The Sutton Academy

Knowledge Rich Curriculum Plan

Year 7 Core – Place Value and Calculations

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to read and interpret the place value of digits within a number.	• Students will know how to fill in a place value table with a range of integers and decimals. • Students will know how to identify the value of a digit within both large and small integers and decimals. • Students will know how to solve simple place value problems such as writing the smallest 3-digit number. • Students will know how to solve place value problems such as writing the largest possible sum from 4 digits.	**Place Value** – the value of a digit **Integer –** a whole number **Digit –** any of the numerals from 0 to 9.	• Students need to know how to read and write numbers of any size in words and digits.		
To learn how to compare and order numbers.	• Students will know how to order positive and negative integers. • Students will know that to order decimals we must compare each digit within the number individually, starting with the highest value digit. • Students will know how to order positive and negative integers in a real-life context. • Students will know how to use the symbols <, >, =, ≠ to compare small and large integer numbers. • Students will know how to use the symbols <, >, =, ≠ to compare positive and negative numbers. • Students will know how to use the symbols <, >, =, ≠ to compare decimals.	**Order –** the arrangement according to a particular sequence, pattern, or method. **Ascending –** smallest to largest **Descending** – largest to smallest **Negative –** Less than zero **Decimal –** a number whose number is separated by a decimal point.	• Students need to know how to order positive integers	<u>Steps to Success – Ordering Numbers</u> **Step 1:** Identify the first digit of each number and look at it's place value, the number with the greatest place value is biggest. **Step 2:** If the place value is the same, look at the size of the digit, If the digit is larger, then the number is larger. **Step 3:** If the value of the digits is the same, you go to the next digit to the right and compare the size of those digits. **Step 4:** Repeat until you have ordered all of the numbers	
To learn how to add and subtract decimals.	• Students will know how to add decimals using column addition. • Students will know how to subtract decimals using column subtraction. • Students will know how to solve real life problems involving the addition and subtraction of decimals e.g. money problems.	Use a spider diagram to show different words which mean to add. E.g. sum Use a spider diagram to show different words which mean to subtract. E.g. difference	• Students need to know how to add and subtract integers using column addition. ***IF STUDENTS STRUGGLE THIS IS WHERE THE PRIOR KNOWLEDGE CONSOLIDATION SLIDE IS ESSENTIAL!***	<u>Steps to Success – Adding Decimals</u> **Step 1:** Place the decimals in a column by lining up their decimal points **Step 2:** Add as usual **Step 3:** Ensure the decimal point in your answer is in the same place as the decimals above <u>Steps to Success – Subtracting Decimals</u> **Step 1:** Place the decimals in a column by lining up their decimal points **Step 2:** Subtract as usual **Step 3:** Ensure the decimal point in your answer is in the same place as the decimals above	
To learn how to add and subtract negative numbers.	• Students will know how to add and subtract with negative numbers using a number line. E.g. $4 - 7$ or $-3 + 5$ • Students will know how to solve real life problems involving adding and subtracting negative numbers. **Avoid using terminology such as 2 negatives make a positive.**		• Students need to know how to order positive and negative numbers.	<u>Adding and Subtracting Numbers</u> Think of positive numbers as **hot** and negative numbers as **cold**. **Adding a negative number** is like adding cold air to a room — it makes the room colder. So, the number goes **down**. **Subtracting a negative number** is like removing cold air from a room — it makes the room warmer. So, the number goes **up**.	

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<tr><th>Lesson objective</th><th>Intended Knowledge:</th><th>Tiered Vocabulary</th><th>Prior Knowledge:</th><th>Steps to Success</th><th>Feedback</th></tr>
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<td>To learn how to multiply and divide by powers of 10.</td>
<td>• Students will know how to multiply integers by 10, 100 and 1000.
• Students will know how to divide integers by 10, 100 and 1000.
• Students will know how to multiply decimals by 10, 100 and 1000.
• Students will know how to divide decimals by 10, 100 and 1000.</td>
<td></td>
<td>• Students need to know how to fill in and use a place value table.</td>
<td><u>Steps to Success – Multiplying by Powers of 10</u>
Step 1: Draw out a place value table like the one below to help you.
<table>
<tr><th>Thousands</th><th>Hundreds</th><th>Tens</th><th>Ones</th><th>.</th><th>Tenths</th><th>Hundredths</th><th>Thousandths</th></tr>
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Step 2: Align the digits of the number that you are multiplying by 10, 100 or 1000 etc. into the place value table
Step 3: Work out how many times you need to shift the digits to the left:
If you are multiplying by 10 shift all the digits 1 space to the left.
If you are multiplying by 100 shift all the digits 2 spaces to the left.
If you are multiplying by 1000 shift all the digits three spaces to the left and so on.
Step 4: Once you have shifted all digits the appropriate number of times you can then write this new number as your final answer.

Steps to Success – Dividing by Powers of 10
Step 1: Draw out a place value table like the one below to help you.
<table>
<tr><th>Thousands</th><th>Hundreds</th><th>Tens</th><th>Ones</th><th>.</th><th>Tenths</th><th>Hundredths</th><th>Thousandths</th></tr>
<tr><td></td><td></td><td></td><td></td><td>.</td><td></td><td></td><td></td></tr>
</table>
Step 2: Align the digits of the number that you are multiplying by 10, 100 or 1000 etc. into the place value table
Step 3: Work out how many times you need to shift the digits to the right:
If you are dividing by 10 shift all the digits 1 space to the right.
If you are dividing by 100 shift all the digits 2 spaces to the right.
If you are dividing by 1000 shift all the digits three spaces to the right and so on.
Step 4: Once you have shifted all digits the appropriate number of times you can then write this new number as your final answer.</td>
<td></td>
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</table>

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To learn how to multiply integers.	• Students will know how to multiply 2-digit integers by a 2-digit integer using column multiplication. • Students will know how to multiply 3-digit integers by a 2-digit integer using column multiplication. • Students will know how to solve real life problems involving the multiplication of integers using column multiplication.	Use a spider diagram to show different words which mean to multiply. E.g. product	• Students need to know how to multiply 2-digit and 3-digit integers by a 1-digit integer using column multiplication.	**Steps to Success – Multiplying integers.** **Step 1:** To start, write the bigger number over the smaller one, making sure that the 1s are above each other, the 10s are above each other and so on. Keeping everything in the right column is very important. **Step 2:** Then, we want to multiply each **component** of the top number by the unit of the second number and write the results of the multiplications under the line. Make sure to carry over any digit that does not belong in that column. **Step 3:** Now, we do everything we just did but this time, multiply each component of the top number by the tens. The only **difference** is because for e.g. a 2 represents a 20, everything is shifted one space to the left and a zero is put in the 1s column. For the completed step, using same methods as before. **Step 4:** Finally, we add together the two sets of numbers and write the final answer underneath the second line.	
To learn how to multiply decimals.	• Students will know how to multiply decimals by integers. • Students will know how to multiply decimals by decimals. **Opportunity for challenge:** • Students will know how to solve real life problem involving the multiplication of decimals using column multiplication.		• Students need to know how to multiply and divide by powers of 10. • Students need to know how to multiply 2-digit and 3-digit integers by a 2-digit integer using column multiplication.	**Steps to Success – Multiplying decimals.** **Step 1:** Multiply each number by powers of ten to transform it from a decimal to an integer. **Step 2:** Multiply the two integers using column multiplication. **Step 3:** Adjust your answer by dividing by the powers of 10 that you multiplied by at the start (for example if you multiplied one number by 10 and the other by 100 you would need to divide by 1000 (10 x 100).	
To learn how to divide integers.	• Students will know that multiplication and division are inverse operations of one another. • Students will know how to divide 2-digit and 3-digit integers by a 1-digit integers using short division. • Students will know how to divide 2-digit and 3-digit integers by 2-digit integers using short division. • Students will know how to use short division to produce a decimal answer – they will not express these answers using remainders. **Opportunity for challenge:** • Students will know how to solve simple real-life problems involving the division of integers.	Use a spider diagram to show different words which mean to divide. E.g. share	• Students need to know how to divide integers using short division.	**Steps to Success – Dividing** Example: 288 ÷ 9 **Step 1:** Draw a rotated L-shape with the number we are dividing (the dividend) on the inside, and the number we're dividing by (the divisor) on the outside. **Step 2:** From there, we ask how many times 9 goes into 2 and write the answer, zero, above the line, as before. Then, we write the remainder of this division, 2, in the gap just before the next digit of the dividend. **Step 3:** We ask how many times the divisor goes into the number formed by that remainder and the next digit, which here is 28. So, 9 goes into 28 three times with a remainder of 1, meaning we write a 3 above the line and a 1 in the gap before the third digit of the dividend. **Step 4:** This process is the same and repeats until we get to the end of the number. **Step 5:** If the divisor does not fit perfectly into the divided, you can either stop once you get to the end and take the final remainder to be the remainder of the whole division,	

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				or you can put in a decimal point and keep going until you are satisfied with how many decimal points you have.	
To learn how to divide with decimals.	• Students will know how to divide a decimal by an integer using short division. • Students will know how to divide a decimal by a decimal. • Students will know that they will not need to make any extra adjustments to their answer as its equivalent to the original divide. **Opportunity for challenge:** • Students will know how to solve simple real-life problems involving the division of decimals.		• Students need to know how to divide 2-digit and 3-digit integers by a 1-digit integers using short division. • Students need to know how to divide 2-digit and 3-digit integers by 2-digit integers using short division. • Students need to know how to multiply by powers of 10.	**Steps to Success - Dividing Decimals** **Step 1:** Write the question as a fraction. **Step 2:** Multiply both the numerator and denominator by an appropriate power of ten to eliminate the decimal in the denominator making sure to keep the fraction equivalent to the original question. **Step 3:** Divide the numerator by the denominator using the bus stop method where necessary.	
To learn how to multiply and divide negative numbers.	• Students will know how to multiply a positive number to a negative number. • Students will know how to multiply two negative numbers together. • Students will know how to divide when one number is positive and one is negative. • Students will know how to divide when both numbers are negative. Avoid using terminology such as 2 negatives make a positive.	Negative – less than zero	• Students need to know how to multiply and divide positive integers.		
To learn how to solve problems involving money.	• Students will know how to solve a mixture of simple money problems using addition, subtraction, multiplication and division without a calculator. • Students will know how to solve a mixture of simple money problems using addition, subtraction, multiplication and division with a calculator. **Opportunity for challenge:** • Students will know how to solve a mixture of more complex/multi-step money problems using addition, subtraction, multiplication and division.		• Students need to know how to add, subtract, multiply and divide with decimals.		
Mini-Assessment 1					