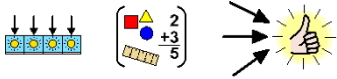# Maths

Level descriptors and home learning ideas

Helping your child get dressed, baking together, going to the shops, singing counting songs, building with blocks – practically every activity we do with our children involves maths.

Talking about numbers and counting everyday objects often will show that numbers are part of everyday life.
All we need to do is find the learning opportunities in these activities and we'll be helping them develop into happy and confident mathematicians!

Mathematical language

Mathematical language is all around us – words and expressions such as "bigger", "smaller", "shorter", "taller", "more than", "less than", "beside", "above", "below", "heavy", "light", etc. Using a variety of vocabulary helps children to develop a wide range of language and gain more confidence in the process.

Everyday maths opportunities:

At Home
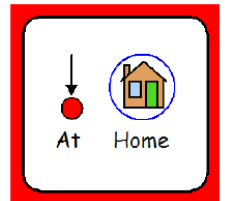
→ Count everyday objects together

→ Sing counting songs

→ Build, draw, and write numbers together

→ Play board games together

→ Solve practical problems. Work out "how many altogether", "how many more", etc.

→ Sort, organise and count collections of things like: clothes, toys, books, shells, rocks, birthday candles

→ Choose from a variety of materials of different shapes and sizes to use for play and solving problems

→ When talking about TV programs ask: What is the time? What time does the program start? Do we have enough time to do something else before it begins?

→ Gardening is a rich experience to practice measuring length (centimetres between seeds or plants, metres for rows or fences, etc. Area (square metres for planting, paths, or bricks) and volume (litres for liquid or cubic metres for bark and soil).

→ Stick the thermometer to the window outside to look at the temperature each day.

→ Gardening is about timing and planning. Keep track of what is happening in their garden on a calendar. Check the seed packet for the information about germination, harvesting etc.
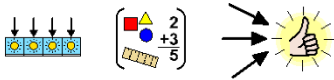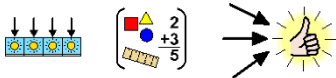
Everyday maths opportunities:

Going places

→ Point out numbers when out and about. For house numbers ask questions like: what number do you think the next house will be? Will it be an odd or even number?

→ Go on a Number or shape Hunt.

→ Count forward and backwards together as you walk up and downstairs

→ Pointing out numbers in magazines, books, signs, prices, packaging and number-plates - how these numbers help us to know how to find things, to know how much, to know how many and to know which one.

→ Be involved in making plans and designing their own constructions like houses, robots, sand castles

→ When travelling play games and ask questions like: Let's count all the blue cars we see on our way to, How long will it take to get there?

→ Count the seconds while waiting for the light to change, notice anywhere there is a clock along the way.

→ Notice all the signs that have pounds on them.

→ Choose a shape and find objects in that shape along the way. You can choose two dimensional-shapes (circles, squares, rectangles, triangles etc) or three-dimensional objects (boxes, balls, cones, pyramids).

→ Choose one colour of car to count on the way. On the way home or the next time choose a different one. Keep going for several trips. What colour seems to be the most common? The least common?

→ Look for clocks and schedules. Ask children to read the time, if it's a digital clock ask what it would look like on traditional clock, where would the hands be to make that time? If waiting for a bus ask children to read the schedule and tell you what time the next bus comes, what time does the last one come, is there a pattern for the bus times?

→ Time how long it takes to walk from one place to another

→   Count the amounts of each ingredient being used in recipes.

→   Count the numbers of items being made.

→   Count the cups or spoons required.

→   Count the cutlery when you are setting the table.

→   Make cookies or biscuits and explore the different types of shapes there are.

→   Explore all the different types of measurement including cups, teaspoons, tablespoons, millilitres, litres, grams, kilograms.

→   Equivalencies between measures such as 250 ml = 1 cup or 16 tablespoons = 1 cup or 1000g = 1 kg.

→   double and halve recipes, (or increase it by 3x, or 1 ½ x or 10x)

→   Explore fractions within the context of cooking (1/2, ¼, 1/3)

→   Explore the ratio of a recipe by changing it o make a bigger or smaller amount.

→   How much of each of the ingredients you will need and how much it will cost altogether. Compare prices.

→   Set the timer.

→ Look for clocks and schedules. Ask children to read the time, if it's a digital clock ask what it would look like on traditional clock, where would the hands be to make that time? If waiting for a bus ask children to read the schedule and tell you what time the next bus comes, what time does the last one come, is there a pattern for the bus times?

→ For improving counting and learning to recognise and name numbers the super market is a great place to practice.
   Can you get us 5 oranges?
   We need 2 cans of beans.
   How many juice boxes are in that packet?
   What number is this aisle?
   Can you find a five on this packet?

→ Draw their attention to prices. *This small packet of biscuits is £1.50. But this big one is £2. Which one should we get?*

→ Compare two amounts and use place value knowledge to know that you compare the pounds first and then the pence.

→ Use the product price information to compare prices based on units. For example, for pasta sauce look at the price per 100ml so you can compare different brands.

→ Practice estimation by rounding prices to the nearest pound and so it's easier to figure out how much for several items.

→ Let them pay and ask them to determine the change they'll get from the cashier.

→ Solve practical problems and practice multiplying and dividing. E.g. *The 1.5 l bottles of coke come in boxes of 12. How many litres are in a box? Each packet has 345g, how much does 10 packets weigh?*

Number & place Value

- Count to and across 10, forward and backward from any given number
- Count on in 2's with visual aids.
- Given a number, identify one more and one less to 10 (in a range of situations)
- Use ordinal numbers from 1st – 10th to describe position of objects, people and events
- Estimate a small number (up to 10) and checking by counting
- Recognise 'more' and 'less' when comparing objects in a group.
- I can read and write numbers from 1 to 5 in words and to 10 in numerals, including in a calculator.
- Subitise groups of items up to 5

Operations addition and subtraction

- Read and write with support mathematical statements involving addition (+), subtraction (−) and equals (=) signs.
- Combine 2 sets of objects to ten and count objects
- Use repeated addition to solve practical problems

Operations multiplication and division

- In practical situations share out groups of objects.

Fractions

- Recognise, find and name a half as one of two equal parts of an object or shape

Measurement
Compare, describe and solve practical problems for:
• lengths and heights (long/short, longer/shorter, tall/short, double/half)
• mass/weight (heavy/light, heavier than, lighter than)
• capacity and volume (full/empty, more than, less than, half, half full)
• time (quicker, slower, earlier, later)
Measure and begin to record the following:
• lengths and heights;
• mass/weight;
• capacity and volume;
• Recognise and know the value of different denominations of coins and notes, recognise and use symbols for pounds (£) and pence (p);
• Solve simple problems in a practical context involving addition and subtraction of whole pounds.
• Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening].
• Starting to recognise and use language relating to dates, including days of the week
• Tell the time to the hour and draw the hands on a clock face. *To use analogue and digital clocks.*

Geometry: Properties of Shapes
Recognise and name common 2-D and 3-D shapes (triangle, square, rectangle, circle) (cuboid, cube, cylinder , sphere and cone)
Geometry: Position & Direction
• Respond to positional language in practical situations.
• Show understanding of prepositions such (on, in, under, on top), and talk about it.
• Continue simple patterns using pictorial representations
Statistics
• Sort and classify objects using one or two simple criteria (boy/girl, thick/thin)
• Collect and sort simple data into tally charts, block diagrams, Venn and Carroll diagram.

Ruby	Sapphire	Pearl	Silver	Gold	Emerald	Jet	Diamond

Number & place Value

- Join in rote counting to 50 and count to and across 20 forwards and backwards.
- Count in multiples of 2
- Given a number, identify one more and one less to 20 (in a range of situations)
- Use ordinal numbers in descending position of objects, people and events (1st – 10th)
- Estimate a small number (up to 20) and checking by counting
- Recognise 'most' and 'least' when identifying numerals
- Read and write numbers 1-10 in words and to 20 in numerals, including in the calculator
- Subitise groups of items up to 10

Operations addition and subtraction

- Demonstrate an understanding of the mathematical symbols (+) (–) (=).
- Recognise and use the mathematical signs (+) (-) (=) in a calculator
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations.
- Recall number bonds to and within 5
- Demonstrate understanding of the commutative law *(3+2=5/2+3=5)*

Operations multiplication and division

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete and pictorial objects, with the support of the teacher. *(grouping and sharing)*

Fractions

- Recognise, find and name a quarter as one of four equal parts of an object or shape

Measurement
Start to use standard metric units to measure to the nearest appropriate unit and read scales in divisions of 1's and 2's.   • length (m/cm);
• mass (kg/g);
• Capacity (litres/ml).
• Combine amounts to make a particular value using 1p, 2p, 5p and 10p
• Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. (whole pounds up to £10)
• Recognise and use language relating to dates, including days of the week, months and years with support
• Tell the time to half past the hour and draw the hands on a clock face. *To use analogue and digital clocks.*

Geometry: Properties of Shapes
• Name, identify and describe the properties of 2-D shapes, including the number of sides (pentagon, hexagon, oval and semicircle)
• Name, identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces (prims and pyramids)
• Identify 2-D shapes on the surface of 3-D shapes *[ie. a circle on a cylinder and a triangle on a pyramid].*
• Compare and sort common 2-D and 3-D shapes and everyday objects
Geometry: Position & Direction
• Order and arrange combinations of mathematical objects in patterns and sequences.
• Describe direction (forward, backward)
Statistics
• Interpret and construct simple pictograms, Carroll diagram, tally charts, and block diagrams
• Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.
• Ask and answer questions about totalling and comparing categorical data

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Number & place Value

- Count to and across to 100, forwards and backwards, beginning with 0, 1 or any given number.
- Count in multiples of 2, 5 and 10
- Given a number (0-100) identify one more and one less.
- Use ordinal numbers (1st – 20th) in descending position of objects, people and events
- Compare and order numbers from 0 up to 50; use <, > and = signs.
- Estimate a small number (up to 50) and checking by counting
- Use the language form most to least, and equal to, more than, less than.
- Partitioning 2 digit numbers into 10's and 1's using structured resources (e.g. Base ten and abacus)

Operations addition and subtraction

- Use a calculator to add and subtract small numbers to 100.
- Represent and use number bonds and related subtraction facts to 10
- Add and subtract 10 and 0 to a number
- Demonstrate an understanding of inverse relationship involving addition and subtraction
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ⬚ – 9.

Operations multiplication and division

- Solve one-step problems involving multiplication, by calculating the answer using arrays and a calculator.
- Solve one-step problems involving division, by calculating the answer using arrays with the support of the teacher and a calculator.

Fractions

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

| **Measurement** |
|---|
| Read scales in divisions of 5's and 10's and use standard metric units to measure to the nearest appropriate unit, using rulers, scales, thermometer and measuring vessels:
• lengths (m/cm/mm);
• mass (kg/g);
• Volume/capacity (l/ml). |
| • Temperature (°C) – *only positive numbers* |
| • Record the results for lengths, mass, temperature and capacity. |
| • Combine amounts to make a particular value using 1p, 2p, 5p, 10p and 20p |
| • Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. |
| • Tell and write the time to quarter past/to the hour and draw the hands on a clock face to show these times. To use analogue and digital clocks. |
| • Know the number of minutes in an hour, number of hours in a day and months |
| • Read and extract information from a timetable. |
| • Read dates written in different formats (i.e. food packages) |

Geometry: Properties of Shapes
• Name, identify and describe the properties of 2-D shapes, including the number of sides, (heptagon, octagon and nonagon)
• Name, identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces (prims and pyramids)
• Recognize lines of symmetry in simple 2D shapes

Geometry: Position & Direction
• Order and arrange combinations of mathematical objects in patterns and sequences.
• Give directions (left, right, forward, backward) and describe movement (whole turn and half turn)

Statistics
• Interpret and present data using bar charts, pictograms and tables.
• Solve one-step and two-step questions [e.i., 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

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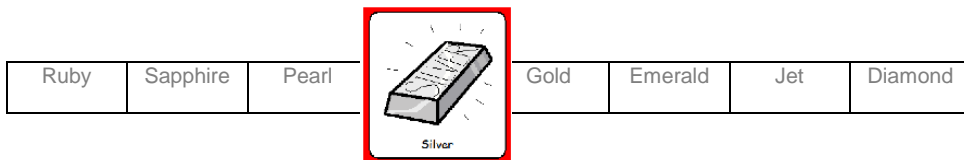
Number & place Value

- Count in steps of 3 and 100 from any number, forward and backward.
- Find 10 more or less than given number.
- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).
- Compare and order numbers from 0 up to 100; use <, > and = signs.
- Read and write numbers to at least 100 in numerals and in words.
- Estimate up to 100 and checking by counting

Operations addition and subtraction

Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones;
- a two-digit number and tens;

Recall and use addition and subtraction facts to 20 fluently

Solve problems with addition and subtraction:

- Using concrete objects and pictorial representations, including those involving numbers, quantities and measures;
- Applying their increasing knowledge of mental and written methods and use a calculator.

Operations multiplication and division

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables,
- Recognise odd and even numbers.
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.
- Recognize the mathematical signs (×) (÷) (=) in a calculator

Fractions

- Recognise, find, name and write fractions 1/3, 1/4, 2/4, and 3/4 of a length, shape, set of objects or quantity.

Measurement
Choose and use appropriate standard units to measure to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels:
• length/height in any direction (m/cm);
• mass (kg/g);
• temperature (°C); *only positive numbers*
• Capacity (l/ml).
• Compare and order lengths, mass, volume/capacity and record the results using >, < and =.
• Combine amounts to make a particular value up to £1.
• Find different combinations of coins that equal the same amounts of money.
• Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
• Tell and write the time to five minutes and draw the hands on a clock face to show these times. To use analogue and digital clocks.

| **Geometry: Properties of Shapes** |
| --- |
| • Name, identify and describe the properties of 2-D shapes, including symmetry in a vertical line and right angles. |
| • Name, identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces |
| • Recognize the nets of common 3D shapes. |
| **Geometry: Position & Direction** |
| • Order and arrange combinations of mathematical objects in patterns and sequences. |
| • Complete a simple symmetric figure with respect to a specific line of symmetry. |
| • Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise). |
| **Statistics** |
| • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, simple pie charts, and tables. |
| • Start to read and interpret line graphs and pie charts |

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				Gold			
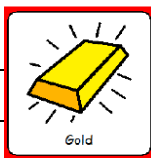
Number & place Value

- Find 100 more or less than given number.
- Count from 0 in multiples of 4
- Compare order and recognise the place value of each digit in a four-digit number and partition
- Partition any 2 digit number into different combinations of 10's and 1's explaining their thinking (verbally, in pictures or using apparatus)
- Compare and order numbers from 0 up to 1000; use <, > and = signs.
- Use place value and number facts to solve problems.
- Round any number to the nearest 10

Operations addition and subtraction

- Near doubles (6+7=6+6+1)

Recall and use addition and subtraction facts:

Add and subtract numbers using written and mental strategies, including:

- two two-digit numbers;
- a three-digit numbers and ones.
- 3 one-digit numbers.

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations.

Operations multiplication and division

- Recall and use multiplication and division facts for the 3 and 4 multiplication tables.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Fractions

- Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2.

Measurement
Measure, Estimate, Compare, Add and Subtract:
•   lengths (m/cm/mm);
•   mass (kg/g);
•   temperature (°C); *only positive numbers*
•   Volume/Capacity (l/ml).
• Add and subtract amounts of money to give change, using both £ and p in practical contexts.
• Use different coins to make the same amount
Tell and write the time from:
•   An analogue clock and 12-hour and 24-hour clocks;
•   Compare and sequence intervals of time.
•   Use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight.
•   Know the number of seconds in a minute and the number of days in each month, year and leap year
•   Compare durations of events *[ie. to calculate the time taken by particular events or tasks]*.

Geometry: Properties of Shapes
•   Draw 2-D shapes and make 3-D shapes using modelling materials.
•   Recognise 3-D shapes in different orientations and describe them.
•   Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.
•   Complete complex symmetric figures with respect to a specific line of symmetry.
•   Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
Statistics
•   Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
•   Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and line graphs.
•   Interpret simple pie charts and line graphs.

Ruby	Sapphire	Pearl	Silver	Gold	Emerald	Jet	Diamond

Number & place Value
• Count from 0 in multiples of 8, 50 and 100;
• Find 100 or 1000 more or less than a given number.
• Round any number to the nearest 10, 100
• Count backward from zero to include negative numbers
• Solve number problems and practical problems involving these ideas
Operations addition and subtraction
Add and subtract numbers mentally, including:
• a three-digit number and tens;
• a three-digit number and hundreds.
Add and subtract numbers with up to three digits, using a calculator.
Estimate the answer to a calculation and use inverse operations to check answers.
Operations multiplication and division
• Recall and use multiplication and division facts for the 8 multiplication table.
• Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
• Solve problems, including all the above (include the use of a calculator)
Fractions
• Count up and down in tenths, recognise the tenths rise from diving an object into 10 equal parts and in diving into 10 equal parts
• Compare and order unit fractions, and fractions with the same denominators.
• Solve problems that involve all of the above.

Measurement
Measure, Estimate, Compare, Add and Subtract: temperature (°C); *use positive and negative numbers*
• Convert between different units of measure *[i.e. kilometre to metre; hour to minute]*.
• Measure the perimeter of simple 2-D shapes.
• Estimate, compare and calculate different measures, including money in pounds and pence.
• Read, write and convert time between analogue and digital 12- and 24-hour clocks.
• Estimate and read time with increasing accuracy to the nearest minute.
• Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

Geometry: Properties of Shapes
• Recognise angles as a property of shape or a description of a turn.
• Identify lines of symmetry in 2-D shapes presented in different orientations.
• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and size.
• Identify acute and obtuse angles.
• Measure angles in degrees (°).
Geometry: Position & Direction
• Describe positions on a 2-D grid as coordinates in the first quadrant.
• Describe movements between positions as translations of a given unit to the left/right and up/down.
• Plot specified points and draw sides to complete a given polygon.
Statistics
• Complete, read and interpret information in tables, including timetables.
• Interpret and construct pie charts and line graphs and use these to solve simple problems
• Read and interpret information in tables, including timetables.

Ruby	Sapphire	Pearl	Silver	Gold	Emerald	Jet	Diamond

Number & place Value
• Read roman numerals to 100 (C)
• Count in multiples of 6, 7, 9, 25, 1000.
• Round any number to the nearest 1000
• Interpret negative numbers in context.
• Count backward and forward with positive and negative numbers
• Solve number problems and practical problems involving these ideas
Operations addition and subtraction
• Compare numbers with the same number of decimal places up to 2 decimal places.
• Solve addition and subtraction 2-step problems in contexts, deciding which operations and methods to use and why.
Operations multiplication and division
• Solve problems involving multiplication and division, deciding which operations and methods to use and why.
Fractions and decimals
• Solve money and measure problems involving fractions and decimals
• Add and subtract fractions with the same denominator within one whole *[for example, 5/7 + 1/7 = 6/7]*.
• Round decimals with one decimal place to the nearest whole number

Measurement
• Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.
• Find the area of rectilinear shapes by counting squares.
• Tell and write time from an analogue clock, including using Roman numerals from I to XII.
• Estimate and read time with increasing accuracy to the nearest minute.
• Record and compare time in terms of seconds, minutes and hours
• Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).

| Geometry: Properties of Shapes |
|---|
| • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. |
| • Identify, estimate and measure acute, obtuse and reflex angles |
| • Draw given angles, and measure them in degrees (°) |
| **Geometry: Position & Direction** |
| • Represent the position of a shape following a reflection or translation |
| **Statistics** |
| • Interpret and construct pie charts and line graphs and use these to solve problems. |
| • Calculate and interpret the Mode, Median. Mean and Range |

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Diamond
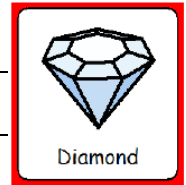
Number & place Value

- Find 1000 more or less than a given number
- Order and compare numbers beyond 1000
- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Solve number problems and practical problems that involve all of the above

Operations addition and subtraction

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
- Add and subtract numbers mentally
- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Operations multiplication and division

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Fractions and decimals

- Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Solve problems that involve all of the above.

Measurement
• Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
• Measure and compare the area of rectangles (including squares), and including the using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of regular shapes.
• Solve problems involving converting between units of time.
• Use all 4 operations to solve problems involving measure.

Geometry: Properties of Shapes
• Use the properties of rectangles to deduce related facts and find missing lengths and angles
• Distinguish between regular and irregular polygons on reasoning about equal sides and angles.
Geometry: Position & 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.

Success in maths
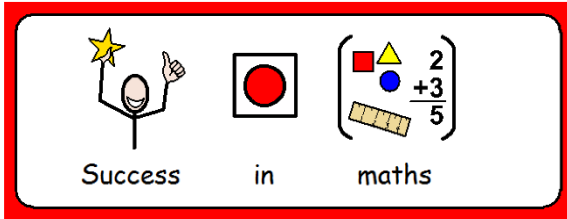
→ Talk to your children about everyday maths

→ Play games with them

→ Value mistakes as learning opportunities

→ Recognise that there is more than one way to work

things out

→ Praise children for effort over outcome

→ Avoid saying things like "I'm useless at maths"

online   maths   games

Mathseeds

MATHSFRAME.CO.UK

Mathletics

Topmarks

BBC Bitesize

nrich
enriching mathematics

www.oxfordowl.co.uk

Math Playground

ict games

IXL

SplashLearn

Crickweb