Reception

Mastery Overview
Term by Term

Reception

Guidance

The Reception yearly overview has been ordered in a logical way using the Early Learning Goals (ELGs). Number is at the heart of our scheme and is supported and strengthened through the delivery of NCETM Mastering Number programme. ELGs have been broken down to support our ethos of spending longer on some topics to ensure children have a deep understanding before moving on to the next topic. This document fits in with the White Rose Maths Hub Year 1 – 6 Mastery documents and Power Maths mastery scheme of work.

Mastery of mathematics in the Early Years will mostly be evident when pupils initiate their mathematics successfully. They will use their maths consistently and without overt adult support when they are secure with a concept. (Early Years Handbook, December 2015).
Direct teaching could be with whole class or smaller groups and will be adult led and successful learning should be observed and assessed independent of this. The mastery approach to mathematics also embraces the Characteristics of Effective Learning as stated in Development Matters document.

Everyone Can Succeed

At Jarrow Cross we believe that all children can succeed in mathematics. We don't believe that there are individuals who can do maths and those that can't; because of this, we aim to develop a growth mindset in our pupils. This, along with a positive teacher mindset and strong subject knowledge are key to pupil success in mathematics.

Bold Beginnings

This scheme has been written using the key findings from Bold Beginnings (OFSTED, 2017) document. We have prioritised the use of whole-class direct teaching, with sufficient time to practice and rehearse key skills using practical activities and equipment, as well as counting, numeral recognition and the additive composition of number. By doing this, we are equipping pupils with the knowledge, skills and understanding that will prepare them effectively for maths in Year 1 and beyond.

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Characteristics of Effective Learning (Developmental Matters)	Principles of Mastery (NCETM 2015)
Playing and Exploring – Engagement • Finding out and exploring • Playing with what they know • Being willing to 'have a go'	The reasoning behind the mathematical processes is emphasised. Teacher/pupil interaction explores in detail how answers were obtained, what method/strategy worked and what the most efficient method/strategy is. Teaching is underpinned by a belief in the importance of maths and that the vast majority of children can succeed in the learning of mathematics in line with national expectations for the end of key stage.
Active learning – Motivation • Being involved and concentrating • Keeping trying • Enjoying achieving what they set out to do	Lessons are short but intense. Teacher led discussion is interspersed with short tasks and/or pupil-pupil or pupil-teacher discussion.
Creating and Thinking Critically – Thinking • Having their own ideas • Making links • Choosing ways to do things	Learning is broken down into small, connected steps building on what the pupils already know. There is regular interchange between concrete/contextual ideas and their abstract or symbolic representation (CPA)
Children should apply their maths in a variety of contexts and play situations to make connections. They should use appropriate and relevant vocabulary and should be actively encouraged to discuss their maths and reason mathematically, using full sentences. They should use well-chosen concrete, pictorial and iconic representations and should recognise and be encouraged to use abstract symbols alongside less formal jottings and recordings.	
Mastery Indicators (Early Learning Goals) **Numbers:** children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing. **Shape, space and measures:** children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.	

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Development Matters

Each section starts with the ELG underlined and in bold. The statements underneath are taken from the Development Matters (40-60 months old) document; these support the children to meet the ELG. If children are working below age related expectation the guidance can be found in the 30 - 50 months expectations. This document supports challenging all pupils within Reception and does not recommend using the Year 1 curriculum to challenge the more confident pupils.

The Development Matters statement 'Records, using marks that they can interpret and explain' has not been included because this does not link directly to the ELGs; it is a Year 1 objective for children to read, write and interpret mathematical statements. However, if children are interested and able to use marks to explain their thoughts, then this should be encouraged. The use of zero is also a Year 1 objective but children need to be aware of the number and value of it. The importance of children understanding that having nothing is recorded using zero cannot be stressed enough.

The Development Matters Numbers statement 'Counts out up to six objects from a larger group' has been changed to ten instead of six. This is because the scheme works up to 10 in spring so we feel it is important children count anything up to 10.

Although sections have been dedicated to teaching time, money and measures they are shorter because these topics are taught throughout the year. For example, a week has been dedicated to money to introduce and discuss the different coins, but money will be taught through addition and subtraction and will be in different areas of provision across the year.

Term by Term Objectives

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Reception Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Baseline			Numbers: counting and recognition			Shape, space and measures: 2D shape		Shape, space and measures: money	Numbers: addition and subtraction		
Spring	Numbers: counting and recognition			Shape, space and measures: size, weight and capacity			Numbers: addition and subtraction			Shape, space and measures: 3D shape		Shape, space and measures: time
Summer	Numbers: counting and recognition		Numbers: addition and subtraction		Numbers: doubling, halving and sharing			Shape, space and measures: position and distance			Consolidation/ assessments	

Term by Term Objectives

Reception

Year	Reception	Term	Autumn

Week 1 - 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Baseline	**Numbers** *(Using numbers 1 – 5)* **Children count reliably with numbers from 1 to 5** Recognise some numerals of personal significance. Recognises numerals 1 to 5. Counts up to three or four objects by saying one number name for each item. Count actions or objects which cannot be moved. Selects the correct numeral to represent 1 to 5 objects. Counts an irregular arrangement of up to 5 objects. **Show Me** **Owl's Packing List** **Tidying** **Dice** **Golden Beans**			**Shape, space and measures** **Explore characteristics of everyday objects and shapes and use mathematical language to describe them.** **Recognise, create and describe patterns** Beginning to use mathematical names for 'flat' 2D shapes, and mathematical terms to describe shapes. Selects a particular named shape. Use familiar objects and common shapes to create and recreate patterns and build models. **Making Footprints** **Building Towers** **Exploring 2D Shape** **Making a Picture** **Shapes in the Bag**		**Shape, space and measures** **Children use everyday language to talk about money.** Beginning to use everyday language related to money.	**Numbers** ***(Securing numbers 1-5)*** **Place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.** Uses the language of 'more' and 'fewer' to compare two sets of objects. Finds the total number of items in two groups by counting all of them. Says the number that is one more than a given number. Finds one more or one less from a group of up to five objects. In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting. **Number Rhymes** **Using Books: Maisie Goes Camping**		

Term by Term Objectives

Reception

Year	Reception	Term	Spring

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Numbers *(Using numbers 1 – 10)* **Children count reliably with numbers from 1 to 10** Recognises numerals 1 to 10. Counts out up to 10 objects from a larger group. Count actions or objects which cannot be moved. Selects the correct numeral to represent 1 to 10 objects. Counts objects to 10. Counts an irregular arrangement of up to 10 objects. **Number Book** **Playing Incey Wincey Spider** **Shopping**			**Shape, space and measures Children use everyday language to talk about size, weight and capacity to compare quantities and objects and to solve problems.** Orders two or three items by length or height. **Making Caterpillars** **Long Creatures** **Wrapping Parcels** **Sock Washing Line** Orders two items by weight. **Balances** **Cooking** **Presents** **Spring Scale** Orders two or three items by capacity. **I Have a Box** **Mud Kitchen** **Water, Water**			**Numbers** *(Securing numbers 1-10)* **Place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.** Uses the language of 'more' and 'fewer' to compare two sets of objects. Finds the total number of items in two groups by counting all of them. Says the number that is one more than a given number. Finds one more or one less from a group of up to 10 objects. In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting. Estimates how many objects they can see and checks by counting them. **Estimation Station**			**Shape, space and measures Explore characteristics of everyday objects and shapes and use mathematical language to describe them. Recognise, create and describe patterns.** Beginning to use mathematical names for 'solid' 3D shapes and mathematical terms to describe shapes. Selects a particular named shape. Use familiar objects and common shapes to create and recreate patterns and build models. **Pattern Making** **Collecting**		**Shape, space and measures Children use everyday language to talk about time to compare quantities and to solve problems.** Uses everyday language related to time. Orders and sequences familiar events. Measures short periods of time in simple ways. **Timing**

Term by Term Objectives

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Year	Reception	Term	Summer

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Numbers *(Using numbers 1 - 20)* **Children count reliably with numbers from 1 to 20.** Recognises numeral 1 to 20. Counts out up to 20 objects from a larger group. Count actions or objects that can't be moved. Selects the correct numeral to represent 1 to 20 objects. Counts objects to 20. Counts an irregular arrangement of up to 20 objects.		**Numbers** *(Securing numbers 1 – 20)* **Place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.** Use the language of 'more' and 'fewer' to compare two sets of objects. Finds the total number of items in two groups by counting all of them. Say the number that is one more than a given number. Find one more or one less from a group of up to 20 objects. In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting. Estimate how many objects they can see and check by counting. **The Box Game**		**Numbers** **Solve problems including doubling, halving and sharing.** In practical activities and discussion, begin to use the vocabulary involved in doubling, halving and sharing. **Maths Story Time** **Double Trouble** **Two Halves** **Using Books: The Doorbell Rang**			**Shape, space and measures.** **Children use everyday language to talk about position and distance to compare quantities and objects and to solve problems.** Can describe their relative position such as 'behind' or 'next to'. **Paths** **Position with Wellies** **Scooters, Trikes and Bikes** **Small World Play**			Time at the beginning or end of the term for consolidation, gap filling, seasonal activities, assessments, etc.	

Pedagogy: Numbers & the Number System

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Numbers and the number system
Key concepts – Early Learning Goal 11 Number For Expected achievement: • Children count reliably with numbers from one to twenty • Place them in order • Say which is one more and one less than a given number

Themes	Possible key learning points
• Cardinality • Subitising • Conservation of number • Nominal values e.g. the number 7 bus is not necessarily the seventh one • 1:1 correspondence • Concept of zero	• Recite numbers to 10 (then when secure 20) • Say and use number names in rhymes and stories • Count up to 10 moveable objects • Count out up to 10 objects (then 20) from a larger quantity • Begin to match numerals to numbers of objects in a set • Count up to 10 objects (then 20) which cannot be moved • Begin to understand 0 • Rehearse counting back from 10 (eventually 20) including rhymes and songs • Count actions or sounds • Begin to estimate numbers of objects and check by counting • Order numbers to 10 (then 20) both ascending and descending • Understand 1 more than a given number • Understand 1 less than a given number • Begin counting at 10 • Partition numbers into 10s and 1s • Notice and extend number patterns
Mathematical Language	**Pedagogical Notes**
Number, zero, one, two, three ….. to twenty (and beyond) teens, eleven, twelve, none How many? count on (to or from) count up (to), count back (to or from) count in ones, twos, fives, tens is the same as, equals, balances, as many as more, larger, bigger, greater, biggest, most less, fewer, smaller, smallest, least odd, even	• Ensure there is a distinction between fewer (countable objects *e.g. fewer toys, fewer bricks, fewer cups of water*) or less (mass or abstract e.g. *less sand, less water, less honesty*). • Zero is an important way of expressing nothing (or the absence of something e.g. 3 -3 = 0 and has a symbol/numeral to denote it. • Nurture children's number sense by developing subitising (Piaget) which means to be able to recognise numbers in small groups without the need for counting (e.g. using dice patterns, tens frames, Numicon etc.) • Moveable objects are best used initially for counting to encourage 1:1 correspondence and moving to ensure that objects are not counted more than once or omitted.

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pattern ones, tens, digits compare, order, size first, second, third…… last, before, after, next, between guess, estimate, nearly, close to, about, just over, just under, too many, too few, enough, not enough	• Progression in counting will see children able to count objects which cannot be moved in an irregular arrangement. • Children need to understand that the last number spoken is the number of objects in successful counting (cardinality) • Early Years Mathematics: How to Create a Nation of Mathematics Lovers by Dr Sue Gifford • The Hueys in None the Number by Oliver Jeffers
Reasoning opportunities and probing questions	**Suggested activities or stories with a mathematical context**
• How many teddies are there? Is it still the same number if I spread them out? How do you know? • Use a puppet, toy, class mascot, cheeky elf etc. to make mistakes e.g. Tommy the Teddy counts objects but misses one out/ counts one more than once, says the next number after the final count etc. • Here are some numbers…e.g. 7, 8, 10, 11 – which one is missing? How do you know? • What is the same between these two numbers? What is different? (E.g. 3 and 13) • Close your eyes, can you count the number of pennies that I am dropping into the tin? • What if we had one more, how many would there be? What if we had one less, how many now?	• Number tracks in games and activities (ensure there is variation e.g. horizontal, vertical, diagonal, ascending value and descending value) • Number rhymes (ten green bottles, five little ducks, ten fat sausages, five little aliens, five speckled frogs etc.) • Creating number books e.g. 'My book of 6' and taking photographs, stamping numbers and objects in. • NRICH: Playing Incey Wincey Spider • NRICH: Golden beans • The Very Hungry Caterpillar by Eric Carle, One is a Snail, Ten is a Crab by Apri • Pulley Sayre, More or Less? By Stuart J Murphy, Equal Scmequal by Virginia Kroll
Possible misconceptions	
• Eleven, twelve, thirteen (one teen, two teen, three teen) • Misconceptions from using activities with different fonts e.g. 1 and I (or different numerals for 4 or 7) or children may confuse 2 and 5 due to transposing numbers when writing their own • Counting errors – encourage children to check their counting for sense and error.	

Pedagogy: Calculating

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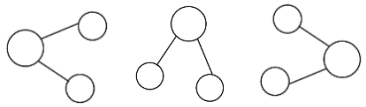
Calculating	
Key concepts – Early Learning Goal 11 Number For Expected achievement: • Using objects and quantities, children add and subtract using two single digit numbers • They count on or back to calculate • They solve problems using doubling, halving and sharing	There is no expectation that children in the EYFS write symbols and calculations to record their mathematical thinking although they may choose to make their own jottings and mark making to support their learning.
Themes	**Possible key learning points**
• Composing and decomposing numbers using visual apparatus such as tens frame e.g. 7 can be a 5 & 2, 3 & 4 etc. • Commutativity i.e. 2 + 3 = 3 + 2 • Addition as combining two or more groups • Addition as increasing • Subtraction as take away • Subtraction as decrease • Subtraction as difference between	• Exploring composition (making numbers) • Exploring decomposition (break numbers down) • Exploring the part, part whole model in contexts. • Understanding addition to 10 (then 20) • Understanding subtraction to 10 (then 20)
Mathematical Language	**Pedagogical notes**
Number, zero, one, two, three ….. to twenty (and beyond) teens, eleven, twelve, none How many? count on (to or from) count up (to), count back (to or from) count in ones, twos, fives, tens is the same as, equals, balances, as many as, make more, larger, bigger, greater, biggest, most less, fewer, smaller, smallest, least 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, difference between How many are left? How many are gone? How many fewer is …. than…? sharing, doubling, halving parts of a whole, half, quarter	• Part-whole model is very useful for composing and decomposing numbers and exemplifying number relationships in a variety of orientations and with more than two parts. Begin with concrete, moveable objects and move to abstract symbols when the children are ready.  • Include 0 in problem solving and represent with an empty set or group. • Concept of sharing equally / fairly is one to explore with the children – they need to ensure that the share a whole object (i.e. a cake / pizza/piece of paper) and a whole set of items (i.e. a whole packet of biscuits or cubes) • Using practical equipment and contexts to teach concepts e.g. plates and cupcakes for the part, part whole model, small world play people in bus and move to the iconic concrete e.g. unifix cubes to represent votes in a linear fashion thus it is easy to see different between (early bar model representations). • NCETM: Progression in calculating in the Early Years

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Reasoning opportunities and probing questions	Suggested activities or stories with a mathematical context
• Show me five on the tens frame. Show me another arrangement of five. Now another and another. • Use a character or puppet to make deliberate mistakes when adding, subtracting or sharing. Ask the children to correct the mistakes. • If I have 5 teddies altogether and I need to put them into two boxes. How many could I put in each one? Is there more than one way I could pack them? How many ways can you find altogether?	• Practical problems involving addition, subtraction and sharing such as snack time, artwork, data collection. • Use everyday pictures for children to make number stories for calculating, similar to those in Japanese or Shanghaiese textbooks for grade 1. • Using a pan balance and Numicon pieces, unifix cubes e.g. " 2 cubes and 3 cubes in the red pan balances 5 cubes in the blue pan" • Using a tens frame • Counting on / back on a number line or track – card or dice games • Baking / Playdough – Can you share the equally between 2 or 4? • Traditional stories with contexts for calculating • Red Riding Hood's Math Adventure by Lalie Harcourt • A Fair Bear Share by Stuart J Murphy • The Doorbell Rang by Pat Hutchins • How Many Legs by Kes Gray

Possible misconceptions
• Children may think that subtraction is commutative like addition. When counting on or back, pupils may say the number that they start on e.g. counting on from 8 to add 8 and 3 they may say "8, 9, 10". • When using the term 'difference between' some pupils may assume the everyday use and not the mathematical one e.g. "The difference between the 7 and 8 is that 7 has straight lines and 8 has curved ones". There may be confusion between the symbols + - and = • Avoid confusion by labelling parts such as "the biggest half of the pizza" Avoid misconceptions by calculating with a variety of objects and amounts to expose children to counting large objects and smaller ones – it is not the size of the individual item but their cardinal value.

Pedagogy: Length

Exploring Length	

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Key concepts – Early Learning Goal 12 Shape, Space and Measures For Expected achievement: • Children use everyday language to talk about size of everyday objects • Compare quantities and objects • Use the language of distance	There is no expectation that the children use any standard measures in the Early Years Foundation stage.
Themes	**Possible key learning points**
• Conservation of length – size does not alter if object is moved • Prediction • Reasoning and justifying	• Comparing the lengths of two of the same type of objects. Stating which is longest, which is the shortest? • Estimating and ordering familiar objects by length and by comparing directly • Understanding places that are near or close • Understanding places that are far away
Mathematical Language	**Pedagogical Notes**
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, thick, thin Longer, shorter, taller, higher Longest, shortest, tallest, highest Far, near, close	• There is distinction between long (any orientation) and tall (vertical length) so ensure that the children not only know the difference but see objects in a variety of orientations. • There may be opportunity to discuss the need for a uniform, non-standard unit.
Reasoning opportunities and probing questions	**Suggested activities or stories with a mathematical context**
• Find 5 objects that are longer than your thumb. Find 5 objects that are shorter than your thumb. Find an object that is about the same length as your thumb. • Joe thinks that the blue crayon is the longest. Is he correct? How do you know? • Use the class character or puppet to make language and measuring errors which the children need to correct.	• NRICH EYFS Long Creatures • NRICH EYFS Making Caterpillars • Building towers, blocks, Lego • Measuring children, plant growth, leaves, paper or ribbon for role play post office, measuring the distance of cars rolled down a slope • Jim and The Beanstalk by Raymond Briggs • Goldilocks and the Three Bears

Possible misconceptions

- Children may think that the same stick is longer when it is vertical and shorter when it is horizontal.
- When directly comparing two objects, children may not match the ends together correctly, thus giving a false impression of which is smaller or larger.
- Children may not see a crooked line is longer than a straight line even if they begin and end at the same point.
- Children may confuse length and width e.g. they may think a wide ribbon is longer than a narrower one.

Pedagogy: Position

Describing Position

Reception

Key concepts – Early Learning Goal 12 Shape, space and Measures

For Expected achievement:

- Children to use everyday language to describe position

Themes	Possible key learning points
• Prepositions • Distance (near and far) • Estimating and conjecturing • Justifying	• To understand prepositions (select a few at a time from the list, whilst embedding already learned vocabulary) • To use prepositions correctly • To understand the concept of near / far
Mathematical Language	**Pedagogical Notes**
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, left, right, up, down Forwards, backwards, sideways Across, next to, close, near, far Along, through, to, from, towards, away from	• There are several synonyms for prepositions in the English Language – ensure you draw attention to this with the children to avoid confusion. • The concept of near and far are relative e.g. the seaside is far away but nearer than the moon! It might be worth adding a quantifiable value e.g. how long would it take in a car? How many steps?
Reasoning opportunities and probing questions	**Suggested activities or stories with a mathematical context**
• Use the class character or puppet to make language and position errors which the children need to correct.	• We are going on a bear hunt by Michael Rosen • Rosie's Walk by Pat Hutchins • Naughty Bus by Janette Oke • Dinosaur's Day Out by Nick Sharatt • The Hokey Cokey song (to distinguish left from right) • Small world play resources such as cars, maps, cooking situations, shops • Outdoor or large play equipment such as bikes, trikes, obstacle courses, treasure hunts • Using Logo or Beebots or other programmable toys • NRICH: Position with wellies • NRICH: Scooters, bikes and trikes
Possible misconceptions	
• Children may have less developed everyday language skills on arrival at school or may be EAL. There are synonyms used for each position. • Many children confuse left and right.	

Pedagogy: Weight

Reception

Exploring Weight

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- Children use everyday language to talk about weight of everyday objects
- Compare quantities and objects
- Use the language of weight

Themes

- Prediction
- Reasoning and justifying

Possible key learning points

- To understand what the terms 'light' and 'heavy' and 'weighs the same as' mean
- To be able to use a pan balance
- To compare two objects by their weight
- Order more than two objects by their 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
Weigh, weighs, weighs the same as, balances, heavy, light, heavier than, lighter than, heaviest, lightest, scales

Pedagogical Notes

- Children may need instruction about what the pan balance means e.g. the heavier object will be nearer the table / ground and that the lighter one will be up in the air.
- Although there is no expectation to use standard weights, children may be ready to balance objects and record such as the book balances 25 cubes etc.
- In Foundation Stage and KS1, Mass and weight can be treated as the same although in later years mass is the amount of matter within an object and weight is the amount of gravity acting upon it.
- Here may be opportunity to discuss the need for a uniform, non-standard unit.

Reasoning opportunities and probing questions

- Which do you predict will be the heaviest/ lightest? Why?
- Use the class character or puppet to make language and measuring errors which the children need to correct.
- How many (cubes) do you think will balance? Do you want to change your mind now that we are adding the cubes to the balance? Did you guess too many or too few?

Suggested activities or stories with a mathematical context

- Role play – market, post office, vets (weighing animals)
- Using a toy or real life see-saw to reinforce the concept of balance / pan balance
- Cooking / baking
- NRICH EYFS: Balances
- NRICH EYFS: Presents
- Marvin Weighs In by Dave Browning

Possible misconceptions

- Children may confuse size with weight so it is worth giving examples of large, light packages and small, heavy objects as it cannot be perceived visually unlike weight and length.

Pedagogy: Weight

Reception

Exploring Capacity

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- Children use everyday language to talk about the capacity of everyday objects
- Pupils will compare quantities and objects
- Children will use the language of capacity

Themes

- Prediction
- Reasoning and justifying

Possible key learning points

- To understand full, empty and half full
- To predict and measure how many cups full will it take to 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

- There is a distinction between volume and capacity according to NCETM "Volume is the amount of space a container occupies and is always three dimensional. It is measured in cubic units which are commonly metres, centimetres etc. Capacity is the amount a container can hold when it is full – usually measured in litres etc. "
- Encourage children to get down to eye level to accurately judge part or full capacity.
- Here may be opportunity to discuss the need for a uniform, non-standard unit.

Reasoning opportunities and probing questions

- Which container will hold more/less / about the same than this container? How do you know?
- Use the class character or puppet to make language and measuring errors which the children need to correct.

Suggested activities or stories with a mathematical context

- Using water, sand, rice, (uniformed or non-uniformed size pebbles?), dried pasta or other 'pourable' materials

Possible misconceptions

- Lots of children find it difficult to realise that a short, wide container could have a larger capacity than a taller, narrower one.
- When suggesting it takes (x) amount of small cups to fill the bigger cup, children may not consistently fill the smaller cup, thus the measurement not being accurate.
- Children need practical experience of filling a range of containers including more unusual containers with diagonal edges e.g. 

Pedagogy: Time

Reception

Understanding Time

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- Children use everyday language to talk about the passing of time.
- Compare quantities of time and objects related to time

Themes	Possible key learning points
• Days of the week • Sequencing events in a day • Units of time – seconds, minutes and hours • Estimating and predicting • New / old • Comparing events and ordering by their duration • Reading a clock to the hour (o'clock) • Prediction • Reasoning and justifying	• To name the days of the week in order • To order and discuss the order of events during the school day • To order events in my life • To understand 'new' and 'old' • To understand & use the language of units of time • To estimate and measure how many time I can_____in 10 seconds or a minute • To compare two time durations (quicker, slower) • To compare two or more time durations (quickest, slowest etc.) • To be able to read the time on the clock to the hour (7 o'clock)
Mathematical Language	**Pedagogical Notes**
Time Days of the week (Monday, Tuesday etc.) Day, week, Birthday, holiday, morning, afternoon, evening, night Bedtime, dinner time, playtime, 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	• The more you can build time into your everyday routines the better. Regularly draw attention to the day, month, year, season, and time on the clock, birthdays and routines. • It is a very abstract concept, one which children need to see visually using sand timers, stop watches, clocks (use a variety), calendars etc. • Most classroom displays such as the days of the week and months of the year are displayed in a linear way. It would be better to display such information in a circle so that children are familiar with the cyclic and repetitive nature of these units of time.

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Reasoning opportunities and probing questions	Suggested activities or stories with a mathematical context
• How many claps or hops or star jumps do you think you can do in 1 minute? Were you correct? • Use the class character or puppet to make language and measuring errors which the children need to correct.	• Songs can be helpful when learning the days of the week and months of the year so that the children can recite them with ease. It is not easy otherwise because there is no logical order to remembering them! • Visual timetables • Play 'What's the time, Mr Wolf?' • Sequencing events of a story or events relevant to the children's life • Writing a recount of visit or event in literacy • Timing events or tasks • The Time it Took Tom by Stephen Tucker • What's The Time Mr Wolf? By Debi Gliori • Cluck O' Clock by Kes Gray • NRICH EYFS Timing
Possible misconceptions	
• In a very young child's understanding "yesterday" may relate to any event that is in the past. • Similarly, they may not be able to understand future events such as next week, next month etc. • When telling the time on an analogue clock, children may say 3 o'clock is " 12 to 3" or "3 to 12" etc.	

Pedagogy: Money

Reception

Using Money

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- Children use everyday language to talk about money
- They can compare quantities and objects

Themes	Possible key learning points
• Understanding the concept of money • Using and applying in real life situations • Sorting and classifying • Explaining and reasoning	• To understand what money is, what it is for and the different forms of money • To recognise coins of the UK • To order coins by their value • To sort coins by denomination (& then by own criteria) • To use money in play and real life situations e.g. totalling, change, exchanging • To solve problems with money
Mathematical Language	**Pedagogical Notes**
Money Coin, penny, pence, pound Price, cost Buy, Sell Spend, spent, pay	• The most recent coins in circulation do not say the denomination in numerals on so children will need lots of experience of handling and identifying (real not toy) money by its comparative size and shape. • Do not use the term 'pennies' as a general term for money, especially if there are mixed denominations of coins. • As we are living in a technological world, children may not see adults physically hand over cash or even cards in the case of contactless payments.
Reasoning opportunities and probing questions	**Suggested activities or stories with a mathematical context**
• Would you rather have 5 1pence coins or 3 2 pence coins? Why? • Show me NOT a 10p, NOT a 2p. • How many ways can you make 5 pence? How do you know you have them all? • Use the class character or puppet to make counting and defining errors which the children need to correct.	• Visit a real shop or supermarket where children can physically hand over cash and even receive change – it might be a new experience for them! • The Great Pet Sale by Mick Inkpen • Jack and the beanstalk / 3 little pigs traditional tales • Money song – 5 current buns • It is an ideal to link with PSHE – the feelings and morals related to money and spending. Pfeg (Personal Finance Education Group) have some good, cross curricular resources • EYFS NRICH • PIRATE POUNDLAND • Role play – shops, post office, bank etc.

Reception

Possible misconceptions
• Children may not understand that totalling coins does not mean • Counting the number of coins (unless they are only 1p coins) and often feel confused that 2p = 2 1 pence coins etc. • They may also think that a 2 pence coin is worth more than a 5 pence coin because it is physically larger

Pedagogy: Describing Patterns

Reception

Describing Patterns

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- To recognise, create and describe patterns
- To use every day mathematical language to describe them

Themes

- Recognising and extending patterns
- Creating patterns
- Using and applying in real life situations
- Sorting and classifying
- Explaining and reasoning
- Generalising

Possible key learning points

- To recognise a 2 step pattern
- To extend / create a 2 step pattern
- To recognise a 3+ step pattern
- To extend / create a 3+ step pattern
- To understand and recognise symmetry (or not!)
- To 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, describe, draw, compare

Pedagogical Notes

- Educational research shows that the 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.
- It may be an opportunity to link symmetry with fractions for example, giving children one half of a pattern and asking them to complete it on a pegboard.

Reasoning opportunities and probing questions

- Which one of these is in the wrong place? How do you know?
- Can you make a pattern similar to this?
- Can you extend this pattern?
- Use the class character or puppet to make language and creating pattern errors which the children need to correct.

Suggested activities or stories with a mathematical context

- NRICH EYFS: Making a Picture
- Aliens Love Underpants by Claire Freedman
- Making art work in paint, clay or collage
- Day and Night (Patterns in Nature) by Margaret C Hall
- Andy Goldsworthy is an artist who makes patterns in nature – photography on a nature walk

Possible misconceptions

- Some children may continue a colour or number pattern by copying the pattern from the beginning rather than looking at where the initial pattern ended.

Pedagogy: Describing Patterns

Reception

Describing Shapes

Key concepts – Early Learning Goal 12 Shape, Space and Measures

For Expected achievement:

- To explore characteristics of everyday objects and shapes
- To use everyday language to describe objects and shapes

Themes

- Using and applying in real life situations
- Sorting and classifying
- Explaining and reasoning

Possible key learning points

- To recognise rectangles, including squares, and cubes
- To recognise circles and spheres
- To recognize triangles and pyramids
- To explore characteristics of 2-D shapes
- To recognise cones, including corner and sides
- To explore characteristics of 3-D shapes
- To sort and classify 2-D shapes, including face, edge and vertices

Mathematical Language

Count, sort, group, set, list

2D shapes

Corner, side,

Rectangle (including square), circle, triangle

3D shapes

Face, edge, vertex, vertices

Cube, pyramid, sphere, cone

Pedagogical Notes

- Be aware of the shift between 3D shapes and 2D representations of them. It is best to work with the physical, concrete in a variety of sizes and with everyday items which are that shape.
- Children find it tricky to understand that a square is a special rectangle. It can be useful to adopt the policy of using Oblong which is a non-square rectangle.
- Precise language choice is vital in this topic (although incredibly important in all areas). Properties of 2D and 3D shapes need defining with accuracy and language structures modelled by adults.

Reasoning opportunities and probing questions

- Show me a___, show me NOT a___.
- Which shape is in the wrong place on this sorting table? How do you know?
- Use the class character or puppet to make language and sorting errors when dealing with shapes, which the children need to correct.

Suggested activities or stories with a mathematical context

- NRICH EYFS: Shapes in the bag
- NRICH EYFS: Exploring 2D shapes
- NRICH EYFS: Building Towers
- Captain Invincible and The Space Shapes by Stuart J Murphy
- The Shape of My Heart by Mark Speering
- The Shape Game by Anthony Browne

Possible misconceptions

- Children may not recognise shapes if they are constantly given the same shape in the same orientation – the class example is the square on its point, some children will say it is a diamond.