



Key concepts that will be covered

Arithmetic

Numbers to 10 million

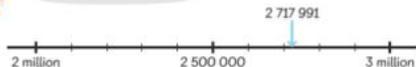
We will refine our knowledge of place value, working with numbers between 1 000 000 and 10 000 000. We will use concrete apparatus, numerals and words to represent numbers. We will round and compare numbers to 10 000 000, and place them in order from smallest to greatest.



1 Round 2 717 991...



... to the nearest million.

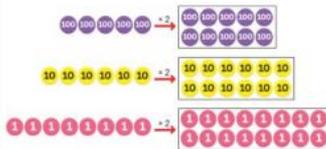


2 717 991 is closer to 3 million than to 2 million.

2 717 991 = 3 million (to the nearest million)

Four Operations on Whole Numbers

We will learn to create and solve expressions involving brackets, exponents, multiplication, division, addition and subtraction. We will then be multiplying 3-digit and 4-digit numbers by 2-digit numbers using number bonds and column multiplication as the key methods. After this, we will learn to estimate the products of multiplication sentences before moving onto division. We will be learning to divide 3-digit and 4-digit numbers by 2-digit numbers using a variety of methods, including number bonds and long division. We will use strategies to solve more complex word problems involving multiple operations, including multiplication and division, using the bar and other pictorial methods. We will deepen our understanding of common multiples, common factors and prime numbers.



$$2 \times 568 = 1136$$

$$10 \times 568 = 5680$$

$$2 \times 568 = 1136$$

$$12 \times 568 = 6816$$

$$\begin{array}{r} 12 \\ \times 568 \\ \hline 96 \\ 736 \\ 6240 \\ \hline 6816 \end{array}$$

Write even numbers greater than 10 but less than 20 as a sum of two prime numbers.



$$12 = 5 + 7$$

$$16 = 3 + 13$$

$$14 = 3 + 11$$

$$18 = 5 + 13$$



Is each of the highlighted numbers a prime number?

Count forwards and backwards in steps of integers, decimals and powers of 10.

Count from 0 in steps for multiplication facts for up to 12x tables. What number would come next in this counting sequence? 0, 10, 100, 1000, __, __
What number is missing from this counting sequence? 0, 0.01, 0.02, 0.04, 0.05

Find 0.001, 0.01, 0.1, 1 10 and powers of 10 more/less than a given number.

$$500 \pm 0.001 = \quad 9.46 \pm 0.01 =$$

What is 1000 more than __? What is 0.1 less than __?

Recall and use addition and subtraction facts for 1 (with decimals to two decimal places)

$$1 = 0.05 + \quad 0.95 + \quad = 1 \quad \quad + 0.8 = 1$$

$$0.09 + \quad = 1 \quad 0.23 + \quad = 1 \quad \quad + 0.4 = 1$$

Multiply and divide numbers by 10, 100, 1000 giving answers up to three decimal places

$$345 \times 10 = \quad 4598 \div 10 = \quad 452 \div \quad = 4.52$$

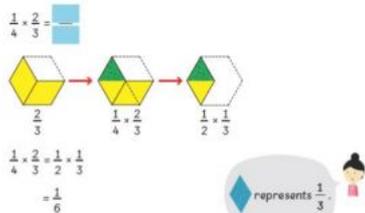
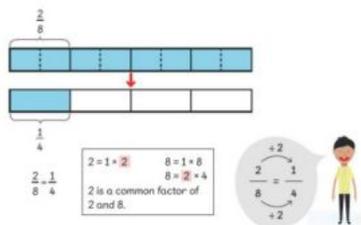
$$894 \times 100 = \quad 2098 \div 100 = \quad 109 \times \quad = 10900$$



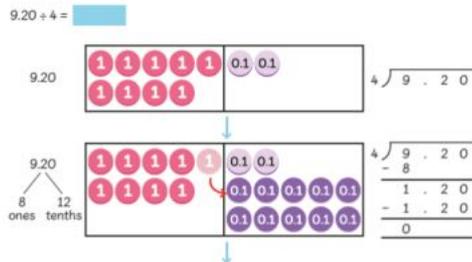
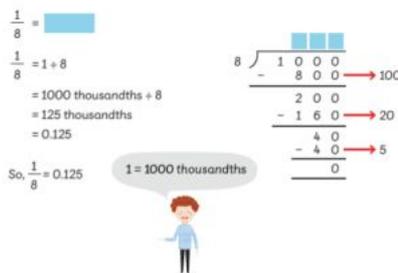
Key concepts that will be covered

Fractions

We will refine our understanding of simplifying fractions using concrete apparatus and use this understanding to order fractions from the smallest to largest. We will learn to add and subtract fractions with different denominators, using pictures and diagrams to support our learning. We will extend our understanding to add and subtract mixed numbers. We will learn to use pictorial and abstract methods to multiply and learn how to divide fractions by a whole number.

Decimals

We will deepen our understanding of reading and writing decimals using base ten materials before moving on to dividing and multiplying decimals by 1-digit numbers with no regrouping or renaming. We will learn how to write fractions as decimals using division and pictorial methods before moving on to multiplying decimal fractions. We will learn to divide decimals by 1 and 2 digit numbers using a variety of methods, including: number bonds, the worded method, long division and the column method.



Arithmetic

Mental Calculation Strategies – Addition and Subtraction
 Partition and combine multiples of thousands hundreds, tens and ones

$5800 + 2400 - 5800$ add 2000 and 400 = 5800 add 2000 add 400
 $873 + 350$ 873 add 300 and 50 = 873 add 300 add 50
 $7584 - 2351$ 7584 take away 2000 and 300 and 50 and 1 = 7584 take away 2000 take away 300 take away 50 take away 1 (crossing no boundaries)

Partition and combine multiples of ones and tenths

$8.4 + 3.8$ 8.4 add 3 and 0.8 = 8.4 add 3 add 0.8
 $13.2 - 4.5$ 13.2 take away 4 and 0.5 = 13.2 take away 4 take away 0.5

Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. $680 + 430$, $6.8 + 4.3$, $0.68 + 0.43$ can all be worked out using the related calculation $68 + 43$



$0.62 + 0.38$ using knowledge of $62 + 38 = 100$
 $0.75 + 0.56$ using knowledge of $75 + 56 = 131$
 $0.92 - 0.35$ using knowledge of $92 - 35 = 57$
 $8.3 - 0.52$ using knowledge of $830 - 52 = 778$

Find differences by counting up through the next multiple of 0.1, 1, 10, 100 or 1000

$8.2 - 3.46$ $14.23 - 7.58$

Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. $58 + 5 = 58 + 2 + 3$ or $76 - 8 = 76 - 6 - 2$)

Add or subtract a multiple of 1 or 10 and adjust (for those numbers close to multiples of 1 or 10)



Key concepts that will be covered

Measurements

We will learn to convert units of measure using fractions and decimals. We will apply our knowledge to length, mass, volume and time.

$$1 \text{ km } 25 \text{ m} = \text{ } \text{ km}$$

$$25 \text{ m} = \frac{25}{1000} \text{ km}$$

$$= 0.025 \text{ km}$$

$$1 \text{ km } 25 \text{ m} = 1.025 \text{ km}$$

$$1 \text{ km } 25 \text{ m} < 1.25 \text{ km}$$

$$1 \text{ km} = 1000 \text{ m}$$



$$1.25 \text{ km} = \text{ } \text{ km } \text{ } \text{ m}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$0.25 \text{ km} = 250 \text{ m}$$

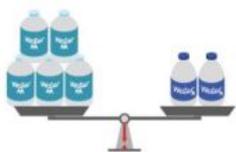
$$1.25 \text{ km} = 1 \text{ km } 250 \text{ m}$$

$$1.25 \text{ km} > 1 \text{ km } 25 \text{ m}$$

$$0.25 = \frac{1}{4}$$

World Problems

We will be learning to solve increasingly complex word problems using the 4 operations and bar model diagrams. We will be learning to use high-order reasoning skills to solve problems and we will also be creating and solving our own word problems.

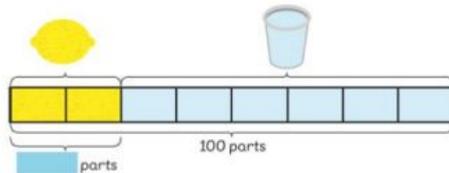


8  weigh as much as .

5  and 8  weigh 6 kg. Find the mass of  in g.

Percentages

We will be exploring how to calculate percentage of numbers and quantities. We will learn how to solve problems for percentage change and use percentage to compare amounts. We will learn how to find the percentage of a quantity, measured in amounts such as litres and millilitres. We will learn how to use percentage to compare numbers and amounts.



$$100 \div 4 = 25$$

25 out of 100 parts of the mixture is lemon syrup.

25% of the mixture is lemon syrup.

That means for every 100 ml of mixture, 25 ml is lemon syrup.



Arithmetic

Mental Calculation Strategies –
Multiplication and Division

Multiply whole numbers and decimals to three decimal places by 10, 100 and 1000

$$4562 \times 1000 \quad 9.682 \times 10 \quad 25.784 \times 100$$

Use partitioning to double or halve any number

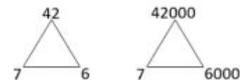
What is double 34.7?

What is half of 456?

$$34.5 \div 2 =$$

$$409 \times 2 =$$

Identify and use all related facts that link to tables



7000 x 6 becomes 7 x 1000 x 6 reordered as 7 x 6 x 1000

500 x 40 becomes 5 x 100 x 4 x 10 reordered as 5 x 4 x 100 x 10

Use related facts to multiply 0.0t by a one-digit number

0.03 x 7 related to 3 x 7 = 21

0.06 x 9 related to 6 x 9 = 54

0.05 x 4 related to 5 x 4 = 20



Use related facts to divide TU by 0.t

56 ÷ 0.8 related to 56 ÷ 8 = 7

21 ÷ 0.7 related to 21 ÷ 7 = 3

36 ÷ 0.9 related to 36 ÷ 9 = 4

48 ÷ 0.4 related to 48 ÷ 4 = 12

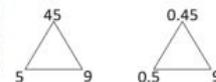


Use related facts to divide 0.th by 0.t

0.32 ÷ 0.4 related to 32 ÷ 4 = 8

0.64 ÷ 0.8 related to 64 ÷ 8 = 8

0.45 ÷ 0.9 related to 45 ÷ 9 = 5





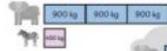
Key concepts that will be covered

Ratio

We will be learning to compare quantities and use fractions to represent this. We will learn to use the language of ratio. We will then solve problems using ratio.

$$\text{Ratio} = 2700 \text{ kg} : 450 \text{ kg}$$

$$= \frac{2700}{450}$$

**Algebra**

We will be learning how to understand pattern using concrete apparatus and we will learn how to tabulate to help identify patterns. We will begin to understand how we can express the relationships between two numbers using a symbol or a letter. We will learn how to write algebraic expressions for each of the four operations. We will learn how to write and use formulae.

He thinks it is $x - 8$.

Is correct?

When $x = 12$, $x - 8 = 4$

He thinks it is $\frac{1}{3}x$.

Is correct?

When $x = 12$, $\frac{1}{3}x = 4$

$$\begin{aligned} \text{When } x &= 12 \\ x - 8 &= 12 - 8 \\ &= 4 \end{aligned}$$

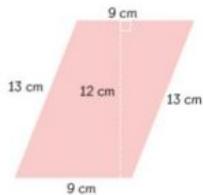
$$\begin{aligned} \text{When } x &= 12 \\ \frac{1}{3}x &= \frac{1}{3} \times 12 \\ &= 4 \end{aligned}$$

This means $\frac{1}{3}$ is multiplied by a number.

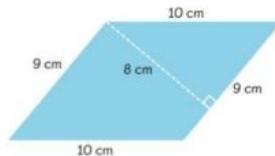
Area and Perimeter

We will be exploring how to calculate the area of rectangles, triangles and parallelograms.

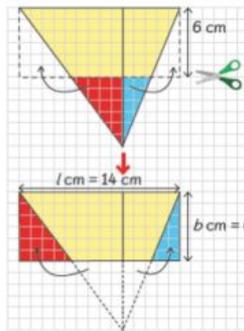
Find the area of this parallelogram.



Find the area of this parallelogram.



's method



$$\begin{aligned} \text{Area of triangle} &= \text{area of rectangle} \\ &= \left[14 \times \left(\frac{1}{2} \times 12 \right) \right] \text{ cm}^2 \\ &= \text{ cm}^2 \end{aligned}$$

For rectangle,
 $A = l \times b$.

Arithmetic**Mental Calculation Strategies –
Multiplication and Division**

Use compensation to multiply U.9 and U.99 by a one-digit number

$$5.9 \times 4 \text{ understood as } 6 \times 4 - 0.1 \times 4$$

$$3.99 \times 7 \text{ understood as } 4 \times 7 - 0.01 \times 7$$

$$9.99 \times 6 \text{ understood as } 10 \times 6 - 0.01 \times 6$$

Use partitioning to multiply 0.th by a one-digit number

$$0.76 \times 3 \quad 0.28 \times 7 \quad 0.54 \times 6$$

Use partitioning to double numbers including those with three decimal places

$$\text{Double } 3.421 \quad \text{Double } 6.705 \quad \text{Double } 12.594$$

$$\text{Double } 54\,672 \quad \text{Double } 674\,960$$

Divide whole numbers and decimals to three decimal places by 10, 100 and 1000

$$356.7 \div 100 \quad 9.83 \div 10 \quad 7.04 \div 10$$

$$860.2 \div 100 \quad 56\,789 \div 1000$$

Use related facts to divide by 50

$$4100 \div 50 \text{ understood as } (4100 \div 100) \times 2$$

$$7800 \div 50 \text{ understood as } (7800 \div 100) \times 2$$

$$530 \div 50 \text{ understood as } (530 \div 100) \times 2$$

Use related facts to divide by 25

$$3200 \div 25 \text{ understood as } (3200 \div 100) \times 4$$

$$7600 \div 25 \text{ understood as } (7600 \div 100) \times 4$$

$$360 \div 25 \text{ understood as } (360 \div 100) \times 4$$

Use partitioning to divide ThHTU by a one-digit number

$5035 \div 5$ by partitioning into 5000 and 35 (multiples of 5 totalling 5035)

$1236 \div 4$ by partitioning into 1200 and 36 (multiples of 4 totalling 1236)

$9240 \div 6$ by partitioning into 6000 and 3000 and 240 (multiples of 6 totalling 9240)



Key concepts that will be covered

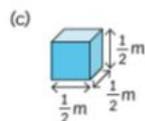
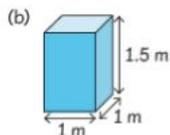
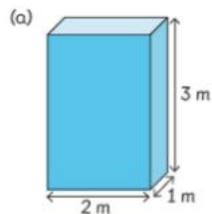
SATs

We will take three Standardised Assessment Tasks in Mathematics: an arithmetic paper and two reasoning papers

Volume

We will be developing our understanding of volume as it relates to cubes and cuboids. We will use concrete materials to understand the meaning of volume thoroughly. We will then determine a formula for the volume of cubes and cuboids, estimating volumes and calculating total volumes with a formula. We will solve problems related to volume, using division and multiplication.

Calculate the volume of each box.



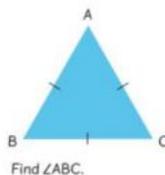
How big is each of these boxes?



Geometry

We will explore angles and discover rules for opposite angles and adjacent angles. We will explore angles in quadrilaterals and triangles. We will learn to name the parts of a circle and investigate angles within a circle. We will practise precision drawing of quadrilaterals and triangles. We will explore the nets of three dimensional shapes and learn to draw them accurately.

ABC is an equilateral triangle.



We name vertices using letters like A, B, C.



We name lines using a pair of letters like AB.



$\angle ABC$ means the angle between the lines AB and BC.

Arithmetic

Progression Towards Written Calculation Strategies – Addition

This final stage of the method should have been achieved in Year 3 and should be continued to be used for all written addition calculations.

The first example would be explained as follows:

$5 + 8 = 13$, put 3 down and carry the 10 (written as a 1 in the tens column)

$20 + 40 + 10$ that was carried over = 70 (7 written in the tens column)

$600 + 0 = 600$ (6 written in the hundreds column)

Children will be expected to use this method for adding numbers with up to seven digits, numbers involving decimals and adding any number of amounts together.

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \end{array}$$

4	4	5
1	9	
0	0	8

Progression Towards Written

Arithmetic – Subtraction

This final stage is the compact method or decomposition should have been achieved in Year 4 and should be continued to be used for all written subtraction calculations.

Children will be expected to use this method for subtracting numbers with up to seven digits and numbers involving decimals.

The example shown would be explained as follows:

We are subtracting 86 from 754. Start with the least significant place value column.

$$\begin{array}{r} 4 \ 10 \ 11 \ 1 \\ 51.20 \\ - 4.83 \\ \hline 46.37 \end{array}$$

Are there enough hundredths to subtract 3 hundredths? **46.37**

No – so let's exchange a tenth from the tenths column for ten hundredths. 2 tenths and 0 hundredths becomes 41 tenth and 10 hundredths.

10 hundredths subtract 3 hundredths = 8 hundredths

Are there enough tenths to subtract 8 tenths?

No – so let's exchange a one from the ones column for ten tenths. 1 one and 1 tenth becomes 0 ones and 1 tenths.

11 tenths subtract 8 tenths = 3 tenths.

Are there enough ones to subtract 4 ones?

No – so let's exchange a ten from the tens column for ten ones. 5 tens and 0 ones becomes 4 tens and 10 ones

$10 - 4 = 6$

4 tens (40) – 0 tens = 4 tens (40)

Answer 46.37

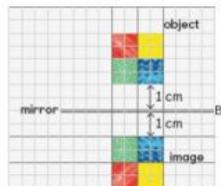
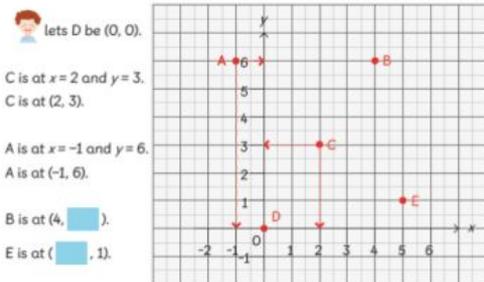


Key concepts that will be covered

NB In Year 6 some learning may be covered at an earlier date in order to adequately prepare children for their SATs.

Position and Movement

We will be learning how to describe positions of shapes on a grid in all four quadrants. We will learn to describe translations and reflections in all four quadrants. We will learn how we can use algebraic expressions to describe a position or a movement of a shape.

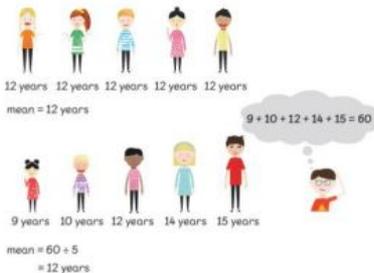


is 1 cm from the mirror. Its image is also 1 cm from the mirror.

Graphs and Averages

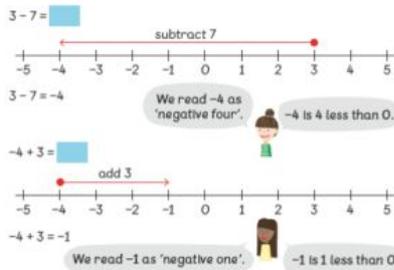
We will be deepening our understanding of the mean as an average and solve problems using the mean. We will learn how to read pie charts and line graphs with more complex scales. We will solve problems involving graphs and pie charts

Find the mean age.



Negative Numbers

We will consolidate our understanding of negative numbers by learning how to add and subtract using them. We will learn to use negative numbers in context.



Arithmetic

Progression Towards Written Calculation Strategies – Multiplication

As the grid method for multiplication supports children's number sense and appreciation of the values of each digit, schools can decide if this is the final stage of written multiplication.

It is often easier for children to keep track of the partial products calculated by using the grid method rather than the compact vertical method.

Concerns over 'acceptable methods' for 2 mark questions in the end of key stage 2 test should be weighed up against the improved chance of gaining 2 marks for the correct answer by using the grid method.

x	600	90	3	
20	12000	1800	60	= 13 860
4	2400	360	12	= 2 772 +
				16 632

Progression Towards Written Calculation Strategies – Division

As the chunking method for division supports children's number sense and appreciation of the values of each digit, schools can decide if this is the final stage of written division. It can be used for both short and long division (Year 6 expectation) and leads to more efficient mental methods. As children develop their understanding of this method, they should use ever more efficient steps. The menu box may not need to be written, but the children should continue to think in this way.

	155 r4		155 r4
	640 r2	26 4034	26 4034
	8 5122	- 2600	- 3900
	- 4800	1434	134
	322	- 1300	- 130
	- 320	134	4
	2	- 130	4
		5x	5x