Year 7 Intervention – Number and Place Value

Big Ideas

For whole numbers, the more digits a number has, the larger it must be: any 4-digit whole number is larger than any 3-digit whole number. But this is not true of decimal numbers: having more digits does not make a decimal number necessarily bigger.

Ordering decimal numbers uses the same process as for whole numbers ie we look at the digits in matching places in the numbers, starting from the place with the highest value ie from the left. The number with the higher different digit is the higher number.

We can think of place value in additive terms: 456 is 400 + 50 + 6, or in multiplicative terms: one hundred is ten times as large as ten

Excellence Defined – (can track back further if needed)

Year 5 Number and Place Value

To solve number and practical problems that involve reading, writing, ordering and comparing numbers to at least 1000,000 including negative whole numbers and decimals (2dp)

Year 6 Number and Place Value

To solve number and practical problems that involve reading, writing, ordering and comparing numbers to at least 10,000,000 including negative whole numbers and decimals (3dp)

Year 7 Number and Place Value

To solve increasingly complex number and practical problems by applying understanding of all four operations including decimal and negative numbers.

1. Number and Place Value
   - Have a secure understanding of the number system and recognise place value of numbers up to 10 million. (Including decimals)
   - Partition numbers in different ways (including decimals)
   - Order and compare whole numbers and decimals
   - Round numbers including decimals
   - Multiply and divide whole numbers and decimals by 10 and 100 and understand the effect this has on numbers.
   - Have a secure understanding of negative numbers and apply this in a range of contexts.

Milestone	Teaching points	Activities	Models/Images/Manipulatives to support
To recognise place value of numbers up to 10 million. (Including decimals)	• Must ensure pupils can read the numbers up to 10 million. • Putting larger numbers into a context – footballers wages, house prices, voting in TV shows, TV viewers, populations (things that the children are interested in)	• Using all of the digits from 0 to 9, write down a 10-digit number. What is the largest number you can write? What is the smallest number you can write? Write down the number that is one less than the largest number. Write down the number that is one more than the smallest number., • True or false? 'Using the digits 0 to 9 we can write any number, no matter how large or small.' Do you agree? Explain your reasoning.	Dienes apparatus Place Value charts Place value cards Digit cards Dice Calculators Bead strings Unifix or multi link cubes Cuisenaire rods Gattegno Chart Number Grid ITP
To partition numbers in different ways including decimals	• Ensure that children practise reading and writing numbers that contain a zero digit, such as 502, or a 'teen' number, such as 718. • Try the following if children make mistakes writing large numbers, for example writing 123 as 10023. – Demonstrate with place value	• How many different ways can you partition the number….. • What can we say about 48000? It is_____ less than 50000. It is made of 40000 and _____together. It is made of_____thousands. It is made of _____hundreds. It is made of _____tens.	Dienes apparatus Place value cards Cuisenaire rods Place Value Charts

	cards how the 20 and the 3 are placed on top of the 100 to form 123. – Ensure that children handle place value cards themselves. • Children should practise partitioning numbers in different ways (e.g. 327 = 300 + 20 + 7 = 300 + 10 + 17 = 200 + 120 + 7). This is key to understanding future calculation strategies. • Children need to appreciate that the position of a digit tells you about its value. – If children do not appreciate, for example, that the 3 in the number 231 has greater value that the 3 in the number 473, model this using the dots on the *Place value* ITP or using ones, tens and hundreds bundles of craft straws. – Use base 10 apparatus or money to demonstrate that ten ones make one ten and ten tens make one hundred.	Miss Wong, the teacher, has four cards. On each card is a number: 59 996 59 943 60 026 62 312 She gives one card to each pupil. The pupils look at their card and say a clue. Anna says, 'My number is 60 000 to the nearest 10 thousand.' Bashir says, 'My number has exactly 600 hundreds in it.' Charis says, 'My number is 59900 to the nearest hundred.' David says, 'My number is 60 000 to the nearest 10.' Can you work out which card each pupil had? Explain your choices. Think about the number 34 567 800. Say this number aloud. Round this number to the nearest million. What does the digit '8' represent? What does the digit '7' represent?	
To order and compare whole numbers and decimals	Build on understanding of decimals in the contexts of money and measures when working with decimal numbers with up to two places. However, decimal place value should also be planned for and taught in its own right and not just in those contexts.	• **Do, then explain** 747014 774014 747017 774077 744444 If you wrote these numbers in order starting with the smallest, which number would be third?	Number line ITP Number lines

	• Stress that although £1.26 is read as 'one pound twenty-six', the decimal number 1.26 is normally read as 'one point two six'. • Use number lines to help children read, write and order decimals. • Present children with numbers that have different numbers of decimal places for ordering, to tackle the common misconception that the more digits there are after the decimal point, the bigger the number. When ordering numbers such as 2.3 and 2.15, children may find it helpful to use zero as a place holder so that each number has the same number of decimal places, i.e. 2.30 and 2.15. • Ensure use and understanding of inequality signs when comparing numbers.	Explain how you ordered the numbers. • On a number line, which of these numbers is closest to 1? 0.2 0.95 1.2 1.9 Use words or diagrams to explain how you know. • Put the following in order from largest to smallest. 5.25, 15.3, 5.78, 5.87, 5.2, 1.5, 1.375, 1.4, 1.3, 1.35, 1.425 • Place these decimals on a number line from 6.9 to 7.1. 6.93, 6.91, 6.99, 7.01, 7.06	
To round numbers including decimals		• Round the dice decimals – Nrich • **What do you notice?** Give an example of a six digit number which rounds to the same number when rounded to the nearest 10000 and 100000 • **Possible answers** Two numbers each with two decimal places round to 23.1 to one decimal place. The total of the numbers is 46.2. What could the numbers be?	Number lines
Multiply and divide whole numbers and decimals by 10 and 100 and understand the effect this has on numbers.	Help children to generalise correctly so that they can cope with decimals. Multiplying by 10 gives an answer that is bigger than the original number and all the digits move one place to the left. Dividing by 10 gives an answer that is smaller than the original number and all the digits move one place to the right.	• Why do 6 × 100 and 60 × 10 give the same answer? • I divide a four-digit number by 100. The answer is between 70 and 75. What could the four-digit number be? • How do I convert 4527p into pounds? • Tom says: 'If I divide a four-digit number by 1000 it	Slider boards to multiply and divide numbers practically Moving Digits ITP

	Use visual images such as digit cards and a fixed decimal point or the Moving digits ITP to reinforce understanding. • Discuss common misconceptions, for example why 4.6 × 10 does not equal 4.60 and why 40.3 ÷ 10 is not the same as 4.3. • Create sequences of equations to explore the patterns involved when multiplying and dividing by 10, 100 or 1000, for example – 4.85 × 10 = 48.5 – 4.85 × 100 = 485 – 4.85 × 1000 = 4850 • Explore with children the relationships between the operations and how to simplify combinations of operations. For example, multiplying by 10 then dividing by 100 is the same as dividing by 10. Help children to recognise that dividing by 200 is the same as dividing by 10, dividing by 10 again and then halving, by using a calculator to explore different examples. • Emphasise that multiplication and division by 10, 100 and 1000 should be mental calculations. • Use conversion between units of measure as a context to consolidate and practise multiplying and dividing by 10, 100 or 1000. • Extend multiplying by 10, 100 and 1000 to multiplying by multiples of 10, 100 and 1000; for example, solve 3.4 × 200 by multiplying 3.4 by 100 and then doubling it.	always has a number after the decimal point.' Is he right? Explain your answer. Link to springboard materials https://12262.stem.org.uk/level_3_4/3_1_20.html	

Have a secure understanding of negative numbers and apply this in a range of contexts.	Give children a range of opportunities to position positive and negative numbers on number lines. This could include the use of practical washing lines, counting sticks and individual number lines. • Make sure that children experience number lines in different orientations. • Use a range of counting activities with different starting points and step sizes to emphasise that counting continues beyond zero. Use number lines to show the relative position between pairs of negative numbers and to demonstrate that –4 is less than –2. • Help children to use the benchmark numbers on a number line to determine the position of other numbers on that number line. • Help children to make connections between using benchmark numbers on a number line and reading the scale on a thermometer. • Use negative numbers in other contexts, for example, 'A diver is below the surface of the water at –30 m. He goes up 12 metres, then down 4 metres. Where is he now?'	• http://nrich.maths.org/5898 Tug Harder Circle two numbers which have a difference of 2 –1 –0.5 0 0.5 1 1.5 • What temperature is twenty degrees lower than six degrees Celsius? • A sequence starts at 500 and 80 is subtracted each time. 500 420 340 ... The sequence continues in the same way. Write the first two numbers in the sequence which are less than zero. • **True or False?** When I count backwards in 50s from 10 I will say -200 • **True or False?** The temperature is -3. It gets 2 degrees warmer. The new temperature is -5? • The difference between two numbers is 18 and one of them is negative. What could the two numbers be? • A scientist measured the temperature each day for one week at 06:00. On Sunday the temperature was 1·6°C. On Monday the temperature had fallen by 3°C. On Tuesday the temperature had fallen by 2·1°C. On Wednesday the temperature had risen by 1·6°C. On Thursday the temperature had risen by 4·2°C. On Friday the temperature had fallen by 0·9°C. On Saturday the temperature had risen by 0·2°C. What was the temperature on Saturday?	Thermometer ITP Number line ITP Vertical and horizontal number lines with negative numbers on.