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| **Numbers and the number system**  **Expected expectations**   * **Count reliably with numbers 1-20.** * **Place these numbers in order** * **Say one more and one less than a given number** | |
| **Themes**   * Cardinality * Subitising * Conservation of number * Nominal values * 1-1 correspondence * Concept of 0 | **Key learning points**   * Recite numbers to 10, then 20 * Say and use number names in rhymes and stories * Count up to 10 moveable objects * Count out 10, then 20 objects from a larger quantity * Match numerals to numbers of objects in a set * Count 10, then 20 objects that cannot be moved * Understand 0 * Counting back from 10, then 20 * Count actions or sounds * Estimate objects in a set and check by counting * Order numbers to 10, then 20, ascending then descending * Understand one more than a given number * Understand one less than a given number * Begin counting at 10 * Partition numbers into tens and ones * Notice and extend number patterns |
| **Mathematical language**   * Number names (one, two, three… eleven twelve thirteen etc) * None * How many * Count on (to or from), count up (to), count back (to or from) * Count in ones, twos, fives and tens * Is the same as, equals, balances, as many as * More, larger, bigger, greater, biggest, most * Less, fewer, smaller, smallest, least * Odd, even * Pattern * Ones, tens, digits * Compare, order, size * 1st, 2nd, 3rd, last, before, after, next, between * Guess, estimate, nearly, close to, about, just over, just under, too many, too few, enough, not enough | **Pedagogical notes**   * Distinction between fewer (countable objects) and less (mass or abstract) * Zero to express nothing - symbol 0 * Subitising - recognising a small number without counting * Moveable objects first to ensure 1-1 correspondence, then objects that cannot be moved in an irregular arrangement * Last number spoken is the amount in the set * Cardinality |
| **Reasoning and probing questions**   * How many \_\_\_? Is it still the same if i spread them out? How do you know? * Make mistakes e.g. missing one out, say a number more than once, say the next number after the final object * What is the same between two numbers e.g. 3 and 13? What is different? * How many pennies have I dropped in the tin? Can you count them with your eyes closed? * What if we had one more or one less? | **Possible misconceptions**   * Saying 11, 12, 13 as one teen, two teen, three teen * Recognising numbers in different fonts * 2 and 5 - children may make transposing errors * Counting errors. |

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| **Calculating**  **Expected expectations**   * **Using objects and quantities, add and subtract 2 one digit numbers** * **Count on or back to calculate** * **Solve problems using doubling, halving and sharing** | |
| **Themes**   * Composing and decomposing numbers * Commutativity * Addition as combining groups * Addition as increasing * Subtraction as taking away * Subtraction as decreasing * Subtraction as the difference between | **Key learning points**   * Exploring composition (making numbers) * Exploring decomposition (breaking numbers down) * Exploring part part whole in contexts * Understanding addition to 10, then 20 * Understanding subtraction to 10, then 20 |
| **Mathematical language**   * Number names to 20 * None * How many * Count on, count up, count back * Count in ones, twos, fives and tens * Is the same as, equals, balances, as many as, make * More, larger, bigger, greater, biggest, most * Less, fewer, smallest, least, smaller * Odd, even * Pattern * Ones, tens, digits * Add, more, and, make, total, sum, altogether * How many more to make\_\_\_? * How many more is \_\_\_ than\_\_\_? * Take away * How many left? How many gone? * How many fewer is \_\_\_ than \_\_\_? * Difference between * Sharing, doubling, halving * Parts of a whole, half, quarter | **Pedagogical notes**   * The part part whole representation is useful for composing and decomposing numbers and in different orientations. Begin by using concrete objects and move to abstract symbols * Include 0 in problem solving and represent with an empty set * Concept of sharing - equality * Practical equipment to teach concept |
| **Reasoning and questioning**   * Show 5 on a tens frame. Show another arrangement of 5. And another etc * Make deliberate mistakes and children have to figure out what has been done wrong * I have 5 teddies and i need to put them in 2 boxes. How many could i put in each box. Is there more than one way? | **Possible misconceptions**   * May think that subtraction is commutative * Counting on/back - may say the number they start on instead of counting the jumps * Difference between - may use the everyday definition of the word instead of the mathematical definition * Confusion between the symbols + - and = * Avoid labelling e.g. biggest part of the pizza * Avoid misconceptions by calculating with a variety of objects and amounts to expose children to counting large objects and small objects - not size but cardinal value |

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| **Length**  **Expected expectations**   * **Use everyday language to talk about the size of objects** * **Compare quantities and objects** * **Use the language of distance** | |
| **Themes**   * Conservation of length * Prediction * Reasoning and justifying | **Key learning points**   * Comparing lengths of 2 of the same type of objects, saying which is the longest or shortest * Estimating and ordering familiar objects by length and comparing directly * Understanding places that are near or close * Understanding places that are far away |
| **Mathematical language**   * Measure, size, compare, guess, estimate * Enough, not enough, too much, too little, too many, too few * Nearly, close to, about the same as, just over, just under * Length, height, width * Long, short, tall * High, low * Wide, narrow, thin, thick * Longer, longest, shorter, shortest, taller, tallest, higher, highest * Far, near, close | **Pedagogical notes**   * There is a distinction between long and tall * There may be need to discuss the need for a uniform non-standard unit. |
| **Reasoning and questioning**   * Find 5 objects longer than your thumb. Find 5 objects shorter than your thumb. Find 5 objects the same length as your thumb. * Crayons not lined up correctly when measuring. John thinks the blue crayon is longers. Is he right? How do you know? * Make deliberate mistakes for the children to correct. | **Misconceptions**   * Children may think that an object is longer when vertical and shorter when horizontal * Children may not match the ends of the objects together correctly, creating a false impression of the longest object * Children may not see a crooked line as longer even if they begin and end at the same point * Children may confuse length and width. |

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| **Position**  **Expected expectations**   * **Use everyday language to describe position** | |
| **Themes**   * Prepositions * Distance - far and near * Estimating and conjecturing * Justifying | **Key learning points**   * Understand prepositions * Use prepositions correctly * Understand the concept of near and far |
| **Mathematical language**   * Position * Over, under, above, below, top, bottom, side, on, in, outside, inside, around, in front, behind, back, front * Beside, next to, opposite, apart, between, middle, edge, corner * Direction, up, down, left, right * Forwards, backwards, sideways * Across, next to, close, near, far * Along, through, to, from, towards, away from | **Pedagogical notes**   * Synonyms for prepositions * The concept of near and far are relative. It might help to add a quantifiable value e.g how long does it take to drive here |
| **Reasoning and questioning**   * Make deliberate mistakes for children to detect and correct | **Misconceptions**   * Children may have less developed language skills, or EAL children may not have the same level of language development * Children may confuse left and right |

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| **Weight**  **Expected expectations**   * **Use everyday language to talk about weight** * **Compare quantities and objects** * **Use the language of weight** | |
| **Themes**   * Prediction * Reasoning and justifying | **Key learning points**   * Understand light and heavy and weighs the same as * Use a pan balance * Compare two objects by weight * Order more than two objects by weight |
| **Mathematical language**   * Measure, size, compare, guess, estimate * Enough, not enough, too much, too little, too many, too few * Nearly, close to, about the same as, just over, just under * Weighs, balances, heavy, light * Scales | **Pedagogical notes**   * Pan balance instructions * There is no expectation in EYFSP, but children may be ready to balance and record non-standard units. * In FS and KS1 mass and weight can be treated the same, but in KS2 mass is the amount of matter and weight is the force of gravity acting on it * There may be an opportunity to discuss the need for a uniform non-standard unit. |
| **Reasoning and questioning**   * Predict which object is the heaviest or lightest * Make deliberate mistakes for children to detect and correct * How many cubes will it take to balance the object? Predict and check | **Misconceptions**   * Children may confuse size with weight. Give children large, light packages and small, heavy packages as this cannot be perceived visually |

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| **Capacity**  **Expected expectations**   * **Use everyday language to talk about capacity** * **Compare quantities and objects** * **Use the language of capacity** | |
| **Themes**   * Predicting * Reasoning and justifying | **Key learning points**   * Understand full, empty and half full * Predict and measure how many cups will fill a variety of containers |
| **Mathematical language**   * Measure, size, compare, guess, estimate * Enough, not enough, too much, too little, too many, too few * Nearly, close to, about the same as, just over, just under * Full, empty, holds, container, half full, holds more, holds less | **Pedagogical notes**   * Distinction between volume and capacity, volume is the amount of space and is 3D and measured in cm3 and capacity is the amount a container can hold and usually measured in litres * It may help to get down to eye level to judge * May be helpful to use non-standard units |
| **Reasoning and questioning**   * Which container holds more or less? * Make deliberate mistakes for children to detect and correct | **Misconceptions**   * Children may not understand that a short, wide container may have a larger capacity than a tall, narrow one. * Make sure that children consistently fill the measuring cup for accurate measurement * Children need practical experience of filling a range of containers including unusual shaped containers |

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| **Time**  **Expected expectations**   * **Use everyday language to talk about the passing of time** * **Compare quantities of time and objects related to time** | |
| **Themes**   * Days of the week * Sequencing events in a day * Units of time - seconds, minutes, hours * Estimating and predicting * New, old * Comparing and ordering events by duration * Reading a clock to the hour * Prediction * Reasoning and justifying | **Key learning points**   * Name the days of the week in order * Order events and discuss events during the school day * Order events in my life * Understand new and old * Understand and use language of units of time * Estimate and measure how many times i can \_\_\_\_\_\_ in 10 seconds or a minute * Compare two time durations using the language of quicker or slower * Be able to read the time on a clock to the hour |
| **Mathematical language**   * Time, days of the week, day, week * Birthday, holiday * Morning, afternoon, evening, night * Bedtime, dinner time, play time * Today, yesterday, tomorrow * Before, after, now, soon, early, late * Quick, quicker, quickest, quickly * Slow, slower, slowest, slowly * Old, older, oldest * New, newer, newest * Takes longer, takes less time, * Hour, o’clock * Clock, watch, hands * Measure, size, compare, guess, estimate | **Pedagogical notes**   * Build time into everyday routines * Regularly draw attention to time and date. Time is an abstract concept. Children need to see it visually with sand timers, stop watches, a variety of clocks, calendars * Display date on cyclical calendars so children can the cyclic and repetitive nature of time passing |
| **Reasoning and questioning**   * How many claps, star jumps etc. do you think you can do in a minute? Were you right? * Make deliberate mistakes for children to detect and correct. | **Misconceptions**   * Children may think that ‘yesterday’ relates to any event in the past * Children may not be able to understand future events such as next week or next month * Telling the time on an analogue clock e.g. they may read 3 o’clock as 12 to 3 or 3 to 12 etc. |

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| **Money**  **Expected expectations**   * **Use everyday language to talk about money** * **Compare quantities and objects** | |
| **Themes**   * Understand the concept of money * Using and applying in real life situations * Sorting and classifying * Explaining and reasoning | **Key learning points**   * Understand what money is, what it is for and different forms of money * Recognise coins of the UK * Order coins by value * Sort coins by denominations and by own criteria * Use money in play and real life situations * Solve problems with money |
| **Mathematical language**   * Money * Coin, penny, pence, pound * Price, cost * Buy, sell * Spend, spent, pay | **Pedagogical notes**   * Recent coins don’t say denominations in numerals. Children need lots of experience of handling and identifying real money by comparing size and shape * Don’t say pennies as a general term for money, especially if mixed denominations of coins * It is a technological world. Children may not see adults handing over coins or even cards in the case of contactless payments |
| **Reasoning and questioning**   * Would you rather have five 1p coins or three 2p coins? Why? * Show me NOT a 10p coin, NOT a 2p coin * How many ways can you make 5p? How do you know you have them all? * Make deliberate mistakes for children to detect and correct | **Misconceptions**   * Totalling coins does not mean counting the number of coins. * Children may think that 2p is worth more than 5p because it is physically larger. |

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| **Describing patterns**  **Expected expectations**   * **Recognise, create and describe patterns** * **Use everyday mathematical language to describe patterns** | |
| **Themes**   * Recognising and extending patterns * Creating patterns * Using and applying in real life situations * Sorting and classifying * Explaining and reasoning * Generalising | **Key learning points**   * Recognise a two step pattern * Extend and create a two step pattern * Recognise a three step pattern * Extend and create a three step pattern * Understand and recognise symmetry (or not) * Create symmetrical patterns |
| **Mathematical language**   * Count, sort, group, set, list * Pattern, puzzle, repeating pattern * Bigger, larger, smaller * Symmetrical * What could we try next? * How did you work it out? * Recognise, draw, describe, compare | **Pedagogical notes**   * Research shows that a basis for later, more complicated algebra has roots in spotting patterns and rules and making connections * Opportunity to explore and extend pattern should be given for number and shape in a variety of contexts * Opportunity to link symmetry to simple fractions e.g. half a pegboard and ask children to complete |
| **Reasoning and questioning**   * Which one is in the wrong place? How do you know? * Can you make a pattern similar to this? * Can you extend this pattern? * Make deliberate mistakes for children to detect and correct | **Misconceptions**   * Children may continue a colour or number pattern by copying the pattern from the beginning rather than looking at where the initial pattern ended. |

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| **Shapes**  **Expected expectations**   * **Explore characteristics of everyday objects and shapes** * **Use everyday language to describe objects and shapes** | |
| **Themes**   * Using and applying in real life situations * Sorting and classifying * Explaining and reasoning | **Key learning points**   * Recognise rectangles, including squares * Recognise circles * Recognise triangles * Explore characteristics of 2D shapes, including corners and sides * Sort and classify 2D shapes * Recognise cubes * Recognise pyramids * Recognise spheres * Recognise cones * Explore characteristics of 3D shapes, including faces, vertices and edges |
| **Mathematical language**   * Count, sort, group, set, list * 2D shape names - corner, side * 3D shape names - face, edge, vertex, vertices | **Pedagogical notes**   * Be aware of the shift between 3D and 2D representations of them. Use physical, concrete objects and everyday objects * Children find it difficult to understand a square is a special rectangle * Precise language is vital |
| **Reasoning and questioning**   * Show me a \_\_\_\_\_ Show me NOT a \_\_\_\_ * Which shape is in the wrong place on the sorting table how do you know? * Make deliberate mistakes for children to detect and correct | **Misconceptions**   * Children may not recognise if they are constantly given the same shape in the same orientation, the classic example is a square - if children are given a square on its point they may say it is a diamond |