The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Foundation+ Number 1

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success:	Feedback
To learn how to calculate with negatives.	• 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 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. • 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. • Students will know how to solve real life problems involving multiplying and dividing of negative numbers. • Students will know how to square and cube positive and negative integers. • Students will know how to solve more complex problems involving negative numbers. **Avoid using terminology such as 2 negatives make a positive.**	**Negative –** Less than zero **A hinge point may help to ensure students start at the correct point.**	• Students need to know how to order negative and positive integers.		
To learn how to multiply decimals.	• Students will know how to multiply decimals using the column method. • Students will know how to solve worded problems involving multiplication of decimals. • Students will know how to solve money problems involving multiplication of decimals.	**Multiplication** – the process of calculating the product of two or more numbers **Decimal –** a number whose whole number part and the fractional part is separated by a decimal point **Integer –** a whole number **Place Value** – the value of a digit depending on its position within a number **Question students on the different words that are used to mean multiply.**	• Students need to know how to multiply and divide by powers of 10. Students need to know how to multiply integers using the column method.	**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 decimals.	• Students will know how to divide a decimal by an integer using short and long division. • Students will know how to divide a decimal by a decimal using short and long division. • Students will know how to solve multi-step problems involving division of decimals. • Students will know how to solve worded problems involving the division of decimals.	**Divide** – the act or process of separating or sharing **Question students on the different words that are used to mean divide.**	• Students need to know how to multiply by powers of 10. • Students need to know how to use short division involving integers.	**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 but keep the fraction equivalent to the original question. **Step 3:** Divide the numerator by the denominator using the bus stop method where necessary.	

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To learn how to apply numerical index laws.	• Students will know how to use the basic index laws for multiplication, division and brackets with integer bases where the powers are both positive and/or negative. • Students will know how to simplify more complex multi-step numerical expressions using the index laws. • Students will know how to find the value of a calculation involving the index laws. • Students will know how to interpret the power of 0. Students will know how to evaluate negative powers. They will know that a negative power means that you find the reciprocal.	**Index** – An index, or a power, is the small floating number that goes next to a number or letter **Reciprocal** – The reciprocal of a number is 1 divided by the number	• Students need to know how to find powers and roots.	**Steps to success – Index Laws** There are four index laws that we use to simplify expressions or write a number as a single power: • When the bases are the same and you're multiplying, add the indices. • When the bases are the same and you're dividing, subtract the indices. • When there are brackets, multiply the indices. • The **reciprocal** of a number is 1 divided by the number. For example, the reciprocal of 5 is $\frac{1}{5}$. To evaluate a negative power, first take the reciprocal, the index changes sign, then calculate it. • An additional rule is the power of 0; anything to the power of 0 equals 1.	
To learn how to estimate.	• Students will know how to estimate answers to simple calculations. • Students will know how to estimate answers to more complex, multi-step calculations including where there is a decimal in the denominator. • Students will know how to estimate roots. **Opportunity for challenge:** • Students will know how to estimate to solve worded problems.	**Rounding –** making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use **Significant –** important **One significant figure** –the first non-zero digit which has the most value **Estimate –** an approximate calculation of the value of something	• Students need to know how to round to 1 significant figure. • Students need to know how to divide by a decimal.	**Steps to Success - Estimation** **Step 1:** Round the values in the question to **1 significant figure.** **Step 2:** Use BIDMAS to calculate the answer making sure to show each step.	Is the challenge easier that the decimal questions? LHE
To learn how to find the HCF and LCM using a Venn diagram.	• Students will know how to find the product of prime factors and write the solution in index form. • Students will know how to find the highest common factor (HCF) of two numbers using a Venn diagram. • Students will know how to find the lowest common multiple (LCM) of two numbers using a Venn diagram. • Students will know how to solve worded problems involving the LCM.	**Multiple –** a number in the given number's multiplication tables **Factor –** a number that divides into a given number without leaving a remainder **Common –** shared **Highest Common Factor** – the largest number that both or all of the numbers can be divided by **Lowest Common Multiple** – the smallest number that is in both numbers' times tables **Prime Number** – a number that has exactly 2 factors - 1 and the number itself. **Product** – the result of multiplication	• Students need to know how to find the HCF and LCM of two numbers using lists.	**Steps for Success – Product of prime factors** **Step 1:** To construct a factor tree, think of 2 numbers which multiply together to make the integer in the question. **Step 2:** Draw two branches coming down from the integer, and at the end of the branches write the two factors that you chose. **Step 3:** If a factor is prime, then circle it. If a factor is not prime, then repeat the process until each number at the end of each branch is prime. **Step 4:** Write the prime factors as a product in index form. **Steps for Success – Finding the HCF and LCM from Venn diagrams.** **Step 1:** Find the product of prime factors for both numbers. **Step 2:** Now draw a Venn diagram where each circle represents each number. **Step 3:** Cross off a common factor from both lists and place the number in the overlap/intersection of the Venn diagram. Repeat this until there are no common factor left. **Step 4:** Place any remaining numbers from the lists into the circle that represents that number. **Step 5:** To find the **HCF**, we multiply the numbers in the intersection (these are the factors that are common between both numbers). To find the **LCM** we multiply all of the numbers in the Venn diagram together.	

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		Product of Primes – a product in which every factor is a prime number **Intersection** – the overlap of a Venn diagram **Split the vocabulary up between sections of the lesson.**			
To learn how to convert between standard form and ordinary numbers.	• Students will know that a number written in standard form is written as a x 10^n where $1 \leq a < 10$ • Students will know how to write large and small numbers in standard form in the form a x 10^n where $1 \leq a < 10$ • Students will know how to convert numbers from standard form back into ordinary numbers. • Students will know when a number is/isn't written in standard form because either $a > 10$ or $a < 0$ • Students will know how to adjust a number written in the form a x 10^n where $a > 10$ or $a \leq 0$ so that it is written in standard form (in the form a x 10^n where $1 \leq a < 10$) • Students will know how to compare numbers written in standard form and how the x10^n affects the size of one number compared with another.	**Standard form -** a way of writing down very large or very small numbers easily, a number is written in standard form when it is written in the form a x 10^n where $1 \leq a < 10$	• Students need to know how to multiply and divide by powers of 10.	**Steps to Success - Writing numbers in standard form** **Step 1:** To write a number in standard form put the decimal point after the first significant figure. This will give you 'a' between 1 and 10. **Step 2:** Work out how many times you would have to multiply or divide that number by 10 to get the original number. **Step 3:** Write this after your number as x10^n where n is positive if the number needs multiplying by 10 and negative if we need to divide the number by 10. The value of n tells us how many times we need to multiply or divide by 10. **Steps to Success - Converting numbers out of standard form** To convert a number that is written in the form $a \times 10^n$ out of standard form, when n is positive multiply the 'a' by 10, *n* times. When *n* is negative divide the 'a' by 10, *n* times.	
To learn how to add, subtract, multiply and divide numbers written in standard form.	• Students will know that to add and subtract numbers written in standard form. • Students will know how to multiply numbers in standard form. • Students will know how to divide numbers in standard form. • Students will know how to solve more complex problems with numbers written in standard form both with and without a calculator (as appropriate).		• Students need to know how to convert from standard form to ordinary numbers and vice versa.	**Steps to Success - Adding and subtracting numbers in standard form** **Step 1:** Write the numbers as ordinary numbers by multiplying or dividing by powers of 10. **Step 2:** Add or subtract the numbers using the column method. **Step 3:** Convert your answer into standard form, if necessary. **Steps to Success – Multiplying numbers in standard form** **Step 1:** Multiply the 'a' for each number written in standard form. **Step 2:** Multiply the two 10^n parts. Remember that we will need to add the powers. **Step 3:** Put the two parts back together. **Step 4:** If necessary, check your answer is written in standard form, if not you will need to adjust your answer. **Steps to Success – Dividing numbers in standard form** **Step 1:** Divide the 'a' for each number written in standard form. **Step 2:** Divide the two 10^n parts. Remember that we will need to subtract the powers. **Step 3:** Put the two parts back together. **Step 4:** If necessary, check your answer is written in standard form, if not you will need to adjust your answer.	
Exam Preparation 1					