St Robert Southwell Catholic Primary School

Aiming For Excellence - Being The Best We Can Be

Year 5 Maths Knowledge Organiser: Place Value

Place Value

Year 5 Objectives

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Key Vocabulary

compare
decrease
digit
greater than >
hundreds
increase
less than <
negative
numeral
ones
place value
positive
represent
rounding
sequence
thousands
tens

Modelled Examples / Concrete Pictorial Abstract

Place Value of Digits

Place value helps us know the value of a digit, depending on its place in the number.

HTH	TTH	TH	H	T	O
7	1	4	8	2	5

In the number above, the 7 digit is in the hundred thousands place so it really means 700,000.

The 1 digit is in the ten thousands place so it really means 10,000.

The 4 digit is in the thousands place so it really means 4,000.

The 8 digit is in the hundreds place so it really means 800.

The 2 digit is in the tens place so it really means 20.

The 5 digit is in the ones place so it means 5.

Partitioning

Numbers can be partitioned (broken apart) in more than one way. The number 714,825 could be partitioned in many ways such as:

700,000 + 10,000 + 4,000 + 800 + 20 + 5 or

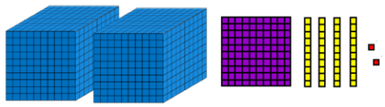
714,000 + 825 or 700,000 + 14,000 + 700 + 125 or

600,000 + 140,000 + 600 + 220 + 5

Representing Numbers to 10,000

A four-digit number is made up of thousand, hundreds, tens and ones. Different concrete manipulatives and pictorial diagrams can be used to represent these numbers.

The number 2,132 can be represented like this:



This shows 2 thousands, 1 hundred, 4 tens and 2 ones.

The same number can also be represented with place value counters:

Roman Numerals

I = 1	XXX = 30	C = 100
II = 2	XL = 40	D = 500
III = 3	L = 50	M = 1000
IV = 4	LX = 60	
V = 5	LXX = 70	MMXVIII = 2018
X = 10	LXXX = 80	
XX = 20	XC = 90	

Ordering Numbers

When we put numbers in order, we need to compare the value of their digits.

123,518 123,736 122,845

First, look at the hundred thousands digits in each number. Each number has the same digit in the hundred thousand place so you then keep comparing digits of the same place value until you find ones that are different. The thousands digits are different so that tells us that 12**2**,845 is the smallest number because it has a 2 in the thousands place. Looking at the hundreds digits, we can see that 123,**5**18 is the next smallest.

122,845 123,518 123,736

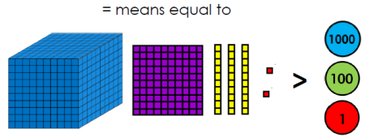
Smallest

Comparing Numbers

We can compare numbers using the < and > symbols.

< means less than > means greater than

= means equal to



123,518 < 123,845 549,736 > 547,736

Negative Numbers

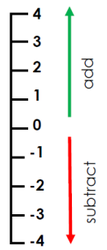
If you count backwards from zero, you reach negative numbers.

Positive numbers are any numbers **more than** zero e.g. 1, 2, 3, 4, 5.

Negative numbers are any numbers **less than** zero e.g. –1, -2, -3, -4, -5.

The number line shows that –5 is smaller than –1.

Negative numbers are often shown vertically such as on thermometers.



When we add a positive number to a negative number, we count upwards towards zero.

-2 + 5 = 3

When we subtract a positive number from a negative, we count down away from zero.

-1 – 3 = -4

Rounding

When rounding, you first need to identify which digit will tell you whether to round up or down.

- To round a number to the **nearest 10,** you should look at the ones digit.
- To round a number to the **nearest 100**, you should look at the tens digit.
- To round a number to the **nearest 1000**, you should look at the hundreds digit.
- To round a number to the **nearest 10,000**, you should look at the thousands digit.
- To round a number to the **nearest 100,000**, you should look at the ten thousands digit.

Quick Quiz

1. Round 153,00 to the nearest 100,000
2. Write 635 in roman numerals
3. Calculate 7 - 12
4. What is the value of the digit 4 in the number 847,025
5. True or false 5678 + 400 = 6178 ?

Counting in Powers of 10

Counting in 10s

365	375	385	395	405	415

The tens increase until 9 tens becomes one more hundred and 0 tens.

Counting in 100s

2841	2941	3041	3141	3241	3341

The hundreds increase until 9 hundreds becomes one more thousand and 0 hundreds.

Counting in 10 000s

276 109	286 109	296 109	306 109

The ten thousands increase until 9 ten thousands become one more hundred thousand and 0 ten thousands.

Counting in 100 000s

2 972 151	3 072 151	3 172 151	3 272 151

The hundred thousands increase until 9 hundred thousands becomes one more million and 0 hundred thousands.

Rounding

Rounding to the nearest 10

20	21	22	23	24	25	26	27	28	29	30

round down round up

Rounding to the nearest 1000

2000 ← 2499 | 2500 → 3000

round down round up

Rounding to the nearest 100 000

200 000 ← 249 999 | 250 000 → 300 000

round down round up

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Addition and Subtraction

Year 5 Objectives

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Key Vocabulary

add total combined more increase plus altogether sum

+

minus take away reduce less than difference decrease fewer than

−

estimate
exchange
inverse
regroup

Modelled Examples / Concrete Pictorial Abstract

Inverse Operations

Inverse means opposite. The opposite of addition is subtraction and therefore the opposite of subtraction is addition. Using an inverse operation is a useful way of checking your answer.

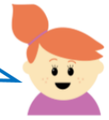
I have calculated that 14,257 - 5,483 = 8,774. How can I check my answer?

To check the answer to your subtraction, you can use the **inverse**, which is addition. If we add 5,483 to your answer of 8,774 it should total 14,257 - your original number. If it does, you have calculated correctly.

Estimate Answers

Estimating means to get a rough idea of an answer . We can use estimation to help us check if an answer to a calculation is correct.

I am calculating 23,478 + 12,983. I think the answer is 34,461.

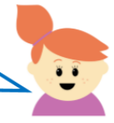


I am also calculating 23,478 + 12,983. I think the answer is 36,461.

Millie and Alfie could check their answers by doing the calculation again. However, if they have made a mistake, they may just make the same mistake again.

Instead, they could use **rounding** to check if their answer is correct.

We can round the numbers to the nearest hundred. So 23,478 + 12,983 becomes 23,500 + 13,000.



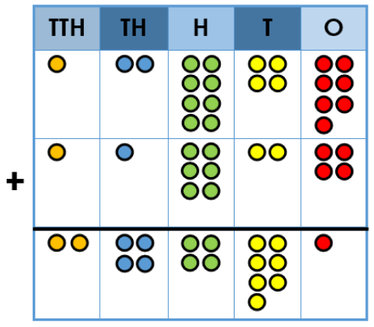
23,500 + 13,000 = 36,500.

Now we compare our estimate to the actual answers given. The answer 36,461 is very close to the estimate of 36,500 so that tells us it is more likely to be correct.

Concrete

Addition - Formal Written Methods

Using counters to show column addition:



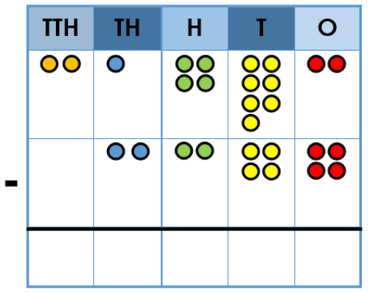
	1	2	8	4	7
+	1	1	6	2	4
	2	4	4	7	1
		1		1	

With column addition and subtraction, you must always start the calculation with the column on the right. 7 + 4 is 11. We can not put 11 in the ones column so a ten is placed under the tens column and the one is placed in the ones column. We then add the extra ten when we add that column.

Pictorial

Subtraction - Formal Written Methods

Using counters to show column subtraction:



	2	1	4	7	2
-		2	2	4	4

In the ones column, we don't have enough to subtract 4 from 2. We need to exchange a ten for ten ones.

To show this, the 7 is changed to a 6 because we now have 6 tens. The 2 becomes a 12. 72 is the same as 60 + 12. We still have the same amount, but it has been regrouped. Now we can start subtracting.

Abstract

12 - 4 = 8 so 8 is written in the ones column.

In the tens column, 6 - 4 = 2 so 2 is written in the tens column.

				~~7~~ 6	$^{1}2$
	2	1	4		
-		2	2	4	4
				2	8

The hundreds column is a straight forward calculation: 4 - 2 = 2.

Looking at the thousands column, we do not have enough to subtract 2 from 1. We need to exchange one of the ten thousands for 10 thousands. To show this, the 2 (in the ten thousands place) is changed to a 1. The 1 (thousand) becomes an 11. 11 - 2 = 9.

Finally, looking at the ten thousands column, 1 - 0 = 1. The final answer to the subtraction is 19,228.

	^{1}~~2~~	$^{1}1$	4	~~7~~ 6	$^{1}2$
-		2	2	4	4
	1	9	2	2	8

Quick Quiz

1. What is the sum of 5745 and 3186
2. Solve _____ + 3000 = 8630
3. Explain how you could check that 2314 + 1568 = 3882
4. Solve 3400 + 2156 mentally
5. Solve _____ - 350 = 1400

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Multiplication and Division

Year 5 Objectives

- 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 (nonprime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- 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
- multiply and divide numbers mentally drawing upon known facts
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- 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
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

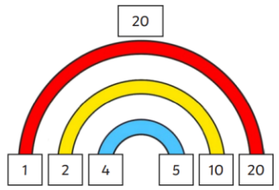
Key Vocabulary

calculate	multiple
common	multiplication
cube number	multiply
divide	operation
division	prime
efficient	remainder
exchange	share
factor	square number
groups of	times
lots of	

Modelled examples / Concrete Pictorial Abstract

Factors

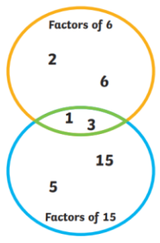
A factor is a number that divides into another number exactly, without leaving a remainder.



A common factor is a factor of 2 or more numbers.

The factors of 20 are 1, 2, 4, 5, 10 and 20.

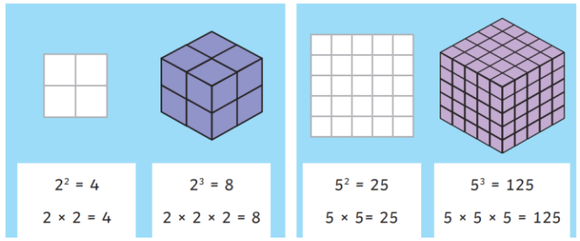
The factor pairs are:
1 and 20
2 and 10
4 and 5



Prime Numbers

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Squared² and Cubed³ Numbers



Related Calculations

$8 \times 9 = 72$	$9 \times 8 = 72$
$80 \times 9 = 720$	$90 \times 8 = 720$
$72 \div 9 = 8$	$72 \div 8 = 9$
$720 \div 9 = 80$	$720 \div 8 = 90$

Short Multiplication

$2543 \times 7 = 17\,801$

	2	5	4	3
×				7
1	7	8	0	1
1	3	3	(2)	

Remember to move any regrouped digits into the next column. After the next multiplication, add the regrouped number to the answer.

Long Multiplication

$2543 \times 67 = 170\,381$

		2	5	4	3
	×			6	7
	1 1	7 3	8 3	0 2	1
1 1	5 3	2 2	5 1	8	(0)
1	7	0	3	8	1
1	1				

Before multiplying by the number in the tens column, remember to use zero as a placeholder because the 6 in 67 is 6 tens (60).

Division

$136 \div 4 = 34$

		3	4	
4	1	3	6	
−	1	2	0	→ 30 × 4
		1	6	
	−	1	6	→ 4 × 4
			0	

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Short Division

		3	8
4	1	$^{1}5$	$^{3}2$

$15 \div 4 = 3$ remainder 3

Remember to regroup any remainders and move them into the next column.

		4	5	5	r	3
5	2	$^{2}2$	$^{2}7$	$^{2}8$		

$28 \div 5 = 5$ remainder 3

If your calculation has a remainder, remember to record it in the answer using the letter r.

Multiply and dividing by 10, 100 and 1,000

When a number is multiplied by 10, 100 or 1,000, the digits move to the left in the place value column. The digits move **1 place left** when we multiply by 10, **2 places** to multiply by 100 and **3 places** to multiply by 1,000.

The empty place value spaces are filled with a **0 as a place holder.**

TH	H	T	O	
	4	2	3	
	100 100 100	10 10	1 1 1	
100 100 100 100	10 10	1 1 1	0	x10

423 x 10 = 4,230

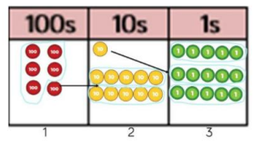
When a number is divided by 10, 100 or 1,000, the digits move to the right in the place value column: **1 place** when dividing by 10, **2 places** to divide by 100 and **3 places** to divide by 1,000.

Look what happens when we divide 7,900 by 10, 100 and 1,000:

TH	H	T	O	.	t	
7	9	0	0			
	7	9	0			÷10
		7	9			÷100
			7	.	9	÷1,000

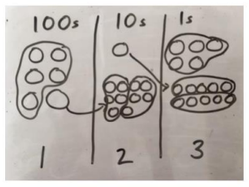
Concrete Pictorial Abstract

Short division using place value counters to group.
615 ÷ 5



1. Make 615 with place value counters.
2. How many groups of 5 hundreds can you make with 6 hundred counters?
3. Exchange 1 hundred for 10 tens.
4. How many groups of 5 tens can you make with 11 ten counters?
5. Exchange 1 ten for 10 ones.
6. How many groups of 5 ones can you make with 15 ones?

Represent the place value counters pictorially.



Children to the calculation using the short division scaffold.

$$5\overline{)615}^{\,123}$$

Quick Quiz

1. Name all the prime numbers up to 20
2. What is 54.13 x 100
3. What are the common factors of 20 and 30
4. Solve 3 squared plus 2 cubed
5. Solve 356 x 25

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Fractions (Including Decimals)

Year 5 Objectives

- compare and order fractions whose denominators are all multiples of the same number
- 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
- 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
- read and write decimal numbers as fractions
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- 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
- solve problems involving number up to three decimal place
- 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
- 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.

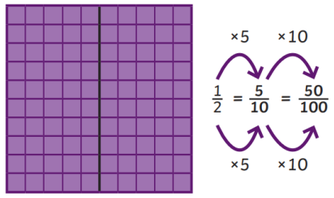
Key Vocabulary

decimal, denominator, equal, equivalent, fraction, half, hundredths, numerator, quarter, tenths, third, unit

Modelled examples / Concrete Pictorial Abstract

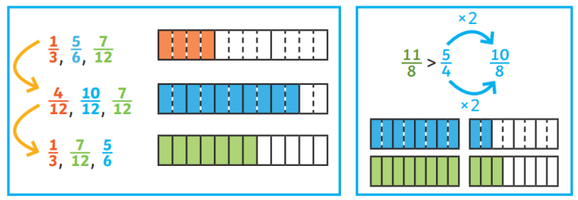
Equivalent Fractions

To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.



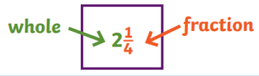
Compare and Order Fractions

We can compare and order fractions by using common denominators.



Mixed Numbers

Mixed numbers contain a whole number and a fraction.

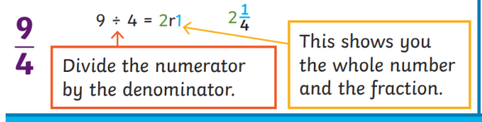


Improper Fractions

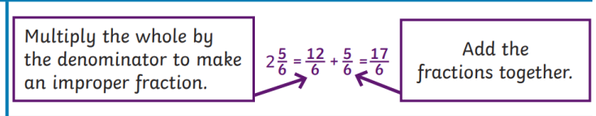
An improper fraction has a numerator which is greater than or equal to the denominator.

$\frac{5}{3}$

Convert an Improper Fraction to a Mixed Number

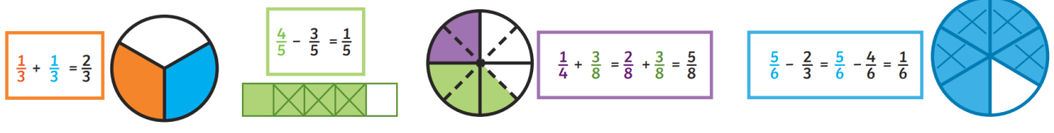


Convert a Mixed Number to an Improper Fraction



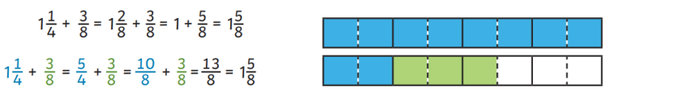
Adding and Subtracting Fractions

To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.

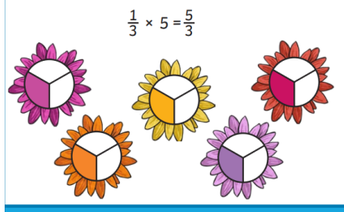


Add Fractions Where the Total is Greater Than 1

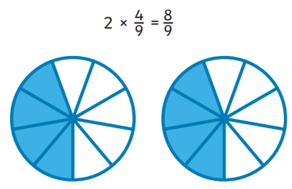
Add Mixed Numbers



Multiply Unit Fractions by an Integer

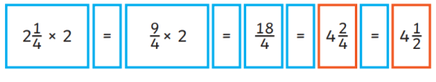


Multiply Non-Unit Fractions by an Integer



Multiply Mixed Numbers by Integers

Convert to an improper fraction and multiply the numerator by the integer.



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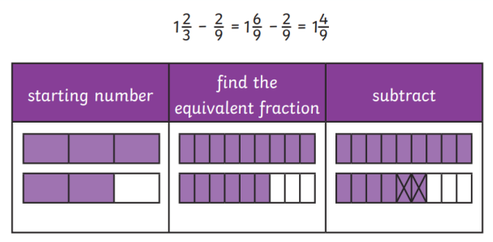
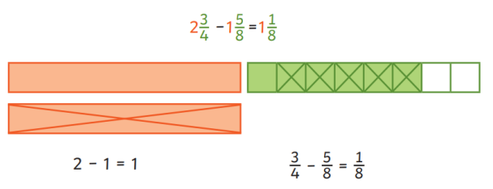
Use repeated addition.

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

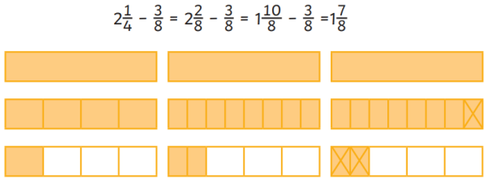
Subtract from a Mixed Number



Subtract Two Mixed Numbers



Subtract from a Mixed Number - Breaking the Whole



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Fractions (Including Decimals) CONTINUED

Year 5 Objectives

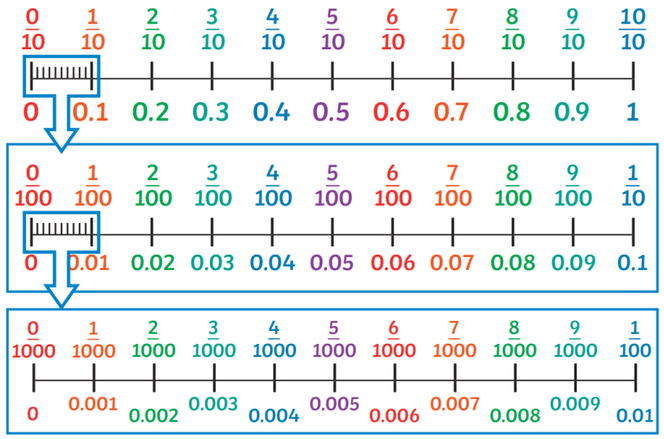
- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number
- 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
- read and write decimal numbers as fractions
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- 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
- solve problems involving number up to three decimal place
- 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
- 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.

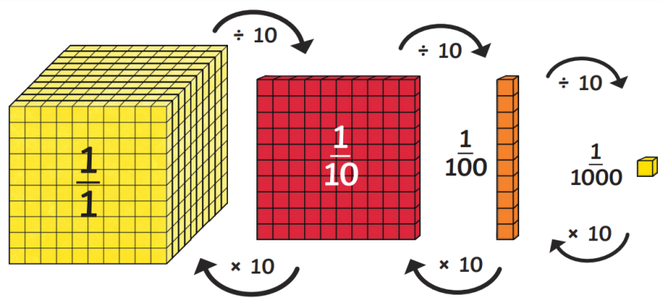
Key Vocabulary

decimal, denominator, equal, equivalent, fraction, half, hundredths, numerator, quarter, rounding, tenths, third, unit

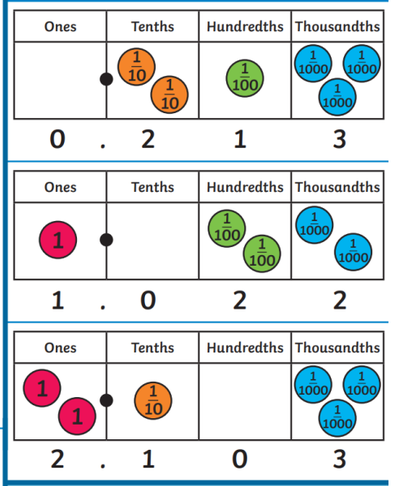
Modelled examples / Concrete Pictorial Abstract

Tenths, Hundredths and Thousandths

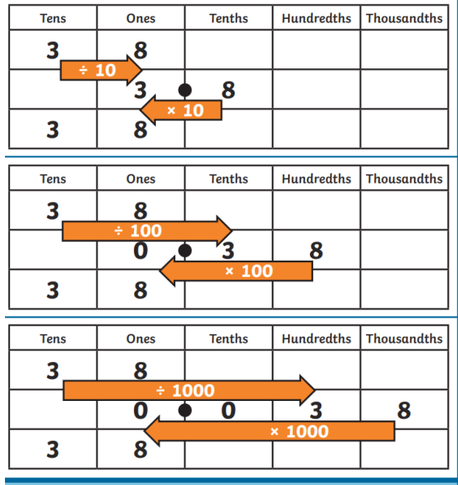




Order and Compare Numbers with Three Decimal Places



Multiplying and Dividing by 10, 100 and 1000



Decimal Numbers as Fractions

$0.71 = \frac{71}{100} = \frac{7}{10} + \frac{1}{100}$

$0.37 = \frac{37}{100} = \frac{3}{10} + \frac{7}{100}$

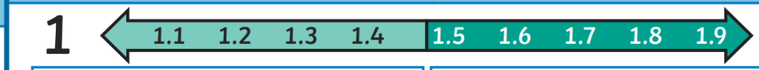
Adding and Subtracting Decimals

0.8 + 0.001 = 0.801

1.031 - 0.23 = 0.801

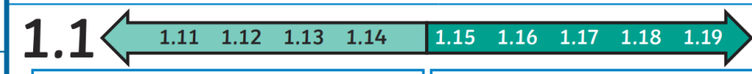
0.4005 + 0.4005 = 0.801

Rounding Decimals



If the tenths digit is 1, 2, 3 or 4, we round down to the nearest whole number.

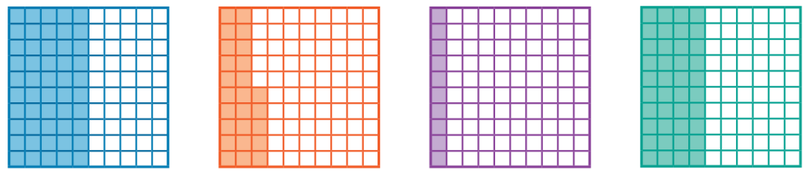
If the tenths digit is 5, 6, 7, 8 or 9, we round up to the nearest whole number.



If the hundredths digit is 1, 2, 3 or 4, we round down to the nearest tenth.

If the hundredths digit is 5, 6, 7, 8 or 9, we round up to the nearest tenth.

Percentage and Decimal Equivalents

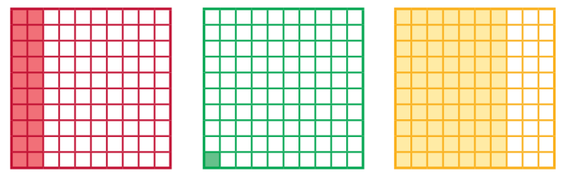


50% = $\frac{50}{100} = \frac{1}{2} = 0.5$ 25% = $\frac{25}{100} = \frac{1}{4} = 0.25$ 10% = $\frac{10}{100} = \frac{1}{10} = 0.1$ 40% = $\frac{40}{100} = \frac{2}{5} = 0.4$

Crossing the Whole

0.82 + 0.63 = 1.45

2.531 - 0.6 = 1.931



20% = $\frac{20}{100} = \frac{1}{5} = 0.2$ 1% = $\frac{1}{100} = 0.01$ 70% = $\frac{70}{100} = \frac{7}{10} = 0.7$

Quick Quiz

1. Subtract ¼ from 12/16
2. Write 1 ¾ as an improper fraction
3. What is ¼ x 1/3
4. What is 0.8 as a fraction?
5. Order 0.3, 0.144 and 0.56 from smallest to largest

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Year 5 Maths Knowledge Organiser - Geometry

Geometry

Year 5 Objectives

Properties of shape –

- Identify 3d shapes, including cubes and other cuboids, from 2d representations
- Use properties of rectangles to deduce related facts and find missing lengths and angles
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
- Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- Draw given angles and measure them in degrees
- Identify: angles at a point and one whole turn; angles at a point on a straight line and a turn; other multiples of 90

Position and direction –

- 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

Key Vocabulary

1. Angle
2. Right angle
3. Acute
4. Obtuse
5. Reflex
6. Protractor
7. Horizontal
8. Vertical
9. Parallel
10. Perpendicular
11. Polygon
12. Regular
13. Irregular
14. Two-dimensional
15. Three-dimensional
16. Flat face
17. Curved surface
18. Edge
19. Curved edge
20. Vertex
21. Apex
22. Coordinate
23. Quadrant
24. X-axis
25. Y-axis
26. Reflection
27. Mirror line
28. Translation

Modelled Examples / Concrete Pictorial Abstract

Properties of 3D Shapes

Name	Surfaces		Edges		Vertices	Picture
	Flat	Curved	Flat	Curved		
sphere	0	1	0	0	0	
cube	6	0	12	0	8	
cuboid	6	0	12	0	8	
cone	1	1	0	1	0	
cylinder	2	1	0	2	0	
square-based pyramid	5	0	8	0	5	
tetrahedron	4	0	6	0	4	
triangular prism	5	0	9	0	6	
pentagonal prism	7	0	15	0	10	
hexagonal prism	8	0	18	0	12	
octagonal prism	10	0	24	0	16	
octahedron	8	0	12	0	6	

A cone has an apex. This is because a vertex is the point where two straight edges meet and a cone has no straight edges.

Regular and Irregular Polygons

Regular	Irregular

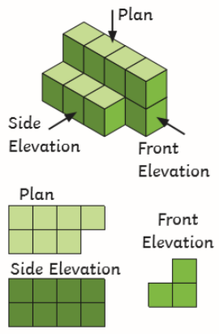
A polygon is any two-dimensional shape formed with straight lines.

In a regular polygon, all the sides and angles are equal.

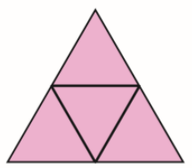
In an irregular polygon, the sides and angles are not equal.

Representations

Cube models can be drawn as 2D representations using different elevations.



A shape net is a 2D drawing of an unfolded 3D shape. When you are drawing or reasoning about shape nets, think carefully about where the edges of the faces meet.



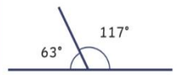
Shape net of a tetrahedron.

Identifying Angles

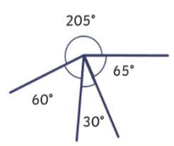
Acute Angles
Any angle that measures less than 90° is called an **acute** angle.

Obtuse Angles
Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.

Reflex Angles
Any angle that measures greater than 180° is called a **reflex** angle.

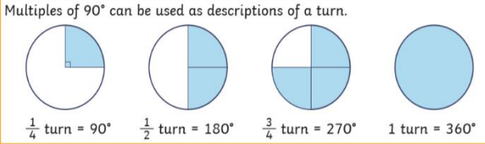


Angles on a straight line always total 180°.



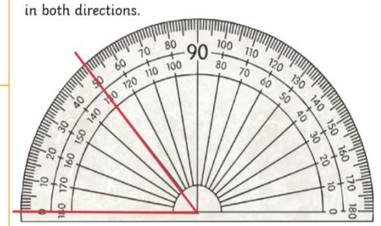
Angles around a point always total 360°.

Multiples of 90° can be used as descriptions of a turn.



Measuring and Drawing Angles

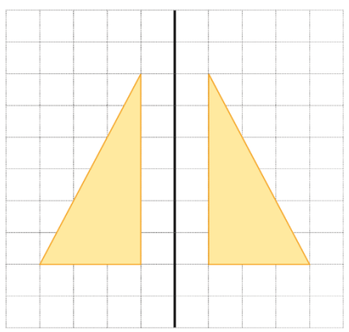
To measure angles, we use a protractor. Look carefully at how the numbers on the scale count from 0° to 180° in both directions.



Reflection

A shape is reflected when is flipped over a mirror line.

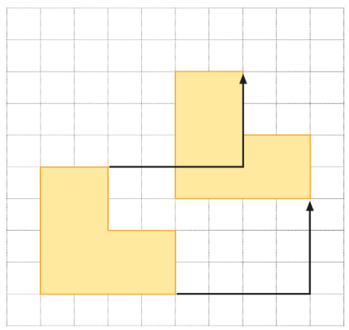
The reflected image is congruent to the original. This means that the measurements of the sides and angles have not changed. Each point of the reflected shape is the same distance from the mirror line as the original shape.



Translation

In maths, translation means moving an object on a grid. The object is moved without changing the size, turning or reflecting it.

When translating an object on a grid, it can move up or down, left or right.



Quick Quiz

1. How many degrees does a ¾ turn have?
2. How many vertices does a pentagonal prism have?
3. Find the missing angle; 63 + _ = 180
4. How many faces does an octagonal prism have?
5. A reflex angle is less than 90 degrees. True or false?

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Year 5 Maths Knowledge Organiser - Measurement

Measurement

Year 5 Objectives

- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm3 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.

Key Vocabulary

amount	estimate	pound
analogue	greater	rectilinear
area	hour	round
combination	less	second
compare	minute	space
convert	order	surface
digital	pence	
equal		

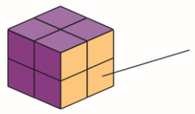
Modelled Examples / Concrete Pictorial Abstract

Volume of Cubes and Cuboids

Volume is measured in cubed units. For example, **cm³**, **m³** and **km³**.

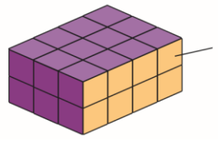
To calculate the volume of cubes and cuboids:

1. Calculate the area of the cross-section (one face).
2. Multiply the area of the cross-section (one face) by its depth.



Area of cross section (face) = 2cm × 2cm = 4cm²

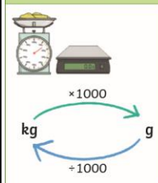
4cm² × 2cm = Volume of 8cm³



Area of cross section (face) = 4cm × 2cm = 8cm²

8cm² × 3cm = Volume of 24cm³

Converting Mass



1000g = 1kg

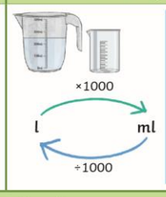
$\frac{1}{10}$kg = 0.1kg = 100g

$\frac{1}{4}$kg = 0.25kg = 250g

$\frac{1}{2}$kg = 0.5kg = 500g

$\frac{3}{4}$kg = 0.75kg = 750g

Converting Capacity



1000ml = 1 litre

$\frac{1}{10}$l = 0.1l = 100ml

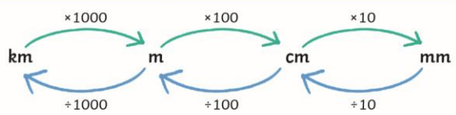
$\frac{1}{4}$l = 0.25l = 250ml

$\frac{1}{2}$l = 0.5l = 500ml

$\frac{3}{4}$l = 0.75l = 750ml

$\frac{1}{100}$l = 0.01l = 10ml

Converting Length



1000 metres = 1 kilometre

100cm = 1m

10mm = 1cm

$\frac{1}{10}$km = 0.1km = 100m

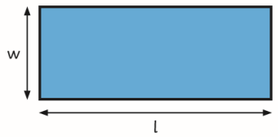
$\frac{1}{4}$km = 0.25km = 250m

$\frac{1}{2}$km = 0.5km = 500m

$\frac{3}{4}$km = 0.75km = 750m

Measure Perimeter

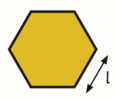
Measure the perimeter of a rectangle:



Measure the length (l) and width (w).

Perimeter = l + w + l + w or (l + w) × 2

Measure the perimeter of regular shapes:



Measure the length (l) and count the number of sides (s) on the shape.

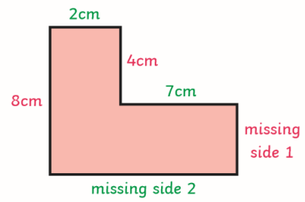
Perimeter = l × s

Measure the perimeter of irregular shapes:

Measure the length of each side and add them together.

Calculate Perimeter

Calculate the missing sides of this rectili shape to find the perimeter:



* This shape is not drawn to the dimensions speci

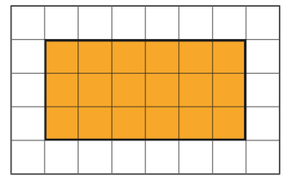
Missing side 1 + 4cm = 8cm,
so missing side 1 = 4cm.

Missing side 2 = 2cm + 7cm = 9cm

Perimeter = sum of all sides =
2cm + 4cm + 7cm + 4cm + 9cm + 8cm = 34

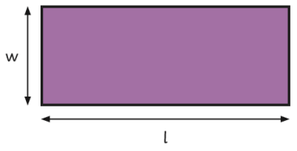
Area of Rectangles

The area of a rectangle on a grid:



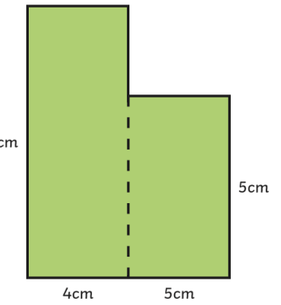
Multiply the length × width
= 6 × 3 = 18 squares.

The area of a rectangle = length (l) × width (w).



Area of Compound Shapes

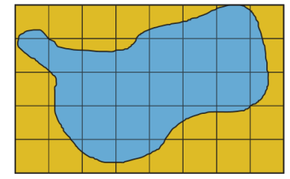
To find the area of a compound shape, divide the shape into rectangles with known dimensions:



Area = 7cm × 4cm + 5cm × 5cm
= 28cm² + 25cm²
= 53cm²

Area of Irregular Shapes

To find the area of an irregular shape, find the number of whole squares and part squares.



Whole squares = 10

Part squares = 22

Estimate of area = whole squares + half part squares

= 10cm² + 11cm² = 21cm²

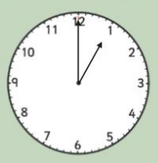
*There are other ways to estimate the area of irregular shapes.

Minute

1 minute = 60 seconds

Hour

1 hour = 60 minutes

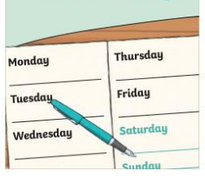


Day

1 day = 24 hours

Week

1 week = 7 days



Fortnight

1 fortnight = 2 weeks

Month

Quick Quiz

1. The perimeter of a square is 28, what is its area?
2. What is the volume of a cube with measurements of 5cm by 5cm by 5cm?
3. How many seconds are in an hour?
4. What is 0.05kg in grams?
5. A 1. 5 litre jug pours out 780ml, what is the remaining amount in the jug?

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Year 5 Maths Knowledge Organiser - Statistics

Statistics

Year 5 Objectives

- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

Key Vocabulary

Axis	discreet	scale
bar	frequency	survey
chart	horizontal	sum
comparison	interpret	table
continuous	pattern	tally
difference	pictograms	time
	predict	vertical

Modelled Examples / Concrete Pictorial Abstract

Reading and Understanding Tables

A table to show ticket prices at a local cinema.

Ticket Type	Weekday Price	Weekend Price
Adult	£6	£7.50
Child	£4	£4.50
Student	£5.50	£6

In order to understand the data presented in a table, you must read the **table's title** and the **headings**. Remember to always look at the heading that **each piece of information** falls under.

Completing Tables

Here is a table showing the favourite drink flavours of some children.

	Boys	Girls	Total
Orange	8		18
Blackcurrant		6	
Total	15		

To find how many boys voted for blackcurrant, look at the total number of boys who voted and subtract the number of votes for orange.

To find how many girls voted for orange, look at the total number of votes for orange and subtract the number of votes from boys.

To find the total number of votes for blackcurrant, the total number of girls or the total number of voters, simply add up the values from the appropriate row or column.

Timetables

Here is a bus timetable:

Bus stop locations	Three different buses		
Mill Road	0726		0842
High Street	0729	0803	
Pitsmoor Road	0759	0833	
Fulwood	0845	0919	0946

The bus starts at this time and location.

The bus does not stop here.

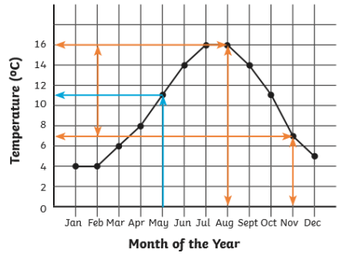
The bus terminates at this time and location.

Read and Interpret Line Graphs

Here is a line graph showing the average temperature for each month.

The y-axis shows temperature in intervals of 2°C on a scale of 0°C to 16°C.

The points show the average temperature for each month.



The x-axis shows the months of the year.

Use Line Graphs to Solve Problems

To find the average temperature in May, follow the arrow up from May and across to the temperature. As this is halfway between 10°C and 12°C, the average temperature in May is 11°C.

To find the difference between the average temperatures in August and in November, find the temperature for each month and calculate the difference between the two. The shape of the line graph can show how the temperature changed. he average temperature falls 9°C from August to November.

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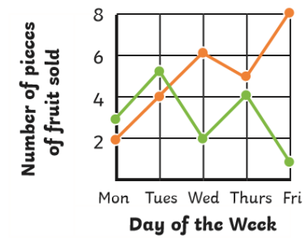
Draw Line Graphs

Here is a table showing the number of different types of fruit sold each day.

	Bananas	Apples
Mon	2	3
Tues	4	5
Wed	6	2
Thurs	5	4
Fri	8	1

This graph can be used to represent the data from the table.



Mark each point for the number of bananas sold each day and join each point with a line.

Mark each point for the number of apples sold each day and join each point with a line.

Quick Quiz

1. Explain the difference between a horizontal and vertical line.
2. Can you point to the y-axis on a graph?
3. Can you point to the x-axis on a graph?
4. Looking at the line graph above, what can you interpret about temperature throughout the year?
5. Looking at the bus timetable, how long is the journey from Mill Road to fulwood?

Following Jesus' footsteps and inspired by St Robert Southwell we work hard, aim high and treat everyone with honesty and gentleness.