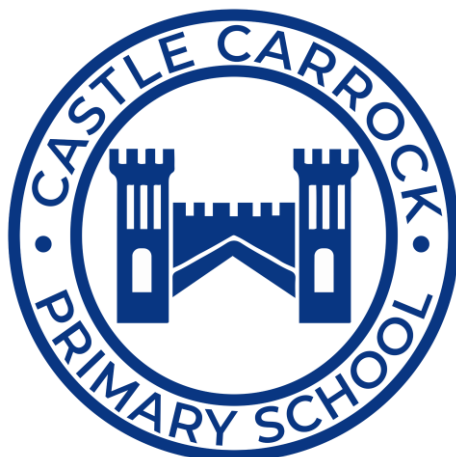


**Maths Foundational
Knowledge
Castle Carrock
Primary School**



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Foundational knowledge in Mathematics EYFS

In the Early Years Foundation Stage (EYFS) of mathematics, children begin to develop foundational mathematical skills that will support their learning in later stages. EYFS maths focuses on building a strong number sense, understanding of shapes, patterns, and the early stages of measurement and data handling.

In EYFS, the focus is on providing children with opportunities to explore and experiment with mathematical concepts in a practical, engaging, and hands-on way. This early mathematical experience helps lay the groundwork for more structured learning in later stages of their education.

Here's an outline of the key areas of foundational knowledge for each group within EYFS:

Nursery (Age 3-4)

In Nursery, the focus is on building a foundation for number sense and exploring basic mathematical concepts through play, practical activities, and interaction with their environment.

1. Number and Counting:

- **Counting Objects:** Counting objects one by one and understanding that each object is counted once.
- **Number Recognition:** Beginning to recognize and name numbers up to 10.
- **Understanding the Concept of "More" and "Less":** Developing a basic understanding of "more," "less," and "same."

2. Simple Addition and Subtraction (Early Concepts):

- **Practical Addition:** Starting to explore basic addition through real-life situations (e.g., "I have one apple, now I have two apples").
- **Simple Subtraction:** Beginning to understand subtraction by taking away objects (e.g., "I had three blocks, now I have two blocks").

3. Patterns:

- **Identifying Simple Patterns:** Recognising and repeating simple patterns (e.g., red, blue, red, blue).

- **Creating Simple Patterns:** Creating patterns with objects (e.g., arranging coloured blocks in a repeating sequence).

4. Shape and Space (Geometry):

- **Recognising Shapes:** Exploring and naming basic shapes like circles, squares, and triangles through play-based activities (e.g., puzzles or sorting activities).
- **Exploring 3D Shapes:** Introducing 3D shapes in play (e.g., cubes, spheres) and discussing their characteristics (e.g., a cube has square faces).
- **Exploring Positional Language:** Using language to describe where objects are in relation to others (e.g., "under the table," "next to the chair").

5. Measurement:

- **Comparing Sizes:** Comparing objects by size using terms like "big," "small," "tall," and "short."
- **Exploring Capacity:** Understanding the concept of full and empty through hands-on activities like pouring and filling containers.
- **Introducing Time Concepts:** Developing a basic understanding of daily routines and sequences of events.

6. Data Handling (Statistics):

- **Sorting Objects:** Sorting objects by colour, size, or shape.
- **Using Simple Language to Compare Quantities:** Using terms like "more" and "less" when comparing sets of objects.

Reception (Age 4-5)

At this stage, the focus is on introducing children to key mathematical concepts in a hands-on, practical way, often through play-based learning.

1. Number and Place Value:

- **Counting:** Children should be able to count to 20 and beyond, both forwards and backwards.
- **Number Recognition:** Recognising and writing numbers up to 20.

- **One-to-One Correspondence:** Understanding that each number represents a specific quantity (e.g., counting 5 objects and recognising that the fifth object corresponds to the number "5").
- **Comparing Numbers:** Comparing quantities using the terms "more than," "less than," and "equal to." This includes matching and ordering numbers.
- **Number Bonds:** Understanding basic number bonds (pairs of numbers that make a total of 10, for example).

2. Addition and Subtraction:

- **Simple Addition and Subtraction:** Understanding and solving basic addition and subtraction problems within 10 (e.g., $3 + 2 = 5$, $5 - 3 = 2$) using concrete objects, number lines, or fingers.
- **Using Language for Operations:** Using terms like "add," "take away," "plus," "minus," and "equals."

3. Patterns:

- **Recognising and Creating Patterns:** Identifying and creating repeating patterns (e.g., red, blue, red, blue) with objects, shapes, and sounds.
- **Describing Patterns:** Using language to describe patterns, such as "alternating," "next," and "same."

4. Shape and Space (Geometry):

- **Recognising 2D Shapes:** Identifying and naming basic 2D shapes like circles, squares, triangles, rectangles, and stars.
- **Recognising 3D Shapes:** Identifying and naming basic 3D shapes like cubes, spheres, cones, cylinders, and pyramids.
- **Exploring Shape Properties:** Understanding that shapes have specific properties (e.g., a square has four equal sides).
- **Spatial Awareness:** Understanding positional language such as "in," "on," "under," "next to," "behind," and "between."

5. Measurement:

- **Size and Length:** Comparing objects by size (e.g., longer, shorter, taller, smaller) and using non-standard units of measurement (e.g., comparing the length of objects using paper clips or blocks).

- **Weight and Capacity:** Comparing objects by weight and capacity (e.g., heavier, lighter, more, less).
- **Time:** Developing an understanding of basic time concepts, such as Recognising daily routines (e.g., morning, afternoon, evening) and understanding the terms "today," "tomorrow," and "yesterday."

6. Data Handling (Statistics):

- **Sorting and Classifying:** Sorting objects into groups by one attribute (e.g., colour, shape, size).
- **Simple Graphs:** Introducing basic concepts of data collection, such as creating simple pictograms or bar charts to represent a small set of data (e.g., favourite fruit).

Summary of Key Foundational Knowledge for EYFS

Maths:

- **Number Sense:** Recognition of numbers, counting, and understanding basic concepts like "more" and "less."
- **Addition and Subtraction:** Beginning to explore simple addition and subtraction through practical activities and play.
- **Patterns:** Recognising, creating, and describing simple patterns in everyday contexts.
- **Shape and Geometry:** Exploring basic 2D and 3D shapes, their properties, and positional language.
- **Measurement:** Introducing early concepts of measurement like size, weight, capacity, and time through hands-on exploration.
- **Data Handling:** Sorting and classifying objects and introducing basic data representation using pictorial methods.

Foundational knowledge in Mathematics Key Stage 1

In Key Stage 1 (KS1) mathematics, students develop fundamental skills that set the stage for more complex concepts in Key Stage 2 (KS2). The curriculum focuses on building number sense, basic operations, and an understanding of shapes, measurements, and simple data.

Here's a breakdown of the foundational knowledge for each year group within KS1 (Years 1 and 2):

Year 1 (Age 5–6)

1. Number and Place Value:

- Recognising and reading numbers up to 100.
- Understanding the concept of place value (tens and ones) for numbers up to 20.
- Counting forward and backward in steps of 1, 2, 5, and 10.
- Comparing and ordering numbers up to 20 (using terms like "greater than," "less than," and "equal to").

2. Addition and Subtraction:

- Using concrete objects and pictorial representations to represent and solve simple addition and subtraction problems within 20.
- Understanding and applying addition and subtraction facts to 20 (e.g., $5 + 3 = 8$, $12 - 4 = 8$).
- Solving one-step addition and subtraction problems using mental strategies and written methods (e.g., number lines).

3. Multiplication and Division:

- Understanding the concept of multiplication as repeated addition (e.g., $2 + 2 + 2 = 6$ or $3 \times 2 = 6$).
- Learning simple division as sharing (e.g., $6 \div 2 = 3$).
- Recognising and using the 2-, 5-, and 10-times tables.

4. Fractions:

- Recognising and finding half and quarter of shapes and objects.
- Understanding simple fractions ($1/2$, $1/4$) in the context of everyday situations.

5. Measurement:

- Comparing and ordering objects by length, weight, and capacity.
- Using standard units of measurement (e.g., cm, kg, l) to describe and measure objects.
- Understanding and telling the time to the hour and half hour (using both digital and analogue clocks).
- Using terms like "full," "empty," "heavy," and "light" in real-life contexts.

6. Geometry:

- Recognising and naming common 2D shapes (e.g., circle, square, triangle, rectangle) and understanding their properties (e.g., number of sides, angles).
- Recognising and naming simple 3D shapes (e.g., cube, sphere, cylinder).
- Describing the position of objects using language such as "next to," "behind," and "in front of."

7. Statistics:

- Sorting and grouping objects based on their properties.
- Representing data using simple pictograms and tally charts.
- Interpreting basic graphs and answering simple questions based on the data.

Year 2 (Age 6–7)

1. Number and Place Value:

- Recognising, reading, and writing numbers up to 100.
- Understanding the place value of digits in two-digit numbers (tens and ones).

- Comparing and ordering numbers up to 100, using terms like "greater than," "less than," and "equal to."
- Counting in steps of 2, 3, 5, and 10 forwards and backwards.

2. Addition and Subtraction:

- Adding and subtracting numbers up to 100 using a variety of methods (e.g., number lines, column addition, mental strategies).
- Solving one- and two-step addition and subtraction problems.
- Understanding and using the inverse relationship between addition and subtraction.

3. Multiplication and Division:

- Recalling and using multiplication facts for the 2-, 5-, and 10-times tables.
- Solving simple multiplication and division problems, including grouping and sharing (e.g., $4 \times 3 = 12$, $12 \div 3 = 4$).
- Understanding and applying the concept of division as sharing and grouping.

4. Fractions:

- Recognising, finding, and writing simple fractions (e.g., $1/2$, $1/4$, $3/4$) of shapes, numbers, and quantities.
- Understanding equivalent fractions in simple cases (e.g., $1/2 = 2/4$).

5. Measurement:

- Comparing, measuring, and estimating lengths, mass, capacity, and time.
- Using standard units of measurement (e.g., cm, m, g, kg, l).
- Telling the time to the nearest 5 minutes using both analogue and digital clocks.
- Understanding the concepts of "before" and "after" in the context of time.
- Using money (e.g., understanding coins, making simple amounts of change).

6. Geometry:

- Recognising and naming 2D and 3D shapes and understanding their properties (e.g., sides, corners, edges).
- Understanding and describing symmetry in shapes.
- Sorting and classifying shapes based on their properties (e.g., number of sides, symmetry).
- Using positional language to describe the location of objects.

7. Statistics:

- Collecting and sorting data into categories.
- Representing data using pictograms, bar charts, and tally charts.
- Interpreting simple graphs and answering questions based on the data.

Summary of Key Foundational Knowledge:

- **Number Sense:** A solid grasp of number recognition, counting, and understanding the value of digits in numbers.
- **Basic Arithmetic:** Mastery of simple addition, subtraction, multiplication, and division.
- **Measurement:** A basic understanding of measurement concepts, including length, weight, and time.
- **Shapes and Geometry:** Recognition and description of 2D and 3D shapes, along with understanding their properties.
- **Fractions:** Introduction to the idea of fractions and simple operations involving them.
- **Data Handling:** Introduction to collecting, sorting, and interpreting data in pictorial forms.

By the end of KS1, students should have a good foundation in these areas, enabling them to progress confidently to the more advanced concepts in KS2.

Foundational knowledge in Mathematics Key Stage 2

In Key Stage 2 (KS2) mathematics, students build on foundational knowledge they acquired in Key Stage 1 (KS1). The curriculum is structured into several key areas, and each group (or year) has specific foundational knowledge that sets the stage for more complex topics.

Here's a breakdown of the essential foundational knowledge needed for each group within KS2 maths:

Year 3 (Age 7–8)

1. Number and Place Value:

- Understanding of numbers up to 1,000.
- Identifying place value of digits in 3-digit numbers.
- Ordering and comparing numbers.
- Understanding and applying the concept of partitioning numbers.

2. Addition and Subtraction:

- Adding and subtracting numbers up to 1,000, including crossing boundaries (e.g., $999 + 7$).
- Using mental and column methods for addition and subtraction.

3. Multiplication and Division:

- Understanding and applying multiplication facts for 3-, 4-, 6-, and 8-times tables.
- Using the inverse relationship between multiplication and division.
- Dividing numbers up to 1,000 using written methods.

4. Fractions:

- Recognising and using fractions, including unit fractions (e.g., $1/2$, $1/3$) and simple fractions (e.g., $2/3$, $3/4$).
- Understanding equivalent fractions.

5. Measurement:

- Measuring and comparing lengths, masses, and volumes using appropriate units (cm, m, kg, l).
- Understanding perimeter and calculating the perimeter of simple shapes.

6. Geometry:

- Recognising and classifying 2D shapes (e.g., triangles, quadrilaterals, circles).
- Understanding properties of 3D shapes (e.g., cubes, spheres, cylinders).
- Understanding symmetry and simple transformations (e.g., reflections).

7. Statistics:

- Interpreting and presenting data in simple bar charts and pictograms.

Year 4 (Age 8–9)

1. Number and Place Value:

- Understanding of numbers up to 10,000.
- Rounding numbers to the nearest 10, 100, and 1,000.

2. Addition and Subtraction:

- Adding and subtracting numbers up to 4 digits using column methods.
- Solving word problems involving addition and subtraction.

3. Multiplication and Division:

- Mastery of times tables up to 12×12 .
- Using long multiplication and division methods for 2-digit numbers.

4. Fractions:

- Understanding fractions greater than 1 (e.g., $\frac{5}{4}$, $\frac{7}{3}$).
- Simplifying fractions.
- Adding and subtracting fractions with the same denominator.
- Understanding mixed numbers and improper fractions.

5. Measurement:

- Converting between different units of measurement (e.g., cm to m, kg to g).
- Calculating area and perimeter of rectangles.

6. Geometry:

- Understanding angles (acute, obtuse, right angles).
- Recognising and classifying 2D shapes by their properties (e.g., number of sides, symmetry).

7. Statistics:

- Interpreting and constructing bar charts, line graphs, and pictograms.
- Calculating the mean, mode, median, and range from a set of data.

Year 5 (Age 9–10)

1. Number and Place Value:

- Understanding numbers up to 1,000,000 and rounding to the nearest 10, 100, 1,000, and 10,000.
- Recognising the value of digits in numbers up to 6 digits.

2. Addition and Subtraction:

- Solving multi-step addition and subtraction problems.
- Using column methods for large numbers.

3. Multiplication and Division:

- Multiplying and dividing larger numbers (up to 4 digits) using long multiplication and long division.
- Understanding factors, multiples, prime numbers, and square numbers.

4. Fractions:

- Comparing, ordering, adding, and subtracting fractions with different denominators.
- Converting between improper fractions and mixed numbers.
- Multiplying and dividing fractions by whole numbers.

5. Measurement:

- Converting units of measurement (e.g., miles to km, hours to minutes).

- Calculating volume, area, and perimeter of more complex shapes (e.g., triangles, parallelograms).
- Solving problems involving time, including converting between 12-hour and 24-hour clocks.

6. Geometry:

- Identifying and classifying 3D shapes (e.g., pyramids, prisms).
- Understanding properties of angles and measuring angles in degrees.
- Recognising and drawing symmetrical shapes.

7. Statistics:

- Interpreting and creating more complex graphs (e.g., line graphs, pie charts).
- Analysing data to find averages (mean, median, mode).

Year 6 (Age 10–11)

1. Number and Place Value:

- Mastery of number operations with whole numbers up to 10,000,000.
- Rounding numbers to the nearest 10, 100, 1,000, 10,000, and 100,000.

2. Addition and Subtraction:

- Solving complex problems involving multiple operations.
- Using mental and written methods for addition and subtraction of large numbers.

3. Multiplication and Division:

- Mastery of multiplication and division of large numbers, including using long multiplication and division methods.
- Solving problems involving multiples, factors, and prime numbers.

4. Fractions:

- Simplifying fractions and finding equivalent fractions.
- Performing operations (addition, subtraction, multiplication, division) with fractions and mixed numbers.
- Converting fractions, decimals, and percentages.

5. Measurement:

- Solving complex problems involving area, perimeter, volume, and capacity.
- Converting between different units of measurement (e.g., cm^2 to m^2 , grams to kilograms).

6. Geometry:

- Understanding the properties of angles and measuring angles using protractors.
- Identifying and describing 3D shapes, including their nets.

7. Statistics:

- Interpreting and constructing a range of graphs (bar charts, line graphs, pie charts).
- Analysing and comparing data sets.
- Calculating mean, median, mode, and range in context.

Summary of Key Foundational Knowledge:

- **Number Operations:** Solid understanding of basic arithmetic operations (addition, subtraction, multiplication, division) and their applications.
- **Place Value:** Mastery of number place value to ensure correct understanding of larger numbers.
- **Fractions:** A deepening understanding of fractions, including equivalence, simplifying, and performing operations with fractions.
- **Measurement:** Accurate conversion between units and solving real-world measurement problems.
- **Geometry:** A developing understanding of shape properties, angles, symmetry, and transformations.
- **Statistics:** Collecting, organizing, and interpreting data, with a focus on average and graphical representations.

By the end of KS2, students should be proficient in all these areas, laying the foundation for the more complex mathematics they will encounter in Key Stage 3.