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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
 |