Chapter 1
Number and Place Value
EYFS 1 – Number and place value (When planning ensure you track forwards to year 1)

**Early Learning Goal 11**
Children count reliably with numbers from 1 to 20 and place them in order.

**Key Vocab:** number, zero, one, two, three etc, none, how many?, count, count (up) to, count on (from, to), count back (from, to), more, less, many, few, odd, even, every other, how many times?, pattern, pair, guess how many, estimate, nearly, close to, about the same as, greater, more, larger, bigger, less, smaller, compare, order, first, second, third, last, before, after, next, between.

**Key concepts**
- When there are more objects the group gets bigger. When there are fewer (less) objects the group gets smaller.
- Anything can be counted: claps, steps, jumps…
- There are many numbers in the world around us.
- When we are talking about objects we say ‘more than’ and ‘fewer than’. When we are talking about numbers we say ‘greater than’ and ‘smaller than’.

**Learning objectives** (see overleaf for exemplification)
- To make comparisons between quantities.
- To use language of quantities such as ‘more’ and ‘a lot’.
- To use the language of ‘more’ to compare sets of objects.
- Recite number names in sequence 0-10.
- Select a small number of objects from a group ‘give me one, two etc’.
- To compare two groups of objects (identifying ‘the same’).
- To use number names and language.
- To match numeral and quantity correctly.
- To use more/most and least.

**Potential barriers/misconceptions**
- Pupils show confusion in vocabulary- more / less.
- Misconception can occur through the linking of words - the bigger a number (in size) the greater it’s quantity. i.e. 3 is bigger than 7. (worth more than…)
- Some pupils at this stage cannot differentiate between numbers and letters.
- Pupils may be able to recite number words up to ten but do not count objects with 1 to 1 correspondence.
- There may be little understanding of the value that each number holds.
- Pupils find it challenging to identify ‘same’ and ‘different when working visually as they don’t focus on the detail.

**Example Questions**
If we count around the circle starting with Gemma, who will say 5?
Look at the bowl of apples. Are there more green apples or red apples? How can you find out?
The birthday card has a 4 on it. Raza is four today. Put the right number of candles on his birthday cake.
How many counters are there?
Select the correct number card and match it with the counters.
Count with me to 10. One, two, three…
Count these buttons. You can move them as you count them if you wish.
What number is the one before six?
Put three coats up on the pegs
Bring me five aprons. Can you put one back?
Are there more books on the top shelf or on the bottom shelf? How do you know?
Which set has more cubes? The set of red cubes or the set of green cubes? How do you know?
Show a card. ‘Read me the number on this card’.
Look at this telephone. Can you press the number 4? Number 6?

**Mental maths** (can revisited throughout day once concept has explicitly shared)
- One, two, three four five. Once I caught a fish alive…
- One potato, two potatoes, three potatoes, four…
- Higgledy, Piggledy, my fat hen…
- This old man, he played one…
- Recite sequence 1,2,3 up to 10
- Count objects: tiny things in a matchbox, pieces of a jigsaw, letters in your name etc.
- Count in 2s: pairs of socks, pairs of animals
- Count in 1s (say aloud every other number)
- Recognise recitation errors: (could use a puppet)
  - One, two, four, five (word omitted)
  - One, two, four, three, five (words in the wrong order)
  - One, two, three, four (repeating a word)
- Start from a given number name and stop at another ( start with three, hold it in your head, count to six)
- Recite the number names in order to 5 then 10
- To count backwards from 10
- To count backwards to zero (none) from any number
- Estimate (guess) how many marbles in the jar, coins in a purse etc
**To make comparisons between quantities.**

<table>
<thead>
<tr>
<th>Which plate would you like? Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Cupcake" /></td>
</tr>
<tr>
<td><img src="image2" alt="Cake" /></td>
</tr>
</tbody>
</table>

**To use language of quantities such as 'more' and 'a lot'.**

<table>
<thead>
<tr>
<th>I need more cars</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Image of cars" /></td>
</tr>
<tr>
<td>I have a lot of cars</td>
</tr>
<tr>
<td><img src="image4" alt="Image of cars" /></td>
</tr>
</tbody>
</table>

**To use the language of more to compare sets of objects.**

<table>
<thead>
<tr>
<th>Which bowl has more fish in?</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Image of fish" /></td>
</tr>
</tbody>
</table>

**Recite number names in sequence 0-10.**

<table>
<thead>
<tr>
<th>0 1 2 3 4 5 6 7 8 9 10</th>
</tr>
</thead>
</table>

**Select a small number of objects from a group ‘give me one, two etc’.

<table>
<thead>
<tr>
<th>To compare two groups of objects (identifying ‘the same’).</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image6" alt="Image of finger" /></td>
</tr>
</tbody>
</table>

**To use number names and language.**

<table>
<thead>
<tr>
<th>zero – none one two three four five six seven eight nine ten more, less bigger, smaller</th>
</tr>
</thead>
</table>

**To match numeral and quantity correctly.**

<table>
<thead>
<tr>
<th>To use one to one correspondence (touch each object and give it a number)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Image of objects" /></td>
</tr>
</tbody>
</table>

**To count objects in a line.**

<table>
<thead>
<tr>
<th>There are five cars in the group.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image8" alt="Image of cars" /></td>
</tr>
</tbody>
</table>

**To know that numbers identify how many there are in a set.** (triad- three key elements)

<table>
<thead>
<tr>
<th>It looks like: 0 1 2 3 4 5 6 7 8 9 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>It sounds like: SIX</td>
</tr>
<tr>
<td>You make it like this:</td>
</tr>
<tr>
<td>Make own marks or tallies resulting from practical activities.</td>
</tr>
<tr>
<td>Pictorial representations of groups.</td>
</tr>
<tr>
<td>When beginning to record numbers:</td>
</tr>
<tr>
<td>Trace with a finger cut out numerals</td>
</tr>
<tr>
<td>Sandpaper</td>
</tr>
<tr>
<td>Rough fabric</td>
</tr>
<tr>
<td>Tin foil</td>
</tr>
<tr>
<td>Corrugated card</td>
</tr>
</tbody>
</table>

**To create and experiment with symbols and marks representing ideas of numbers then numeral.**

<table>
<thead>
<tr>
<th>Isaac’s bears</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hussein’s bear</td>
</tr>
<tr>
<td><img src="image9" alt="Isaac’s bears" /></td>
</tr>
<tr>
<td>Who has the most bears?</td>
</tr>
<tr>
<td>Who has the least?</td>
</tr>
</tbody>
</table>

**To find more/ most and least/least**
### Early Learning Goal 11

Children count reliably with numbers from 1 to 20 and place them in order.

#### Key concepts
- When there are more objects the group gets bigger.
- When there are fewer objects the group gets smaller.
- When counting a group the last number represents the quantity.
- Anything can be counted: claps, steps, jumps...
- There are many numbers in the world around me.
- We can write number with words and squiggles.
- When we are talking about objects we say ‘more than’ and ‘fewer than’. When we are talking about numbers we say ‘greater than’ and ‘smaller than’.

#### Potential barriers / misconceptions
- Pupils may be confused in vocabulary: more / less.
- Misconception can occur through the linking of words - the heavier object is the one that is ‘higher’ on the balance (When using balances to compare quantity).
- There may be little understanding of the value that each number holds.
- There could be recitation errors.

#### Example questions
- One, two, buckle my shoe, three, four, knock at the door. Which two numbers come next?
  - 10, 9, 8, 7, carry on counting backwards until ‘blast off!’
- If we count round the circle starting at Lewis with 3, who will say 9?
- What number comes next after 12 when you count?
- Make a line of toy cars. Make the second car yellow and the fifth car red.
- What number comes before □?
- Given a number, identify one more and one less.
- To count reliably from 1 to 20.
- To use one to one correspondence (touch each object and give it a number).
- To order numbers from 0-20.
- To count objects without physically touching them.
- Write numbers to 20.
- To count objects in a group without counting out (subitise).
- To make ten (feel the ten-ness of ten).

#### Learning objectives
- Learning objectives (see overleaf for exemplification)
- To count reliably from 1-20.
- To use one to one correspondence (touch each object and give it a number).
- To count objects in a line: beginning to count beyond 10.
- To count actions or objects without physically touching them.
- To count objects in a group/irregular arrangement. (Using first same objects/then different objects)
- To represent numbers using fingers, marks and pictures.
- To recognise numerals (0-5), (0-10) and (0-20).
- To order numbers from 0-20.
- To select the correct numeral to represent 1-5 then 1-10 objects.
- Write numbers to 20.
- To estimate how many objects can be seen and check by counting.
- To recognise numbers in a group without counting out (subitise).
- To make ten (feel the ten-ness of ten).

#### Mental maths (can be revisited throughout day once concept has explicitly shared)
- To count from 1-20.
- To count from non-zero starting point (up to 20).
- To recite the number names in order, continuing the count from a given number.
- Recognise recitation errors:
  - (could use puppet) Thirty, fourteen, fifteen (not changing the pattern)
  - Eighteen, nineteen, tenteen (error by analogy)
  - Thirty-nine, thirty-ten (error by analogy)
- Start from a given number name and stop at another. (Start with 2, hold it in your head, count on to 8)
- Count on several numbers from a given number (using fingers to help: count on three numbers from 4)
- To use ordinal numbers in different contexts (Who is third in the line?)
- To say the number name that goes before a given number name. (What number comes before 5?)
- Recite the number sequence consistently back to zero from any given number to 20.
- To count in 2s, 5s and 10s.
- To count on in tens from any given tens number. (Count on in tens from 30)
- To count back in tens from any given tens number.
- Estimate the number in a group (how many children in class today?)
- To know which number is worth more/less.
- To say the number that is one more/one less than the given number.
- Say a number lying between two given numbers.
- Begin to use and understand ordinal numbers in different contexts (first, second, third.... & last).
<table>
<thead>
<tr>
<th>EYFS 2 – Number and place value</th>
<th>Progression (a combination of these models and images can be used for every objective)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>To count reliably from 1-20</strong></td>
<td><strong>To use one to one correspondence (touch each object and give it a number)</strong></td>
</tr>
<tr>
<td>one</td>
<td>eleven</td>
</tr>
<tr>
<td>two</td>
<td>twelve</td>
</tr>
<tr>
<td>three</td>
<td>thirteen</td>
</tr>
<tr>
<td>four</td>
<td>fourteen</td>
</tr>
<tr>
<td>five</td>
<td>fifteen</td>
</tr>
<tr>
<td>six</td>
<td>sixteen</td>
</tr>
<tr>
<td>seven</td>
<td>seventeen</td>
</tr>
<tr>
<td>eight</td>
<td>eighteen</td>
</tr>
<tr>
<td>nine</td>
<td>nineteen</td>
</tr>
<tr>
<td>ten</td>
<td>twenty</td>
</tr>
<tr>
<td></td>
<td>To count objects in a line (beyond 10)</td>
</tr>
<tr>
<td>11 There are eleven cars in the group</td>
<td>Listening to the number of claps.</td>
</tr>
<tr>
<td></td>
<td>The rings of a bell.</td>
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<tr>
<td></td>
<td>Jumps in the air.</td>
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<tr>
<td></td>
<td>Children at the front of the class.</td>
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<tr>
<td></td>
<td>Windows on a building</td>
</tr>
<tr>
<td><strong>To count objects in a group/ irregular arrangement</strong></td>
<td><strong>To represent numbers using fingers, marks and pictures</strong></td>
</tr>
<tr>
<td>There are nine cars in the group</td>
<td>To recognise numerals (0-5), (0-10) and (0-20)</td>
</tr>
<tr>
<td></td>
<td>To order numbers from 0-20</td>
</tr>
<tr>
<td></td>
<td><strong>To select the correct numeral to represent 1-5 then 1-10 objects</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Write numbers to 20</strong></td>
</tr>
<tr>
<td></td>
<td><strong>To estimate how many objects can be seen and check by counting</strong></td>
</tr>
<tr>
<td></td>
<td><strong>To recognise numbers in a group without counting out (subitise)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>To make ten</strong> (recognise the ten-ness of 10)</td>
</tr>
<tr>
<td></td>
<td>(*see addition for number bonds within 10)</td>
</tr>
<tr>
<td>Trace.</td>
<td>Write in the air.</td>
</tr>
<tr>
<td>Write in the air.</td>
<td>Paint.</td>
</tr>
<tr>
<td>Paint.</td>
<td>Model in play dough.</td>
</tr>
<tr>
<td>Model in play dough.</td>
<td>Make number signs for classroom.</td>
</tr>
<tr>
<td>How many oranges do you think there are? Can you check?</td>
<td>Three</td>
</tr>
<tr>
<td>Can recognise iconic, regular images of small numbers (e.g. dice patterns).</td>
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</tr>
<tr>
<td>One</td>
<td>Two</td>
</tr>
<tr>
<td>Three</td>
<td>Four</td>
</tr>
<tr>
<td>Five</td>
<td>Six hold objects</td>
</tr>
<tr>
<td>Six</td>
<td>Seven</td>
</tr>
<tr>
<td>Seven</td>
<td>Eight</td>
</tr>
<tr>
<td>Eight</td>
<td>Nine</td>
</tr>
<tr>
<td>Nine</td>
<td>Ten, twenty</td>
</tr>
<tr>
<td></td>
<td><strong>Egg box ten</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Unifix ten</strong></td>
</tr>
<tr>
<td></td>
<td><strong>bundles of ten straws</strong></td>
</tr>
</tbody>
</table>
Fill in the blanks: 35 is more than 20, 35 is between 30 and 40, 50 is more than 17, 47 is less than 20.

This sentence is correct: 8 is less than 10.
Two of these sentences are correct. Tick them: 18 is more than 30, 26 is between 20 and 30.

Estimate how many pairs of socks you could make.
Estimate the number of pencils.

Draw a ring around the person who is 9 years old.

There is always 1 left over when an odd number is divided by 2.

What would be the best way to count marbles into the jar?

Which tens number comes after 50? Before 80?

Count back from 10 to six. How many did you count?

What

Example Questions
What number comes after 22? Before 65?
Count back from 10 to six. How many did you count?
Which tens number comes after 50? Before 80?
What would be the best way to count marbles into the jar?
There is always 1 left over when an odd number is divided by 2. True or false? Can you prove it?
Draw a ring around the person who is 9 years old.
Estimate the number of pencils.
Estimate how many pairs of socks you could make. (Show a picture of unpaired socks)
Look at these numbers: 34 12 45 60 72 28 Which of these numbers is the largest? Which of these numbers is between 10 and 20?
This sentence is correct: 8 is less than 10. Two of these sentences are correct. Tick them: 18 is more than 30, 26 is less than 60, 50 is more than 17, 47 is less than 21.
Fill in the blanks: 35 is more than □, 35 is between □ and □, 35 has □ tens.
Write the number thirty-two.
Fill in the missing numbers: 18 is 1 less than □, 18 is 10 less than □.

Notes and guidance (non statutory)
Pupils practice counting (1, 2, 3, ... ordering (e.g. first, second, third) and to indicate a quantity (e.g. 3 apples, 2 centimeters), including solving simple concrete problems until they are fluent.
Pupils begin to recognize place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.
They practice counting as reciting numbers and counting as enumerating objects, and counting in 2s, 5s, and 10s from different multiples to develop their recognition of patterns in the number system (e.g. odd/even) including varied practice through increasingly complex questions.
They recognize and create repeating patterns with objects and with shapes.

Learning objectives (see overleaf for exemplification)
To identify one more and one less.
To compare quantities (using equal to, more than, less than (fewer), most, least)
To match numbers and quantities.
To locate numbers on a number line.
To read & write numbers from 1-20 in numerals and words.
To identify odd and even numbers.
To understand ordinal numbers.
To compare numbers up to 20 (and beyond).
To describe and extend number sequences.
To make tens.
To regroup (carry out a fair swap).
To make ten and count on (in concrete).
To identify ten and count on (in pictorial).
To count out a 2 digit number to 20 and regroup in the 1s.
To partition and recombine numbers to 20 into 10s and 1s (teen numbers).
To partition and recombine any 2 digit number into 10s and 1s.

Mental maths
To count to and across 100.
To count larger collections by grouping into tens, then fives or twos.
To count backwards in ones from any two digit number.
To count on any given single digit number from any two digit number (count on seven from 22).
To count in multiples of 2, 5 and 10.
To count on in tens from a tens number stopping at a given number. (count from 20 to 60).
To count back in tens from a tens number stopping at a given number (count from 80 back to 30).
To describe and extend number sequences: counting on or back in steps of tens or ones from any given number.
Count in 2s from 0-20, count in 2s from any given number.
To identify one more and one less than any given number.
Can say whether any number from 1-100 is odd or even and why.
Count in tens from zero... from 40... from 8.
Count in 2s from zero, count from 1, 3, 5.
To say what number comes next in a given pattern. (16, 14, 12, □, □)
To recall number bonds (see addition strand for exemplification).
To know number bonds of all numbers within 10 (6 = 1+5, 5+1, 4+2, 2+4 etc)
To know number bonds to 10, To know number bonds within 20.
To make a reasonable estimate (then count to check).
To state the value of the digits in a two digit number (14 is one ten and four ones).

Learning objectives (see overleaf for exemplification)
To identify one more and one less.
To compare quantities (using equal to, more than, less than (fewer), most, least)
To match numbers and quantities.
To locate numbers on a number line.
To read & write numbers from 1-20 in numerals and words.
To identify odd and even numbers.
To understand ordinal numbers.
To compare numbers up to 20 (and beyond).
To describe and extend number sequences.
To make tens.
To regroup (carry out a fair swap).
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To count backwards in ones from any two digit number.
To count on any given single digit number from any two digit number (count on seven from 22).
To count in multiples of 2, 5 and 10.
To count on in tens from a tens number stopping at a given number. (count from 20 to 60).
To count back in tens from a tens number stopping at a given number (count from 80 back to 30).
To describe and extend number sequences: counting on or back in steps of tens or ones from any given number.
Count in 2s from 0-20, count in 2s from any given number.
To identify one more and one less than any given number.
Can say whether any number from 1-100 is odd or even and why.
Count in tens from zero... from 40... from 8.
Count in 2s from zero, count from 1, 3, 5.
To say what number comes next in a given pattern. (16, 14, 12, □, □)
To recall number bonds (see addition strand for exemplification).
To know number bonds of all numbers within 10 (6 = 1+5, 5+1, 4+2, 2+4 etc)
To know number bonds to 10, To know number bonds within 20.
To make a reasonable estimate (then count to check).
To state the value of the digits in a two digit number (14 is one ten and four ones).
### Year 1 – Number and place value

**Progression (a combination of these models and images can be used for every objective)**

<table>
<thead>
<tr>
<th>To find one more/less than a given number</th>
<th>To compare quantities</th>
<th>To match numbers and quantities</th>
<th>To locate numbers on a number line</th>
<th>To read and write numbers to 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘More than’ to compare objects.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘There are more green apples than red apples’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘There are fewer/less red apples than green apples’</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>‘Greater than’ to compare numbers.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5 is greater than 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 is smaller than 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>‘Less than’ to compare objects.</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>‘There are more green apples than red apples’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘There are fewer/less red apples than green apples’</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>‘Fewer than’ to compare quantities.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2 is fewer than 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 is greater than 2</td>
<td></td>
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</tbody>
</table>

**To identify odd and even numbers**

- Represent up to 9 using ten grid.
- Use ‘pairs of’ to represent even numbers.
- Circle the fourth elephant.
- Circle the ninth spider.

**To describe and extend number sequences**

- How many stars in the next pattern?
- Find the missing numbers: 15, 14, 13, □, □, □, □.
- Draw around ten and then count on.

**To make ten**

- To make ten and count on (concrete).
- To make ten and count on (pictorial).
- ‘16 is 1 ten and 6 ones.’

**To regroup (carry out a fair swap)**

- To use bundles of straws for children to feel the ‘ten-ness’ of ten.
- For children to use Dienes to create a ‘fair swap’ (regrouping of ten ones for one ten).
- ‘16 is 1 ten and 6 ones.’

**To compare numbers up to 20.**

- (fewer/more) (smaller/greater)
- ‘Greater than’ to compare numbers.
- 5 is greater than 3
- 3 is smaller than 5
- ‘Less than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’
- ‘More than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’

**To compare quantities**

- ‘Greater than’ to compare numbers.
- 5 is greater than 3
- 3 is smaller than 5
- ‘Less than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’
- ‘More than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’

**To match numbers and quantities**

- 9
- 5
- 3
- Count and compare quantities.

**To locate numbers on a number line**

- Where would 15 be on the number line?
- How do you know?
- On a bead string? On a counting stick?

**To read and write numbers to 20**

- ‘More than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’
- ‘Greater than’ to compare numbers.
- 5 is greater than 3
- 3 is smaller than 5
- ‘Less than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’
- ‘More than’ to compare objects.
- ‘There are more green apples than red apples.’
- ‘There are fewer/less red apples than green apples.’
Year 2 – Number and place value

(When planning ensure you track back to year 1 and forwards to year 3)

**National Curriculum**

Count in steps of 2, 3, and 5 from 0 and in tens from any number, forward and backward

Recognise the place value of each digit in a two-digit number (tens, ones)

Identify, represent and estimate numbers using different representations including the number line.

Compare and order numbers from 0 up to 100; use <, > and = signs

Read and write numbers to at least 100 in numerals and in words

Use place value and number facts to solve problems.

**Key Concepts**

Numbers can be partitioned in many ways in part, whole. (Unique partitioning is when numbers are broken up in the standard representation i.e. 63 is 6 tens and 3 ones. Multiple partitioning is the ability to also see: 63 = 5 tens and 13 ones or 2 tens and 43 ones- this is an important tool for mental strategies)

We can regroup ten ones for one ten. Ten tens is one hundred.

In a two digit whole number the digit indicating the multiple of 10 is written on the left, and that to distinguish between, say 20 and 2, a zero is put in the space on the right as a place holder. Zero is a place holder and means 'no ones, no tens, no hundreds etc.'

Numbers can be compared using the terms 'greater than' and 'smaller than' with and without concrete representation.

**Potential barriers/misconceptions**

Reversal of digits 03 for 30 and 31 for 13. This can create problems when ordering numbers.

Confusion about the place value of numbers. Difficulties especially apparent when ordering numbers such as 212 and 221.

Failure to understand that the position of the numeral gives it the value.

Pupils not always sure what makes a 'sensible' answer (not estimating).

**Example Questions**

Here are some numbers: 44 87 62 28 51. Write them in order; the first one is done for you: 28 □ □ □ □

Here are two signs: '<' ' > '. Use the signs to make the following correct: 54 □ 16, 19 □ 94, 51 □ 35

Ben puts 12 coins on a table. He hides some of them under his hand. How many coins is Ben hiding?

Tim bought two pieces of fruit. He spent thirty pence altogether. He bought an orange for 12 pence. What did he pay for the other fruit?

Circle two numbers that add to make a multiple of 10: 11 12 13 14 15 16 17 18 19

Fill in the blank to make this correct: 40 – 30 = 10 □ □ □

Write the two missing numbers in this sequence: □ 45 47 49 51 □ 55 57

Charlie is making 3-digit numbers with these cards. He can make this number: 7 2 4. Write all the other 3-digit numbers he can make.

Write the missing digits to make this correct: □ 0 □ □ □ 43

Write an odd number between 34 and 44.

Write the missing numbers in this sequence: 47 42 37 □ □ 22 17 12

Write a number in the space to make this correct: 867 □ □ 60 + 7

Sarah has 60 sweets. She puts 6 sweets in each party bag. How many bags does she put sweets in?

**Notes and guidance (non statutory)**

Using materials and a range of representations, pupils practice counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.

As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.

Pupils should partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the importance of place value and the use of the equals sign.<

**Learning objectives** (see overleaf for exemplification)

- To represent 2 digit numbers (concrete)
- To count within 100 by making tens first.
- To recognise the place value of each digit in a 2 digit number.
- To compare numbers from 0 – 100.
- To order numbers from 0-100.
- To partition and recombine 2 digit numbers into 10s and 1s.
- To partition and recombine 3 digit numbers into 100s, 10s and 1s.
- To partition numbers in different ways.
- To identify numbers on a number line.
- To use the greater than, less than and equals signs (<, >, =)
- To begin to round numbers less than 100 to the nearest 10.
- To read and write numbers in numerals and words.

**Mental maths**

- To count in steps of 2, 3, 5 and 10 (forwards and backwards from any given number).
- To count on in tens from any given number (with and without a hundred square).
- To count to and across 100 from any given number (forwards and backwards).
- To have rapid recall of the x2, x3, x5 and x10 tables.
- To count up in threes from any given number (forwards and backwards).
- To find ten more than a multiple of ten (ten more than 40).
- To identify 1, 10, or 100 more/less than any given number.
- To accurately say the sequence of odd numbers from 1-19.
- To say whether any number is odd or even.
- To recognise multiples of 10, 5 and 2 and say how they know.
- To know the value of each digit (what is the number equivalent to 6 tens and 5 ones?).
- To know number bonds within 10 (for number bond exemplification see addition strand).
- To know number bonds to 10.
- To know number bonds within 20.
- To use the language of ordinality up to twentieth.
Primary Advantage Maths Programme 2015

Year 2 – Number and place value

Progression (a combination of these models and images can be used for every objective)

<table>
<thead>
<tr>
<th>To represent 2 digit numbers (concrete) (for regrouping and making 10 see year 1)</th>
<th>To count within 100 by counting tens first.</th>
<th>To represent numbers as tens and ones in a place value table.</th>
<th>To compare numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count 'bundles' of 10: <img src="image1.png" alt="Image" /> 5 tens = 50</td>
<td>Make 2 digit numbers with dienes: <img src="image2.png" alt="Image" /> 4 tens + 4 ones = 44</td>
<td>68 = □ tens + □ ones 68 = 60 + 8</td>
<td>Which number is greatest? How much greater is it?</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /> 10, 20, 30, 40, 50, 60….. 61, 62, 63, 64, 65, 66, 67, 68 There are 68 in the group. 60 and 8 make 68.</td>
<td></td>
<td><img src="image4.png" alt="Image" /> What are the missing numbers? Can you make these numbers? 97, 62, 33, 48…</td>
<td><img src="image5.png" alt="Image" /> If the tens are equal then we compare the ones.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><img src="image6.png" alt="Image" /> 68 = □ tens + □ ones</td>
<td><img src="image7.png" alt="Image" /> 25 is 3 more than 22 22 is 3 less than 25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To order numbers from 0-100</th>
<th>To partition and recombine 2 digit numbers into 10s and 1s. (unique partitioning)</th>
<th>To partition and recombine 3 digit numbers into 100s, 10s and 1s. (unique partitioning)</th>
<th>To partition numbers in different ways. (multiple partitioning)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image8.png" alt="Image" /> Tens ones 2 3</td>
<td>57 = 50 + 7</td>
<td>173 = 100 + 70 + 3</td>
<td><img src="image9.png" alt="Image" /> 64 can be partitioned as = 6 tens and 4 ones (60+4) 64 can also be partitioned as:</td>
</tr>
<tr>
<td>2 5</td>
<td></td>
<td></td>
<td><img src="image10.png" alt="Image" /> or 64 50 14</td>
</tr>
<tr>
<td>3 3</td>
<td></td>
<td></td>
<td><img src="image11.png" alt="Image" /> 64 40 24</td>
</tr>
<tr>
<td><img src="image12.png" alt="Image" /> Abstract: pupils to place range of numbers in order.</td>
<td><img src="image13.png" alt="Image" /> To use the greater than&gt;, less than&lt; and equals= signs (&gt;,, &lt;)</td>
<td><img src="image14.png" alt="Image" /> To begin to round numbers less than 100 to the nearest 10.</td>
<td><img src="image15.png" alt="Image" /> Read and write numbers in numerals and words. (to 100 and beyond)</td>
</tr>
<tr>
<td>Locate numbers on a number line</td>
<td>Identify numbers on a number line.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image16.png" alt="Image" /> What number is marked by the arrow? How do you know? Can you locate: 22, 39, 94…..on the number line? On an unmarked number line?</td>
<td><img src="image17.png" alt="Image" /> Look at the ones 5 or above? – round on to the next tens number Less than 5? – round back to the previous tens number</td>
<td><img src="image18.png" alt="Image" /> 78 to nearest 10</td>
<td>Note that when recording numbers over 20:</td>
</tr>
<tr>
<td><img src="image19.png" alt="Image" /> 22 &lt; 54</td>
<td></td>
<td>78</td>
<td>22</td>
</tr>
<tr>
<td><img src="image20.png" alt="Image" /> twenty-two</td>
<td></td>
<td>70 75 50</td>
<td>(this is written with a hyphen between the tens &amp; ones)</td>
</tr>
</tbody>
</table>

Key steps in developing understanding of place value

1) Ten- 1 ten has a different value to 1 one
2) Tens and ones- Tens and ones can exist side by side
3) Number names- Instead of naming a number 1 ten and 4 ones we give it a name- fourteen
4) Hundreds, tens and ones- Children should be aware that when they have ten tens they must ‘regroup’ to make 1 hundred
5) Numbers can be broken into different parts. The number 36 can be 3 tens and 6 ones. It is also 2 tens and 16 ones
Primary Advantage Maths Programme 2015

Write in figures the number one thousand and thirty.

What number is ten less than 1002?

Way. Write the number that will be 10

Here are the first five numbers in a sequence: 420, 400, 380, 360, and 340. The sequence continues in the same

Write these numbers in order: 164, 146, 106, 160, 140 (from smallest to largest).

3 5 4 6. Use each of these digits once to make a total that is a

Write a calculation that you could do to check the answer to: 150 + 350 = 500

______ end in 3. Multiples of 5 ______ end in 5. Multiples of 10 ______ end in 0.

Circle three numbers that add to make 160: 10 30 50 70 60

Look at these digit cards: 6 9 7. Use each card once to make the largest number. Use each card once to make the smallest even number.

Look at these digit cards: 6 9 7. Use each card once to make the largest number. Use each card once to make the smallest even number.

Example Questions

Write these numbers in order of size, starting with the smallest: 903 1094 912 106 190

What number is ten less than four hundred and three?

Write these numbers in order of size, starting with the smallest: 903 1094 912 106 190

What number is ten less than four hundred and three?

To count in multiples of 50 and 100.

To find 10 or 100 more than a given number.

To find 10 or 100 less than a given number.

To count on and back in tens crossing hundreds from any given three digit number.

To count on and back in tens crossing hundreds from any given three digit number.

To know what happens when even numbers are added together.

To know what happens when even numbers are added together.

To create sequences with a given constraint, i.e. make a sequence with 107 and 116 in it.

To create sequences with a given constraint, i.e. make a sequence with 107 and 116 in it.

To identify all odd and even numbers up to 1000.

To identify all odd and even numbers up to 1000.

To round numbers to the nearest 10 or 100.

To round numbers to the nearest 10 or 100.

To know which numbers lie between given numbers. (What even numbers lie between 415 and 420?)

To know which numbers lie between given numbers. (What even numbers lie between 415 and 420?)

To know what odd number comes before 301?

To know what odd number comes before 301?

To identify all odd and even numbers up to 1000.

To identify all odd and even numbers up to 1000.

To use dienes and coins to understand place value.

To use dienes and coins to understand place value.
### Year 3 – Number and place value

**Progression (a combination of these models and images can be used for every objective)**

<table>
<thead>
<tr>
<th>From 3 digit numbers (concrete)</th>
<th>To find 1, 10 or 100 more than a given number (concrete).</th>
<th>Count on one hundred</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Concrete model" /></td>
<td><img src="image2" alt="Concrete model" /></td>
<td><img src="image3" alt="Concrete model" /></td>
</tr>
<tr>
<td>10 tens</td>
<td>103</td>
<td>221 + 100 = one hundred more than 221 is 321</td>
</tr>
<tr>
<td>= 1 hundred</td>
<td></td>
<td>221, 321</td>
</tr>
<tr>
<td>10, 20, 30, 40, 50, 60, 70, 80, 90, 100.</td>
<td>221 + 1 = one more than 221 is 222</td>
<td>221, 222</td>
</tr>
<tr>
<td>(ten hundreds = 1 thousand)</td>
<td>4 1 5</td>
<td>+ 1</td>
</tr>
</tbody>
</table>

**To represent 3 digit numbers (concrete)**

- 10 tens
- = 1 hundred
- 4 1 5
- = two hundred and twenty-one

**To find 1, 10 or 100 more than a given number (concrete).**

- 221
- 221 + 1 = one more than 221 is 222
- 221 + 10 = ten more than 221 is 231
- 221 + 100 = one hundred more than 221 is 321

**To recognise the place value of each digit in a three digit number.**

- 2 1 5
- Stands for: 2 hundreds or 200
- 1 ten or 10
- 5 ones or 5

**To use part, part whole to partition numbers in different ways.**

- 146 = 100 + 40 + 6 or 146 = 130 + 16
- 338
- 334
- First compare the hundreds, then the tens, then the ones
- 338 is greater than 334 (334 is smaller than 338)

**To compare numbers up to 1000.**

- 601 is greater than 476 and 259.
- 476 is greater than 259.
- In order from smallest: 259, 476, 601

**To use Dienes and coins to understand place value.**

- The idea of ‘regrouping’ can be reinforced through the exchanging of coins.

**To identify, represent and estimate numbers up to 1000 in numerals and words.**

- Write numbers in words:
  - 999 = nine hundred and ninety-nine
  - 234 = two hundred and thirty-four
  - 303 = three hundred and three

**To recognise the place value of different measures.**

- What number is here on the number line? How do you know?
- 500
- 1000
- 139cm = 100 cm + 30 cm + 9 cm (100cm = 1 metre)
### National curriculum

**Year 4**

- Count in multiples of 6,7,9,25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones)
- Order and compare numbers beyond 1000
- Identify, represent and estimate numbers using different representations
- Round any number to the nearest 10, 100, 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers.
- Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

### Key concepts

- Integer, positive, negative, above, below, zero, minus, next, consecutive, sort, classify, property.

### Learning objectives

- To represent 4 digit numbers (concrete-place value counters).
- To find 1, 10, 100 or 1000 more than a given number (concrete).
- To recognise the place value of each digit in a four-digit number.
- Order numbers beyond 1000.
- Compare numbers beyond 1000.
- Round any number to the nearest 10, 100, 1000. (To round appropriately given context see division strand)
- To identify and count in negative numbers.
- To estimate and round numbers using measuring instruments.
- To understand the history of different numeration systems.
- To read and understand Roman numerals.
- To understand the place value of decimals and fractions (see learning objectives in these strands).

### Mental maths

- To count in multiples of 6,7 and 9
- To count in multiples of 25 and 1000
- To count backwards through zero to negative numbers.
- To find 1,10, 100, 1000 more than any given number (with 4 or more digits)
- To find 1,10, 100, 1000 less than any given number (with 4 or more digits)
- To multiply by 10, 100 and 1000 (understanding that digits move to the left when multiplied by 10…).
- To know what the value of each digit is up to 10,000.
- To count on from any given number crossing boundaries (count on 7 in ones from 669, 70 in tens from 669, 700 in hundreds from 669, 7000 in thousands from 2669).
- To round any two or three digit number to the nearest 10 or 100.
- To round measurements in seconds, minutes, hours, metres, kilometres, litres to the nearest 10 or 100 units.
- Estimate calculations by approximating. (608+297 = 610+300 = approximately 910)
- Approximate multiplications (19x16 = 20x16 = (2x16) x10= 320)
- Extend and explain number sequences (48, 41, 34, 27…) continuing beyond zero.
- To notice a pattern when counting from zero in 2s, 4s then 8s (4s are double 2s, 8s are double 4s)
- To recognise odd and even numbers up to 10,000 and make general statements about them. (If you add odd numbers the answer is even. Check. Explain why?)

### Example Questions

The sum of two numbers is 100. Write the missing digits: \(3 \square + \square 3 = 100\)

Each missing digit in this sum is a 9 or a 1. Write in the missing digits. \(\square \square + \square \square \square = 201\)

Paul says, "Every multiple of 5 ends in 5". Is he correct? Explain how you know.

Write in figures the number five thousand and thirty.

Jet has these numbers: 1330 1303 1033 1004 1030. She writes them in order from smallest to largest. What is the fourth number she writes?

The temperature in London is 3°C. Paris is 9 degrees colder than London. What is the temperature in Paris?

Circle the numbers nearest to 1000. 1050 1340 1004 1040

Match 3500 to numbers with the same value: 35 hundreds 3500 ones 35 tens 350 tens 350 hundreds.

Write these prices in order from smallest to largest: 97p £11.50 £0.76 £8 £3.05

Write these amounts in order in the boxes: £60.06 £60.60 £6.60 £6.06

John makes a sequence of numbers. His rule is: “find half the last number, and then add 10”. Write the next two numbers in his sequence: 36 28 24 _ _

Circle the number that is about the same as the correct answer to 49 + 48. 10 50 40 100 70 200
To represent 4 digit numbers (concrete - place value counters)

Using place value counters:

\[
\begin{array}{c}
\text{Thousands} \\
\text{Hundreds} \\
\text{Tens} \\
\text{Ones}
\end{array}
\]

\[
\begin{array}{c}
1000 \\
100 \\
10 \\
5
\end{array}
\]

(Pupils to regroup tens 1s for 1 ten counter etc.)

\[
\begin{array}{c}
2341 + 10 = 2351
\end{array}
\]

\[
\begin{array}{c}
2341 + 100 = 2441
\end{array}
\]

\[
\begin{array}{c}
2341 + 1000 = 3341
\end{array}
\]

To find 1, 10, 100 or 1000 more than a given number (concrete).

\[
\begin{array}{c}
\text{Count on by tens}
\end{array}
\]

\[
\begin{array}{c}
\text{Count on by hundreds}
\end{array}
\]

\[
\begin{array}{c}
\text{Count on by thousands}
\end{array}
\]

To recognise the place value of each digit in a four digit number.

\[
\begin{array}{c}
\text{Thousands} \\
\text{Hundreds} \\
\text{Tens} \\
\text{Ones}
\end{array}
\]

\[
\begin{array}{c}
1000 \\
100 \\
10 \\
5
\end{array}
\]

Stand for:

- 1 thousand
- 2 hundred
- 1 ten
- 5 ones

\[
1000 + 200 + 10 + 5 = 1215
\]

In 7506 = 7 thousands, 5 hundreds, 0 tens and 6 ones

\[
7506 = 7000 + 500 + 0 + 6
\]

In 7506: The digit 6 is in the ones place, the digit 5 is in the hundreds place and the digit 7 is in the thousands place.

To compare numbers beyond 1000

\[
\begin{array}{c}
\text{Which is greater/smaller?}
\end{array}
\]

\[
\begin{array}{c}
2214 > 2421
\end{array}
\]

Arrange these numbers in order. Begin with the smallest.

6476, 4259, 4601

First compare the thousands.

6476 is greater than 4259 & 4601.

4601 is greater than 4259.

In or der from smallest: 4259, 4601, 6476.

To identify and count in negative numbers.

Negative numbers are numbers that are less than zero.

Ensure thermometer is shown in both directions

To estimate and round numbers using measuring instruments

How much water is there? To the nearest 10ml

What time is it to the nearest 5 minutes?

How much does this weigh? To the nearest 100g?

How long is this? To the nearest cm?

To understand the history of different numeration systems (Derek Haylock, Mathematics explained for primary teachers, 2006)

Egyptian Hieroglyphics

<table>
<thead>
<tr>
<th>Hieroglyph</th>
<th>Roman numeral</th>
<th>Hindu-Arabic</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>III</td>
<td>3</td>
</tr>
<tr>
<td>IV</td>
<td>IV</td>
<td>4</td>
</tr>
<tr>
<td>V</td>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
<td>10</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
<td>50</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>500</td>
</tr>
<tr>
<td>CCCLXVI</td>
<td></td>
<td>366</td>
</tr>
</tbody>
</table>

Roman numerals

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
</tr>
<tr>
<td>V</td>
<td>5</td>
</tr>
<tr>
<td>X</td>
<td>10</td>
</tr>
<tr>
<td>L</td>
<td>50</td>
</tr>
<tr>
<td>C</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>500</td>
</tr>
<tr>
<td>MMXV</td>
<td>2015</td>
</tr>
</tbody>
</table>

Egyptian Hieroglyphic system (3000BC) had separate symbols for ten, hundred, thousand, ten thousand, a hundred thousand and a million. The Romans (3000 years later) based their numeration system on a similar system including additional symbols for 5, 50 and 500. The Hindu Arabic system (used today) uses fewer symbols and is based on the place value system.

We know the value of the digit 2 based on where it is written i.e. 200, 20 or 2. The Roman system would record this as CC, XX or II. In our Hindu-Arabic place value system, all numbers can be represented using a finite set of digits: 0,1,2,3,4,5,6,7,8,9.

The system uses ten as a base (ten fingers to count).
Primary Advantage Maths Programme 2015

Year 5 – Number and place value  (When planning ensure you track back to year 4 and forwards to year 6)

**National Curriculum**

Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit.

Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000.

Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero.

Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000.

Solve number problems and practical problems that involve all of the above.

Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

**Learning objectives** (see overleaf for exemplification)

To represent 6 digit numbers (to 1,000,000) (concrete placebo value counters).

To recognise the place value of each digit in a six digit number.

To compare & order numbers to at least 1,000,000

To recognise and describe linear number sequences.

To find the term-to-term rule

To interpret negative numbers.

To round number to the nearest 10, 100, 1,000, 10,000 and 100,000

To round appropriately in context see division strand.

To count in steps of powers of 10 up to 1,000,000

Read Roman numerals (See progression year 4)

To understand decimals and fractions (see strands on decimals and fractions).

**Key concepts**

If we need to work in the concrete to consolidate our understanding we can use place value counters.

We work from left to right when determining the place value.

We increase the powers of ten as we move from right to left.

10 thousands = 1 ten thousands

When counting in steps of powers of 10, we are multiplying by ten which changes the place value.

The context for rounding is the most important element. Are pupils rounding up when buying packets of tiles for the floor (so as not be short of tiles) or are they rounding back to the nearest 5 minutes when catching a train (so as not to miss it).

The number line and use of ordinal numbers are useful when introducing the concept of negative numbers.

To associate positive and negative integers the number line can be shown both horizontally and vertically.

**Potential barriers/misconceptions**

As the numbers increase, pupils find it difficult to read numbers aloud.

When counting in 1000s pupils sometimes unsure what comes after 9000 (10,000). Also what comes before and after this number (9999, 10,001)

Pupils do not make the link between these numbers and real life contexts. (Could be linked to populations of countries, costs of items etc.).

Pupils counting in powers of ten are often ‘ill advisedly’ told that they need to ‘add a naught’. Children must observe the transformation of numbers as the digits move into new place on the place value grid.

-5 can also be referred to as ‘negative 5’ as ‘minus 5’ can suggest the need for subtraction.

**Notes and guidance (non-statutory)**

Pupils identify the place value in large whole numbers.

They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions they have met so far.

They should recognise and describe linear number sequences (e.g. 3, 3 1/2, 4, 4 1/2, ...), including those involving decimals and fractions, and find the term-to-term rule in words (for example, add 1 \( \frac{1}{2} \)).

**Example Questions**

\( \Box \) and \( \Delta \) each stand for a different number. What is their value?

\( \Box = 34 \)

\( \Box + \Delta = \Box + \Delta \)

Here are four digit cards. ‘7’ ‘5’ ‘2’ ‘1’ Choose two cards each time to make the following two-digit numbers. The first one is done for you: An even number - 52. A multiple of 9 - _ _ _ a square number - _ _ _ a factor of 96 - _ _ _

In the number 15083, what does the 5 represent? Thousands, hundreds, tens, ones.

A car costs more than £8400 but less than £9200. Tick the prices that the car could cost: £8397 £9190 £9230 £8999

Round each number to the nearest whole number: 5.01 8.51 6.65

James has 84 stamps. Emily has 57 stamps. Which of these is the best way to estimate how many stamps there are altogether: 90 + 60 = 150 80 + 60 = 140 80 + 50 = 130

What does the digit 3 in 305 642 represent?
**Numerical Place Value**

- **To represent 5 & 6 digit numbers (to 1 000 000)**
- **To recognise the place value of each digit in a six digit number.**
- **To compare & order numbers to at least 1 000 000**
- **To round numbers to the nearest 10, 100, 1000, 10 000 and 100 000**

**Progression (a combination of these models and images can be used for every objective)**

- **When comparing numbers look at the value of each of the digits starting from the left.**
- **Arrange these numbers in order. Begin with the smallest.**
  
  16476, 14259, 14601
  
  First compare the **Ten thousands**
  
  16476 is greater than 14259 & 14601.
  
  14601 is greater than 14259.
  
  In order from smallest: 14259, 14601, 16476.

- **We round off numbers so that we are able to estimate.**
- **We use the approximation sign ≈ to stand for approximately equal to. It shows rounding off of the numbers.**

**Round off to the nearest 100**

- What is 9872 rounded off to the nearest hundred?
  
  9872 is between 9800 and 9900
  
  9872 is nearer to 9900 than 9800
  
  9872 ≈ 9900

**Round off to the nearest 1000**

- What is 8276 rounded off to the nearest thousand?
  
  8276 is between 8000 and 9000
  
  8276 is nearer to 8000 than 9000
  
  8276 ≈ 8000

**To interpret negative numbers**

- Familiar contexts such as temperatures, multi-story buildings, heights above and below sea level and bank balances can give meaning to positive and negative integers.

**To explain rule for a sequence and work out what comes next.**

- **Fifty-two thousand, five hundred and twenty-two**
  
  Children should be able to read numbers when given as digits and write numbers when given as words.

**To count in steps of powers of 10 up to 1 000 000**

- Larger whole numbers than 9 are constructed using powers of the base: ten, a hundred, a thousand etc.

**Name of power** | **Numerals** | **Constructed from tens** | **Expressed as powers of ten in symbols** | **Expressed as powers of ten in words**
--- | --- | --- | --- | ---
A million | 1000000 | 10\(\times\)10\(\times\)10\(\times\)10\(\times\)10\(\times\)100000 = | 10^6 | Ten to the power six
A hundred thousand | 100000 | 10\(\times\)10\(\times\)10\(\times\)10\(\times\)10\(\times\)1000 = | 10^5 | Ten to the power five
Ten thousand | 10000 | 10\(\times\)10\(\times\)10\(\times\)10\(\times\)10 = | 10^4 | Ten to the power four
A thousand | 1000 | 10\(\times\)10\(\times\)10\(\times\)10 = | 10^3 | Ten to the power three
A hundred | 100 | 10\(\times\)10\(\times\)10 = | 10^2 | Ten to the power two
Ten | 10 | 10\(\times\)10 = | 10^1 | Ten to the power one
**National Curriculum**

Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.

Round any whole number to a required degree of accuracy Use negative numbers in context, and calculate intervals across zero.

**Notes and guidance (non-statutory)**

Pupils use the whole number system, including saying, reading and writing numbers accurately.

**Key vocabulary:** numeral, place value, order, round, stands for, represents, regroup, >, greater than, <, less than, integer, positive, negative, above, below, zero, minus, next, consecutive, sort, classify, property, factor, factorise, square, prime

**Key concepts**
The decimal point is used as the separator in the contexts of money and measurement. When counting in steps of powers of 10, we are multiplying by ten which changes the place value. When rounding numbers we talk about ‘rounding on’ and ‘rounding back’ to link to the number line/counting stick rather than rounding up and down.

The context for rounding is the most important element. Are pupils rounding up when buying packets of tiles for the floor (so as not be short of tiles) or are they rounding back to the nearest 5 minutes when catching a train (so as not to miss it)?

**Potential barriers/misconceptions**
Pupils counting in powers of ten are often ‘ill advisedly’ told that they need to ‘add a naught’. Children must observe the transformation of numbers as the digits move into new place on the place value grid.

Some pupils may still write three hundred and forty seven as 30047, showing a lack of understanding around zero acting as a place holder. When looking at the number 300, the position of the three is what makes it 300, rather than the zeros. The function of the zero is to make this position clear and to signify no tens and no ones.

Pupils may hear ‘tens’ and ‘hundreds’ if the wording is not articulated clearly when saying ‘tens’ and ‘hundreds’.

**Example Questions**

Imagine you have 25 beads. You have to make a three-digit number on an abacus. You must use all 25 beads for each number you make. Here are some digit cards: ‘2’, ‘4’, ‘6’, ‘6’. Write all the three digit numbers, greater than 500, that can be made using these cards.

Tariq makes a sequence of 5 numbers. The first number is 2. The last number is 18. His rule is to add the same number each time. Write the missing numbers: 2, _ _, _, _, 18

Sarah is working with whole numbers. She says: “If you add 2 two-digit numbers you cannot get a four-digit number”. Is she correct? Explain why.

The temperatures were: Inside: -2°C Outside: -10°C What is the difference between these two temperatures? The temperature inside an aeroplane is 20°C. The temperature outside is -30°C. What is the difference between these temperatures?

Round each decimal to the nearest whole number: 5.01 8.51 7.75

Write a half million in figures.

Write 2 and a half million in figures.

Which two of these numbers when multiplied together have the answer closest to 70? 7.4 8.1 9.4 10

Write a decimal which is greater than 0.7 and less than 0.71

Write these numbers in order of size. Starting with the smallest: 1.01 1.001 1.101 0.11

Write down a multiple of 4 that is greater than one thousand.

**Learning objectives** (see overleaf for exemplification)

To consolidate learning objectives from year 5

Then:

To understand the place value of 7 digit numbers

To identify negative integers.

To calculate intervals across zero.

To find the term-to-term rule.

To round any whole number (To round appropriately given context see division strand)

To extend place value to decimals

To identify decimal numbers on a number line

**Mental maths**

To count in multiples of any number up to x12 forwards and backwards from any given number.

To count in steps of powers of 10 up to 1 000 000 (see exemplification year 5)

To count in 11s, 15s, 21s, 25s then back. Can you go past zero?

To count in steps of 0.1, 0.5, 0.25 to 10 then back.

To multiply and divide whole numbers by 10, 100, 1000

To multiply and divide decimal numbers by 10, 100 and 1000

Count forwards and backwards with positive and negative whole numbers including through zero.

Know the value of every digit in six digit+ numbers.

To compare two numbers (which is less 4 thousands or 41 hundreds?).

To make the biggest/ smallest integer possible with a range of digits (i.e. 8 3 0 7 6 0 2).

To know 1000, 10,000, 100,000 more/less than any six digit number.

To round any whole number to the nearest multiple of 10, 100 or 1000

To multiply integers in order from smallest to largest crossing zero. (-37, 4, 29, -4, -28)

To make statements about identification of odd and even numbers.

To find all the prime factors of any number to 1000 (the prime factors of 60 are 2, 2, 3 and 5, since 60= 2x30 = 2x2x3x5.)

Use factors for finding products mentally (32x24 = 32 x 3 x 8 = 96 x 8 = 800 – (4 x 8) = 768

Identify numbers with an odd number of factors (squares)

Identify two digit numbers with only two factors (primes)

Identify two digit numbers with only two factors (primes)

Recognise prime numbers.
Year 6 – Number and place value

Progression (a combination of these models and images can be used for every objective)

To understand the place value of 7 digit numbers.

<table>
<thead>
<tr>
<th>Millions</th>
<th>Hundred Thousands</th>
<th>Ten Thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>4</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

One million, six hundred and forty-nine thousand.

In 1,649,000
The digit 1 stands for 1,000,000. The value of the digit 1 is one million
The digit 6 stands for 600,000. The value of the digit 6 is six hundred thousand
The digit 4 is in the ten thousands place. Forty thousand (40,000)
The digit 9 is in the thousands place. Nine thousand (9,000)

To identify negative integers.

Concrete apparatus cannot be used to teach negative integers.
Positive and negative integers are seen as reflections in zero.
+3 to be referred to as ‘positive three’.
-3 to be referred to as ‘negative three’.

To calculate intervals across zero.

Visual representations can be used to calculate the difference between positive and negative integers.

To order and compare numbers up to 10 000 000

When we compare numbers, we look at the value of each digit starting from the left.

9 hundreds is greater than 8 hundreds.
So 1,712,935 is greater than 1,712,846

To round any whole number

We use the approximation sign ≈ to stand for approximately equal to. It shows rounding off of numbers.

Estimate the value of 6327 x 7 (round off the 4 digit number to the nearest thousand first)
6327 x 7 = 6000 x 7 = 42000

Estimate the value of 6742 + 8 (6742 + 8 using knowledge of x8 tables)
6742 is nearer to 6400 than to 7200. So 6742 + 8 = 6400 + 8 = 6408.

To extend place value to decimals

1.35 can be explained in the context of length as 1 metre + 3 tenths of a metre + 5 centimetres

On the number line it lies between 1 and 2
It lies between 1.3 and 1.4
It lies between 1.34 and 1.36.

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Chapter 1 – Number and Place Value