D shapes and identify and draw nets of 3-D shapes

They should be able to respond accurately to questions such as;

'I am thinking of a 3D shape. It has a square base. It has four other faces which are triangles. What is the name of the 3D shape?'

'Which of these nets are of square based pyramids? How do you know?

'Is this a net for an open cube?' How do you know?

§ compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons

Children should be able to make and draw shapes with increasing accuracy and knowledge of their properties.

They should be able to carry out activities such as;

'Give me instructions to get me to draw a rhombus using my ruler and a protractor'

'On the grid below, use a ruler to draw a pentagon that has three right angles'

§ illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

They should know that:

- The circumference is the distance round the circle
- The radius is the distance from the centre to the circumference
- The diameter is 2 x radius

§ recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

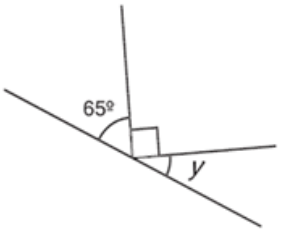
Children should be able to estimate angles, use a protractor to measure and draw them, on their own and in shapes. They should know that the angle sum of a triangle is 180˚, and the sum of angles around a point is 360˚.

They should be able to use this knowledge to respond accurately to questions such as;

'There are nine equal angles around a point. What is the size of each angle?'

'There are a number of equal angles around a point. The size of each angle is 24°. How many equal angles are there?'

Children should be able to calculate the size of angle 'y' in this diagram without using a protractor.



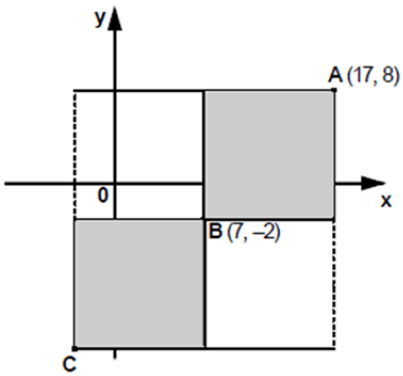
(Not to scale)

<u>Geometry – Position & Direction</u>

§ describe positions on the full coordinate grid (all four quadrants)

Children should be able to answer questions such as;

The two shaded squares below are the same size.



A is the point (17,8). B is the point (7,-2).

What are the co-ordinates of the point C?

§ draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

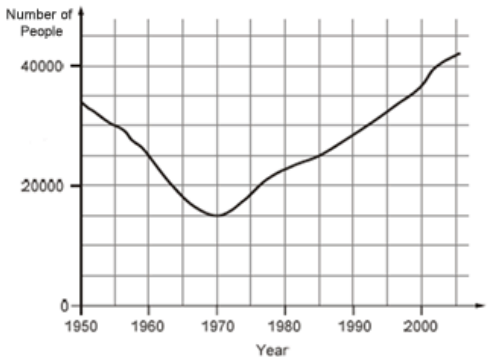
Children should be able to draw a shape with corners at given vertices, and describe the properties of the shape. Can they create the same shape where all of the coordinates will be positive? Negative?

They should be able to sketch the reflection of a simple shape in two mirror lines at right angles and find the coordinates of selected points.

Statistics

§ interpret and construct pie charts and line graphs and use these to solve problems

This graph shows the number of people living in a town.



How many people lived in the town in 1985?
In which year was the number of people the same as in 1950?

Find the year when the number of people first went below 20 000.

Class 6 did a survey of the number of trees in a country park. This pie chart shows their results.

Estimate the fraction of trees in the survey that are oak trees. The children counted 60 ash trees. Use the pie chart to estimate the number of beech trees they counted.

§ calculate and interpret the mean as an average.

From a simple database, children should be able to find the most common score (mode) as well as the mean score for each test.

Scores for 10 spelling and 10 mental answers

Name	Mental test score	Spelling test score
Danny	8	9
Elizabeth	10	7
Anil	7	9

Children should be able to choose their own sets of data to match given criteria, e.g. find a set of five numbers that have a mean of 5 and a range of 7.