

Year 6 – Becoming an ‘exceeding Mathematician’

We have put together the following guide to help our parents and carers support their children at home with Maths and help them become an ‘exceeding Mathematician’! An ‘exceeding Mathematician’ is a child that has mastered the content of their year group curriculum beyond that of the ‘expected’ standard. When assessing children in school, we have found that often children master the procedures and are fluent, but find applying the concepts more difficult.

A child working at ‘exceeding’ will be able to:

- access maths problems presented in a wide range of different, complex ways;
- be able to justify and prove their mathematical thinking when reasoning;
- Ask their own mathematical questions and follow their own lines of enquiry when exploring an open-ended maths problem.

One of the most important ways children can be supported is to encourage their reasoning about maths – can they explain why they think they have found the answer? Can they prove something is true or false? Can they say how things are similar/ different? Reasoning includes being able to explain verbally or in written form, using the correct mathematical vocabulary.

If a child is working at an ‘exceeding’ level in Maths they need to be able to complete most of the ‘exceeding’ statement this list and the ‘expected’ statements will be embedded. If you have any concerns about your child’s maths learning please book an appointment with their class teacher to discuss their maths level further.

Exceeding statements	How I can help at home...
<p>Number and Place Value: Demonstrate rapid recall of number facts and is able to use these fluently to generalise to obtain new facts using place value. Show very good understanding of place value and is able to apply this to working with larger numbers/decimals and in solving problems. Apply their understanding to solving increasingly complex problems, is able to reason and explain their thinking.</p>	<p>Discuss numbers in everyday contexts, including larger numbers up to 10 000 000 and decimals. Practice counting in multiples of 6, 7, 9, 11, 12, 25 and 1000, find 1000 more or less than a given number. Discuss the value of each digit in four, five, six and seven-digit numbers. Use thermometers and weather reports, also golf scores, to talk about negative numbers in context. Compare numbers – which is greater than/ less than? Estimate numbers – e.g. how many cornflakes are in the bowl? Practice rounding any number to the nearest 10, 100, 1000, 10 000 or 100 000. Also decimals to the nearest whole number, tenth or hundredth (2 decimal places). Encourage them to explain how they know using the correct language.</p>
<p>Addition and Subtraction: Demonstrate rapid recall of number facts and is able to use these fluently to generalise to obtain new facts. Show a wide repertoire of reliable and efficient of calculation strategies, both written and mental, that they are able to apply when solving problems. Make choices regarding choice of strategies and explain reasoning. Solve problems of increasing complexity using a range of strategies and is able to communicate their reasoning. Explain why different methods give the same result. Think creatively when problem solving and is able to justify and prove.</p>	<p>Practice adding and subtracting numbers mentally to encourage fluency (include adding and subtracting larger numbers – up to five-digits and calculations with missed operations). Encourage them to jot down their methods and talk about how they know they have the right answer. Practice adding and subtracting numbers with more than four digits and decimals, using formal written methods of column addition and subtraction. Encourage them to explain why they might need to carry for addition and borrow for subtraction. Using items around the house e.g. food packaging, numbers from newspapers, get children to make up word problems in context and solve them.</p>
<p>Multiplication and Division: Show rapid and fluent recall of all x facts to 12 x 12 and is able to use their knowledge to generate new facts and when working</p>	<p>Practice multiplication and division facts for multiplication tables to 12 x 12 and beyond. Practice multiplying four-digit and five-digit numbers by two-digit numbers using a formal written method.</p>

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<p>with larger numbers. Apply knowledge of factors, multiples, prime number, squares and commutativity to solving mental calculations of more complex problems. Show a clear understanding of the different structures of multiplication and division and the related vocabulary and is able to apply this to solving increasingly complex problems. Apply the knowledge of the inverse operation and the links between division and multiplication to solving problems.</p>	<p>Encourage them to jot down their methods and talk about how they know they have the right answer. Talk about what factors, multiples, prime numbers and square numbers are – try activities such as: find all the factors of 36 or 54; give 3 multiples of 4 greater than 24; give 3 prime numbers between 10 and 30; what are the square numbers to 12×12? Encourage them to use the inverse operations to check their calculations. Using items around the house e.g. food packaging, numbers from newspapers, get children to make up word problems in context and solve them.</p>
<p>Fractions: Apply knowledge of fractions to problems involving measures and shapes. Use their knowledge of decimals in problem involving measure to work with increased accuracy. Demonstrate a very good understanding of the connections between fractions decimals and percentages and is able to use their knowledge to translate between the three. Apply their knowledge of fractions, decimals and percentages to problems of increasing complexity and to explain their reasoning and thinking.</p>	<p>Discuss fractions related to everyday situations e.g. eating dinners/ snacks – if you have eaten $\frac{2}{5}$ of your snack how much do you have left? If I have 6 sweets and give away $\frac{3}{4}$ how many have I given away/ got left? Include questions about lengths and shapes. Practice adding and subtracting fractions with the same or different denominators [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]. Practice multiplying fractions, multiplying a fraction by a whole number and dividing fractions by whole numbers. Practice converting fractions to percentages and decimals. Practice dividing one- or two-digit numbers by 10, 100 and 1000 and encourage them to explain the effect and identify the value of the digits in the answer as ones, tenths & 100ths. Practice multiplying decimals with up to two decimal places by whole numbers. Practice rounding decimals with one decimal place to the nearest whole number, tenth or hundredth. Encourage them to explain how they know and why they use the method they used.</p>
<p>Ratio and Proportion and Algebra: Demonstrate a very good understanding of the connections between fractions, decimals and percentages, ratio and proportion and is able to use their knowledge to translate between the three. Apply their knowledge of ratio and proportion to problems of increasing complexity and to explain their reasoning and thinking. Use algebraic representation to illustrate relationships and patterns. Apply understanding of equivalence in calculation to solve problems with unknowns and more than one possibility. Use algebra to prove relationships and patterns. Explain the meaning of the mathematical notation.</p>	<p>https://www.theschoolrun.com/what-is-ratio https://www.theschoolrun.com/what-is-proportion</p> <p>These two web pages are good starting points for support with ratio and proportion. They give examples of problems to solve. Your child could then have a go at making up their own problems to solve. Encourage them to explain their thinking.</p> <p>Practice finding unknown quantities using algebraic expressions.</p> <p>https://www.theschoolrun.com/what-are-equations</p> <p>This web page has a good explanation and lots of examples.</p>
<p>Measures: Apply knowledge of other areas of the curriculum to their understanding of and problem solving with measures. E.g.</p>	<p>Cooking is one of the best ways to support measures – weighing ingredients and asking questions that encourage them to compare amounts. Look at packaging labels and ask questions such as: ‘What is this</p>

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<p>squares, cubes, fractions, multiplication decimals.</p> <p>Convert fluently and efficiently between different units of measures and be able to reason about the multiplicative relationship between related measures. Use their understanding of the concepts related to measures to solve increasingly complex problems.</p> <p>Communicate reasoning and talk about mathematics using sophisticated mathematical language.</p> <p>Apply knowledge of measures to other areas of the curriculum such as science.</p>	<p>amount in grams/ kilograms?’</p> <p>Practice converting mm to cm, cm to m, m to km, g to kg and vice versa etc.</p> <p>Practice converting miles to kilometres using the comparison 5 miles is approximately 8km. Do this when travelling to different places. Work out how many miles per litre of petrol.</p> <p>Relate to fractions and percentages by asking questions such as: ‘What would be half/ quarter/ three quarters of this amount?’</p> <p>Practice calculating the area and perimeter of squares, rectangles, parallelograms, triangles and compound shapes and the volume of containers.</p> <p>Encourage them to explain how they know and what did they did to convert one unit to another or to find half etc.</p>
<p>Properties of Shapes:</p> <p>Sort and classify shapes using a wide range of criterion using increasingly sophisticated mathematically appropriate vocabulary. Creatively apply knowledge of shapes to solving problems with increasing complexity and be able to justify reasoning and communicate their thinking. Make links and connections with other areas of the curriculum and be able to generalise their understanding.</p>	<p>Talk about objects at home and what shapes they are – encourage them to explain how they know using correct vocabulary (a list is available if needed). Especially look at triangles, quadrilaterals and 3D shapes. Dismantle packaging to look at the nets of different cubes, cuboids and prism.</p> <p>Encourage them to explain what is the same/ different about shapes. Discuss angles in shapes and the different types of angles. Encourage them to explain why an angle is acute/obtuse/right/reflex.</p> <p>Encourage them to compare the size of angles.</p> <p>Discuss the different parts of circles – radius (from the outside to the centre and half the diameter), diameter (from one side to the other, passing through the centre) and the circumference (distance around the outside).</p> <p>Get them to find examples of horizontal and vertical lines and pairs of perpendicular and parallel lines around the house.</p>
<p>Position and Movement:</p> <p>Solve increasingly complex problems involving position and movement. Apply knowledge and understanding of position and movement to other curriculum areas such as geography and science.</p>	<p>Use maps to find places using coordinates. Play coordinate based games, such as, Battleships.</p> <p>Encourage them to describe movements of a point or shape on a map as translations of a given unit to the left/right and up/down.</p> <p>Look at reflections and discuss how objects do not change when reflected.</p>
<p>Statistics:</p> <p>Use knowledge of data handling to pose hypothesis and answer questions through the analysis and interpretation of data. Draw conclusions based on data and be able to communicate reasoning. Be able to look for alternative explanations and hypothesis. Use understanding of statistics in other curriculum areas.</p>	<p>Look at tables on food labels and discuss them. Ask comparison questions such as, how many grams of salt are there compared to carbohydrate etc.</p> <p>Encourage them to explain how they know.</p> <p>Look at examples of graphs in newspapers etc (including line graphs and pie charts) and ask questions such as: How many more?’ and ‘How many fewer?’ ‘What do the ingredients show use about this type of food compared to this?’</p> <p>Practice finding the mode, median and mean of a set of data e.g. from newspapers, food packaging.</p> <p>Encourage them to explain how they know.</p>

Please do not feel compelled to complete all the suggestions all the time. Any support, however small, will help your child to make progress.