National Curriculum Programme of Study:

- Count in multiples of twos, fives and tens.
- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Y1

MENTAL CALCULATION
Multiplication & Division

FLUENCY

By the end of Year 1, children should fluently derive and recall:

- doubles for all numbers to at least 10, e.g. double 7 and their corresponding halves
- odd and even numbers to 20

COUNT IN MULTIPLES OF TWOS, FIVES AND TENS

Teaching should focus on:

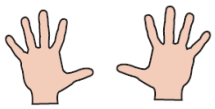
- Counting on and back to zero in ones, twos, fives and tens
- Recognising odd and even numbers to 20

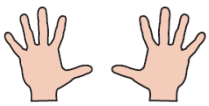
See also ***Written Calculation Guidance:***
Year 1 Multiplication *' Using grouped objects for addition, without recombining'*

Children should have many opportunities to consolidate and practice skills in a range of contexts.

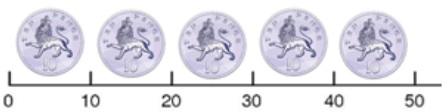
- Explain to the children that you have been saving 2p coins in a pot and want to know how much you have saved. Empty the pot and ask them to count on as you drop the coins back into the pot. Say that you have found some more coins in your purse/wallet. Ask the children to close their eyes and count the sounds as the coins are dropped into the pot. How much money is there now? Repeat with 5p and 10p coins.

- Once children can tell you that they have 5 fingers on each hand without counting, show them how to use their fingers to count on in groups of 5 or 10. Ask the children to close their fingers into their hand and as they stretch out their fingers count "5", outstretch the fingers on the other hand and count "10" and so on. How far can they count? If they are unsure on the next count, each finger can be counted in ones. Repeat with counts of 10 with fingers on both hands being stretched out at the same time. Can they hear any patterns? Write the numbers down – can they see any patterns



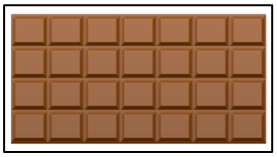


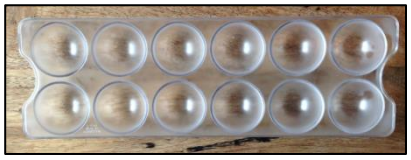
- Arrange a variety of physical objects into groups of the same size, counting the number of groups, the amount in each group, and the total.



10p + 10p + 10p + 10p + 10p = 50p

- Show pupils everyday items that are arranged in arrays. For example,



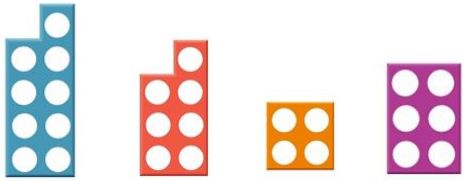


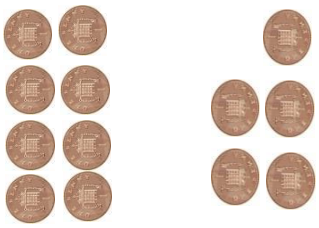
- Discuss ways of grouping items into arrays and expect pupils to count in groups (step counting), rather than ones, to find the total amount.

How much money is in this array?
2, 4, 6, 8, 10.

10p

- Even numbers can be shown using arrays or materials such as numicon.
Demonstrate to pupils that even numbers can be equally arranged in groups of 2 whilst odd numbers will have 1 left over.





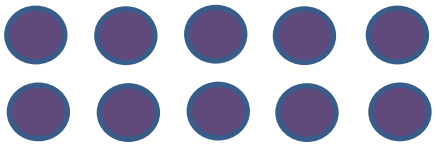
SOLVE ONE-STEP PROBLEMS INVOLVING MULTIPLICATION AND DIVISION, BY CALCULATING THE ANSWER USING CONCRETE OBJECTS, PICTORIAL REPRESENTATIONS AND ARRAYS WITH THE SUPPORT OF THE TEACHER.

Teaching should focus on:

- Doubling and halving
- Exploring multiplication as repeated addition
- Exploring division through grouping and sharing

See also ***Written Calculation Guidance:***
Year 1 Multiplication *'Arranging objects into rectangular arrays'*
Year 1 Division *'Understanding both 'equal sharing' and 'grouping' and ' Introducing remainders when dividing'.'*

- Use a 2 row array to demonstrate doubling e.g. double 5 – lay five counters in a row and then repeat to show the double. Show the relationship between doubling and halving by taking the additional row away to reveal half of 10.



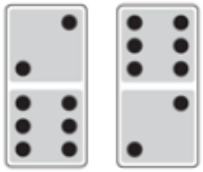
Continue to explore the concept of multiplication as 'groups of' by beginning to make arrays showing groups of different amounts.

- Use doubling and halving function machines to investigate how doubles and halves can be 'undone'.

Introduce children to the concept of function machines before using them for doubling (and halving). Start by showing them a simple 'machine' (for example a simple cardboard box), with various items hidden inside. Examples should start with changes in colour, and then size, before moving onto value. Demonstrate a yellow ball going into the box and a green one (identical in every way apart from colour) coming out. What has our machine done? What will happen if I put the green ball back in at the end point and do the function in reverse (yellow ball emerges back at the start)? Model pushing a small cube into the box, and a large one coming out, discuss the idea of scaling, being made bigger. When confident with the concept of the function machine, push a small number, e.g. 3 into the box. If '6' comes out, what has our function machine done to the number? Test out children's suggestions by putting other numbers in and seeing what comes out. Link to inverse and halving using the function machine in the other direction

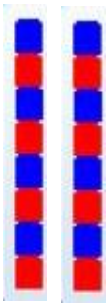
- Find dominoes that have doubles or find matching dominoes to make doubles patterns.

Double 4 is 8



Double 8 is 16

- Ask children to build a multilink tower of, for example 8 cubes high, and then build an identical tower. How many cubes have been used altogether? Double 8 is 16. Remove the new tower to reveal that half of 16 is 8.



- Provide appropriate practical contexts to explore multiplication as repeated addition and sharing and grouping strategies, for division, using real life objects where possible.

Multiplication

  - There are 10 stickers in a pack. Kate bought 5 packs. How many stickers does she have?

10 + 10 + 10 + 10 + 10 = 50 stickers

  - Crayons come in packs of 5. Mrs Brown buys 6 packs. How many crayons will she have altogether?
  - In the lost property box, there are 8 pairs of gloves. How many gloves altogether?

When pupils are confident in representing the problems using practical objects or pictures, encourage them to begin to draw jumps on a number line (alongside their practical work) to represent the counted steps of 2,5 or 10.

Division

- Pupils should be told that they are learning about 'Division' and that 'sharing' and 'grouping' are different division approaches depending upon the context or nature of the problem as opposed to over emphasising the vocabulary and strategy of 'sharing' in place of division. Pupils should experience a fair balance of sharing and grouping experiences whilst learning about division.

Division model	Sharing	Grouping
Generally used when…	…dividing a quantity equally between a number of 'sets'.	… repeatedly subtracting a set amount from the total.
Example	20 ÷ 5 Here, we would share 20 equally between 5 sets. How many is in each set?	20 ÷ 5 Here, we would take groups of 5 repeatedly away from 20. How many groups of 5 do we take away?
Modelled using…	Separate cubes, counters, or other individual items. E.g. start with 20 and physically share between, for example, 5 people (one for you, one for you, one for you….) .	Groups of items or objects that are packed in groups. E.g. wheels on a car, pencils in a box, trading cards in a pack, eggs in a box.
Context	I have 20 pennies and I share them equally between 5 friends. How much does each friend get? 15 people go camping with 3 tents .Each tent needs to hold the same amount of people. How many people will sleep in each tent?	I have 20 pennies and I want to give each friend exactly 5p. How many friends can I give 5p to? 15 people go camping. 3 people will fit into a tent. How many tents will they need to take?

Grouping

- How many groups of 2 socks can you make from this pile of 12 (12 ÷ 2) ?
- The farmer puts 6 eggs in a box. How many boxes will he need for 18 eggs?
- The toy maker has 20 wheels. He needs 4 wheels to make a car. How many cars can he make?

Sharing

- *Tom had 8 sweets to give to his 2 friends. He shared them equally between Sam and Jack. How many sweets did they have each?*
- *The teacher had 15 coloured crayons. She shared them equally between the 5 children. How many crayons did they have each?*
- *Mum had 12 five pence coins. She shared them equally between her 4 children. How many coins did they have each? How much money did each child have?*