A Guide to Helping Your Child with Year 6 Maths

In Year 6, your child will apply the maths they have learned up to Year 5 and develop new skills to help solve more complex problems as they get ready for their transition to Key Stage 3. Don't worry if some methods that your child learns are new to you - there are still many ways in which you can support their learning at home.

Number & place value

In Year 6, children will be expected to read, write, order, compare and round numbers up to 10,000,000 and begin to learn about algebra, ratio and proportion, including:

- using number lines to add and subtract negative numbers
- using simple formulae and following rules such as 2n + 3 to find numbers in a sequence
- solving problems involving place value, ratio, scale factors, and equations expressed

How to help at home

1. Talk about large numbers in the real world, such as house prices, electricity meters, or football transfers. When you see big numbers like these, see if your child can read the number out loud.

2. Use place value charts - these can be a great way to help your child read, write and compare numbers, as well as to understand how zero works as a placeholder. For example, 3,210,421 could be represented as follows:

1 000 000s	100 000s	10 000s	1000s	100s	10s	1s
★★★	★★	★		★★★★	★★	★
3	2	1	0	4	2	1

3. Compare and order numbers: help your child understand that they need to look at the digit with the largest value first. For example, 2,132,654 is more than 1,123,432 as 2,132,654 has two **millions**, whereas 1,123,432 only has one **million**. If the largest value of both numbers is the same, then move on to the second, and then the third, and so on.
Try this game to practise comparing numbers. Write down 10 numbers up to 10,000,000 and the '>' and '<' symbols on separate pieces of paper. Deal your child two numbers, face down. Ask them to turn over the pieces of paper and to use the '>' and '<' symbols to show which number is bigger or smaller.
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4. Make estimates: when calculating, encourage your child to use their rounding skills to estimate the answer before calculating precisely. This will help them to check if their answer seems reasonable.
If you are out shopping and you have picked up a few items, ask your child to estimate the total cost of the items. They will need to round the cost of each item to find the estimated total.

Addition & subtraction

In Year 6, children will be expected to be able to solve problems, including multi-step word problems, involving adding, taking away, multiplying and dividing with large numbers, including:

- choosing efficient methods to solve problems and checking their answer using a different method
- exploring the order of operations using brackets
- rounding answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50, and so on.

Multiplication & division

In Year 6, children will be expected to be able to multiply and divide with large numbers using formal written methods including long divisio, including:

- multiplying four-digit numbers by two-digit numbers using long multiplication
- dividing four-digit numbers by two-digit numbers using long division
- solving multi-step problems using addition, subtraction, multiplication and division choosing which methods to use and explaining why.

How to help at home

The following activities will help with all four operations.

1. You can help your child practise all four operations at home by playing the 1 to 21 game. Ask them to roll a dice five times and record each number shown on the dice on a piece of paper. For example, 1, 4, 3, 5, 3. They then need to find a way to reach an answer of 1 using any operations (addition, subtraction, multiplication, and/or division) on the numbers. Your child can only use each number once and they have to use at least two numbers in each calculation. Find ways to make all the numbers 1 to 21.

2. Play the game Four 4s to practise multiplying, dividing, adding, and taking away.
The aim is to make all the numbers from 1 to 20 using just the number 4 four times. Use a combination of operations (multiplying, dividing, adding, and taking away) to make calculations where the answers are the numbers 1 to 20. You must use all four 4s, but you can put two together to make 44 as well as using operations.

3. Encourage your child to use their knowledge of different calculation strategies to solve problems. When solving word problems, ask your child what exactly the problem is asking them to do. Which operations will they need? Encourage your child to estimate their answer by rounding before they solve questions with a formal method. This will help them check that their answer makes sense when they come to work it out properly. Can they find different ways to solve the problem? Which method seems the most efficient or easiest?

4. Help your child identify factors and factor pairs using their knowledge of times tables: ask your child to choose an even number on a 100 square and cross it out. You then cross out a number that is either a factor or a multiple of that number. For example: start at 20 - a factor of 20 is 4 - a multiple of 4 is 40 - a multiple of 40 is 80. and so on. When a player cannot cross out any numbers, that player loses the game.

5. Explore square and cube numbers: a square number can also be represented in the shape of a square. A square with 3cm by 3cm sides has an area of 9cm^2. Ask your child to arrange a group of similar objects into a square. Notice how this makes a square number.
A cube number can also be represented in the shape of a cube. You could ask your child to make a cube with building blocks or Lego. If they use blocks with sides of equal length (for example, 1cm by 1cm by 1cm), then any bigger cube they build will need to use a cube number of those blocks, such as 3 cubed = 3 x 3 x 3 = 27 blocks.

Fractions, decimals & percentages

In Year 6, children will be expected to be able to calculate and solve problems using fractions, decimals and percentages, including:

- using common factors to simplify fractions
- multiplying pairs of fractions and dividing fractions by whole numbers
- multiplying one-digit numbers with up to two decimal places by whole numbers, for example 1·25 x 2.

How to help at home

1. Help your child calculate with fractions

In Year 6, your child will continue to add and subtract fractions, both with fractions whose denominators are the same (for example, $\frac{1}{5} + \frac{2}{5}$), and those whose denominators are multiples of the same numbers (for example, $\frac{3}{10} + \frac{1}{10}$). They will now also be expected to add and subtract using mixed numbers (for example, $2\frac{1}{5}$).

Your child might solve problems, like $3\frac{1}{5} + 2\frac{3}{5}$, in the following ways.

Option 1

They could separate the whole numbers and the fractional parts:

First, add the whole numbers: 3 + 2 = 5.

Then, add the fractional parts: $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$.

Finally, add the whole number and fractional parts together to create a mixed number: $5\frac{4}{5}$.

Option 2

They could turn each mixed number into an improper fraction, then add the improper fractions together, and finally convert the answer back into a mixed number:

First, convert $3\frac{1}{5}$ into an improper fraction: $\frac{16}{5}$.

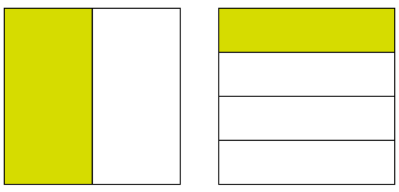
Then, convert $2\frac{3}{5}$ into an improper fraction: $\frac{13}{5}$.

Then, add the improper fractions together: $\frac{16}{5} + \frac{13}{5} = \frac{29}{5}$.

Finally, turn the answer back into a mixed number: $\frac{29}{5} = 5\frac{4}{5}$.

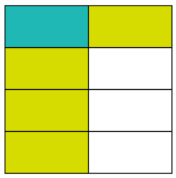
The same strategies can be applied to subtracting fractions using mixed numbers.

2. Multiply and divide with fractions: your child will multiply pairs of simple fractions – for example, $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$. They could be introduced to the idea using diagrams like this:



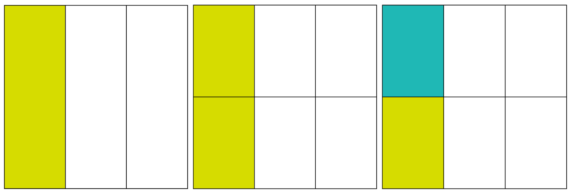
In this example, the **half** is shown on the left by splitting the shape vertically into two equal pieces. The same shape will then be drawn to represent **quarters**, this time split horizontally into four equal pieces. The diagrams will then be added together to divide the shape into eighths:

The answer can be found where the half and the quarter overlap to make one **eighth**:



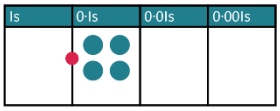
Your child will be able to see that one out of the eight has been shaded, therefore the answer to $\frac{1}{2} \times \frac{1}{4}$ is $\frac{1}{8}$. You could talk about the fact that when we multiply fractions, we can multiply the two numerators and multiply the two denominators.

Your child will also learn to divide proper fractions by whole numbers – for example, $\frac{1}{3} \div 2 = \frac{1}{6}$. Encourage your child to use diagrams to help them:



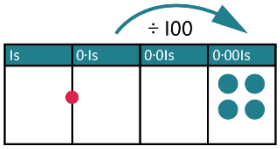
Remind your child that dividing by 2 is the same thing as finding a half of something.

3. Calculate with decimals: your child will continue to practise adding and subtracting with decimal numbers up to 3 decimal places. Place value charts are a great way to visualise these changes:



0·4 ÷ 100 = 0·004

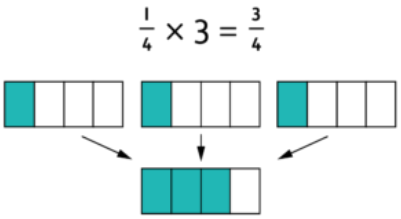
Help your child to understand that dividing by 10 means getting ten times smaller, dividing by 100 means getting a hundred times smaller, and so on. The same concept applies to multiplication, but the other way around.



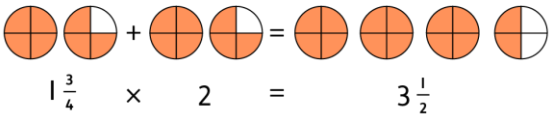
Money and measures are great for practising using numbers with 2 decimal places. You could show your child your shopping receipt with the total hidden. Ask your child to work out the total cost of the shopping receipt. How much change you would be given if you paid using, for instance, a £10 note?

4. Link fractions, decimals, and percentages: decimals and percentages are just other ways to show fractions. Encourage your child to spot fractions, decimals, and percentages in real life and convert between the different forms where possible.

5. Multiply fractions and mixed numbers by whole numbers: It can often be helpful to draw diagrams when multiplying proper fractions by whole numbers, as it helps your child visualise what this means. For example:



Drawings can also be a great way to support your child when they are multiplying mixed numbers by whole numbers. In this example, $1\frac{3}{4}$ is multiplied by 2:



6. Percentages: talk about how 'percent' means 'number of parts per hundred' and numbers that are represented in percentages. Ask them to tell you how to represent the percentage as a fraction and decimal (for example, 55% = $\frac{55}{100}$ = 0·55).

Sales at the shops can provide great real-life opportunities to work with percentages. For example, you could ask your child to help you work out the sale price of an item. If there is 30% off a T-shirt and the full price is £9·99, what is 30% of the full price and what is the sale price?

Geometry

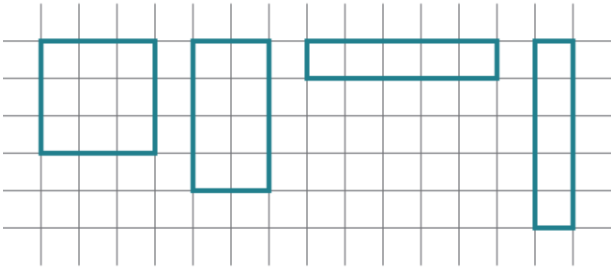
In Year 6, children will be expected to be able to solve problems by calculating and converting measurements with up to 3 decimal places, including:

- converting between miles and kilometres
- working out areas of shapes including triangles and parallelograms
- working out volumes of cubes and cuboids
- knowing and using a formula to work out areas and volumes of some shapes.

How to help at home

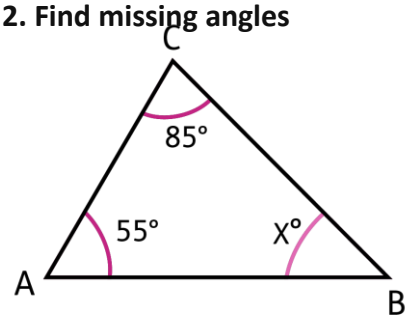
1. Practise drawing different types of polygons, such as:

- isosceles, equilateral, and scalene triangles
- quadrilaterals like parallelograms, rhombuses, and trapeziums.



You could ask your child to draw a square with 4cm sides, or a series of rectangles each with sides totalling 12cm. Encourage them to explore different possibilities. 1cm squared paper can help with this.

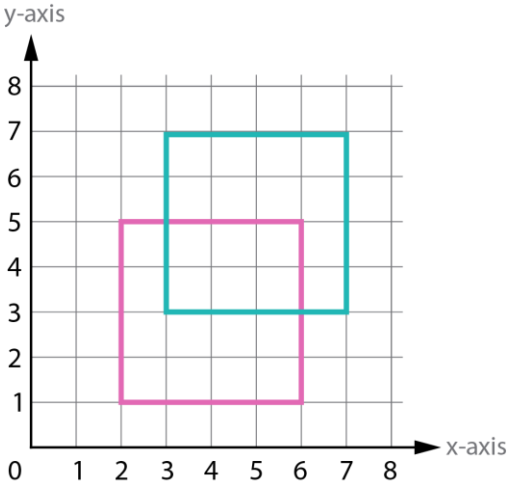
2. Find missing angles



In Year 6, your child will need to know about angle sums in shapes. For example, angles in a triangle total 180° and angles in a quadrilateral total 360°. Help your child find unknown angles in triangles, quadrilaterals, and regular polygons using these facts. For example, give them a triangle with two labelled angles - they should be able to work out the value of the remaining angle.

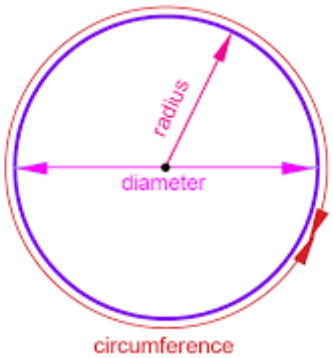
3. Use and understand grids:

Help your child practise translating simple shapes by asking them to move shapes around a grid. For example, they could move a square with coordinates (2,1) / (6,1) / (2,5) / (6,5) two up and one to the right. In this example, the coordinates of the new, translated square would be (3,3) / (7,3) / (3,7) / (7,7):



4. Talk about circles

You can help your child get to know the different parts of circles by using the language *diameter*, *radius*, and *circumference* to point out these properties when you see circles in the real world.



Measurement

In Year 6, children will solve problems by calculating and converting measurements with up to 3 decimal places, including:

- converting between miles and kilometres
- working out areas of shapes including triangles and parallelograms
- working out volumes of cubes and cuboids
- knowing and using a formula to work out areas and volumes of some shapes.

How to help at home

1. Practise converting between units of measurement: the most common metric units your child will need to convert between are:

- kilometres and metres
- centimetres and metres
- centimetres and millimetres
- grams and kilograms
- litres and millilitres.

They may also be asked to convert between metric and imperial units.

Length	Mass	Capacity
1 inch = 2.5cm 1 foot = 30cm 1 mile = 1.6km 5 miles = 8km	16 ounces = 1 pound 1 ounce = 25g 1 pound = 450g 2.2 pounds = 1kg	8 pints = 1 gallon 1 gallon = 4.5 litres 1 pint = 570ml

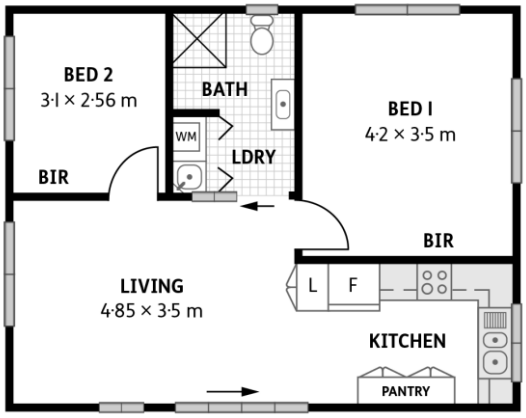
You can help your child practise conversions by making the most of real-life opportunities. For example, if you are travelling abroad and the distances are measured in kilometres, you could convert these to miles. Closer to home, think about how many miles it is to the shops and try to convert that into metres, or vice versa.

2. Bake: discuss which ingredients are measured in metric units and which are measured in imperial units. Can they convert between the two? For example, the recipe requires half a pound of butter. Can you convert this into grams? If 1 pound is equivalent to 450g, then half a pound will be equivalent to **225g**.

3. Explore area and perimeter

Your child will learn to measure and calculate the perimeter and area of rectangles and **composite rectilinear shapes**. Composite shapes are shapes that can be divided into more than one simple shape. Rectilinear shapes are shapes which only have straight sides and right angles.

Floor plans are great for showing how important measurement is in real-life situations. You could find floor plans for houses or flats online, and ask your child if they can work out the perimeter and area of particular rooms. For example, why not ask your child to calculate the quantity of carpet needed to cover the floor in each bedroom?
Once they are comfortable with the idea of a floor plan, you could encourage them to make a floor plan of their dream bedroom! Remind them to think carefully about the room's scale, and to use squared paper if needed.



4. Explore volume and capacity

- **Volume** means the amount of space occupied by a 3D shape. It is measured in cubed units like cm^3.
- **Capacity** means the amount a container can hold. Capacity is measured in units such as litres.

You can help your child get to grips with the different units used to measure volume by pointing them out in the real world. When you are at the swimming pool, ask your child whether its capacity is most likely to be measured in cubic millimetres, centimetres, metres, or kilometres, and discuss why.

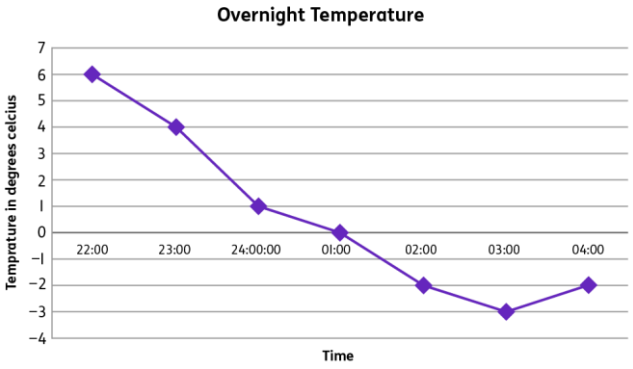
Statistics

In Year 6, children will interpret and present discrete and continuous data in a range of ways. This includes:

- connecting work on angles, circles, fractions, and percentages to make and interpret pie charts
- solving problems by interpreting and making line graphs
- calculating and interpreting mean averages.

How to help at home

1.Line graphs are used to show information that changes over time. Your child will use them to represent continuous data such as temperature, which can have an unlimited number of possible values within a selected range. Why not measure and record the daily temperature over a period of time? Ask your child to make predictions about what data they expect to collect. When you have collected the data, discuss what their graph may look like and then have a go. Remember, they may have to extend the scales on the graph to include negative numbers. As an example of what this might look like, here is a graph showing the overnight temperatures recorded between 10pm and 4am one evening during the winter:

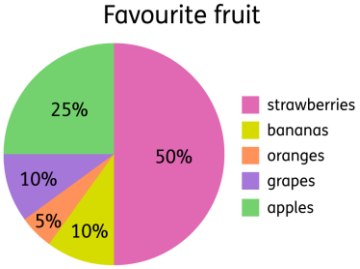


Once your child has created their graph, encourage them to ask and answer questions. For example: What was the highest and lowest temperatures and when did these occur? How much did the temperature fall between 11pm and 3am? How long did the temperature stay below zero? Can you estimate the temperature at 11.30pm?

2. A pie chart is a circular chart which is divided into sectors that represent parts of the total. Pie charts are used to represent discrete data (data that can only take certain values) and is used to show different sizes. At school, your child will use their understanding of circles to interpret pie charts, as well as understand how to calculate fractions from pie charts.
For example: In this pie chart, the blue section represents 42 people who took part in a survey. Can you find the total number of people who took part in the survey?

Looking at the pie chart, we can tell that a quarter of the pie represents 42 people.
Therefore, the whole pie chart represents four groups of 42, which is **168 people** (42 × 4).

Your child may need to interpret data from pie charts using percentages to represent each sector. In this pie chart, 200 people answered a survey asking about their favourite fruit:



How many people chose apples?
*25% of 200 people = **50 people***
How many more people voted for strawberry than apple?
*100 – 50 = **50 more people***
What was the total number of people who chose grapes, oranges, and strawberries?
*20 + 10 + 100 = **130 people***

Your child will also construct pie charts by finding the size of each sector in degrees and using a protractor to measure the angles accurately. They will know that angles in a circle total 360° and that this represents 100% of the data in a pie chart. For example, if a sector represents 50% of the pie chart, this is equivalent to 180°.

3. Find mean averages: the mean is one type of average. You can find the mean by adding together all values in a set of data, and then dividing your answer by the total number of values.
Try to explore this in real life. For example, you could investigate the mean number of goals per match your child's favourite football team has scored in the last ten matches. Here is an example:
The number of goals scored per match is: 3, 2, 0, 1, 2, 1, 3, 2, 2, 4. What are the mean average goals per match?
Find the total number of goals first: 3 + 2 + 0 + 1 + 2 + 1 + 3 + 2 + 2 + 4 = 20
Divide 20 (number of goals scored) by 10 (number of matches) to find the mean: **2 goals per match**

Alternatively, your child could work out the mean number of minutes it takes to walk to school over a week, or the mean temperature of a given week, or the mean score of their latest tests at school. There are all sorts of places the mean average can be really useful and interesting.

Ratio and proportion

In Year 6, your child will begin to learn about ratio and proportion, including:

- solving ratio problems using their knowledge of multiplication and division
- using their knowledge of percentages and circles to calculate angles of pie charts
- solving problems involving unequal sharing and grouping using their knowledge of fractions and multiples.

How to help at home

1. Explore ratio: the concept of ratio is used in many daily activities such as cooking, using maps, or reading scale drawings.
For example, a flapjack recipe requires 240g of oats. This makes 18 flapjacks. What quantity of oats is needed to make 24 flapjacks? The ratio 240:18 can be established, and used to come to the answer 320g.

While using ratios with your child, it is worth talking about the difference between **ratio** and **proportion**.

- **Ratio** tells us how much of one thing there is in relation to another thing. For example, 'For every 2 apples we have 3 bananas'.
- **Proportion** tells us about how much of one thing there is in relation to the *whole amount* of something. For example, 'There are 50 pieces of fruit, and 1 in every 5 of those is an apple.'

2. Find percentages in real life: ask what percentage of your child's class are girls? If there is 25% off the cost of something at the shops, how much money are you saving? Can you then subtract this to find out the new price?

3. Create some simple cards showing problems such as 15% of 300, then write the answers to the problems on other cards. Use the cards to play pairs or snap, or just challenge your child to find the correct answer to each problem from the answer pile.

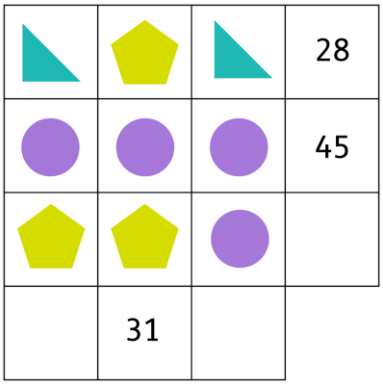
Algebra

In Year 6, your child will begin to learn about algebra, including:

- using simple formulae to solve problems
- generating and describing linear number sequences
- using letters to represent unknown numbers when solving number problems.

How to help at home

1. Practise basic algebra: your child will have solved lots of problems involving missing numbers at school. Before Year 6, the unknown number in a calculation will have been represented using a blank box or a question mark. This will now be replaced by a letter, like *a* or *b*. This letter represents the unknown number, also known as the variable.



There are lots of ways you could help your child solve problems where there are one or more variables. Try number puzzles such as this:

Each shape has a different value. The total value of the shapes in each column and row is shown at the end of the column or row. See if your child can work out the value of each shape and then work out the missing totals.

2. Play with sequences:

- Choose a sequence of five numbers. For example, start with 3 and write down the next four next terms in the sequence: 3, 6, 9, 12, 15. Can your child describe the number sequence? What is happening to the numbers in the sequence? In our example, the numbers are increasing by 3 each time, so there is a difference of 3 between each of the terms.
- Ask your child to predict the next few numbers. They should see that they just need to add three to get the next term. Therefore, the next two numbers in the sequence would be 18 (15 + 3) and then 21 (18 + 3). Can your child predict what the tenth number in the sequence would be? They could do this by adding on 3 ten times to reach 30.
- Encourage your child to look at the relationship between the position of each term (for example, the 3rd number in the sequence) and the value of that term (for example, 9). They could make a table to help them identify patterns and find a general rule:

Position of the term	Number in sequence
1	3
2	6
3	9
4	12
5	15
6	18
7	21
8	24
9	27
10	30

Because the number in the sequence is always the term multiplied by 3, this sequence can be written as the algebraic rule **3*n***.

- What is the 100th term? Iif we multiply the term number by 3, we will get the sequence number. For example, the 100th term would be 300 because 3 × 100 = 300.
- What is the 736th term?