The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Intermediate – 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. • **Avoid using terminology such as 2 negatives make a positive.**	**Negative –** Less than zero	• 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.	**Integer –** a whole number **Decimal –** a number whose whole number part and the fractional part is separated by a decimal point **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 10, 100, 1000 etc. • 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.	
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.	**Index** – An index, or a power, is the small floating number that goes next to a number or letter	• 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. • An additional rule is the power of 0; anything to the power of 0 equals 1.	

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To learn how to interpret fractional and negative indices.	• Students will know how to evaluate negative powers. • Students will know how to evaluate fractional powers where the power is a unit fraction (e.g. 1/2, 1/3) • Students will know how to evaluate more difficult fractional powers where the power is a non-unit fraction (e.g. 2/3) **Opportunity for challenge:** • Students will know how to evaluate a mixture of negative and fractional powers.	**Reciprocal** – The reciprocal of a number is 1 divided by the number	• Students need to how to use a mixture of the index laws.	**Steps to success – Negative indices** • To evaluate a negative power, first take the reciprocal, the index changes sign, then calculate it. **Steps to Success - Fractional indices** • A power of $\frac{1}{2}$ means that you find the square root of the base. • A power of $\frac{1}{3}$ is cube root, and a power of $\frac{1}{4}$ is 4th root, and so on! • When the power is a fraction with a **numerator** that isn't 1, we have to find the root indicated by the **denominator** and then raise the answer to the power of the numerator. Algebraically this can be written as: $a^{\frac{b}{c}} = (\sqrt[c]{a})^b$	
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.	**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.	
To learn how to find error intervals.	• Students will know how to find the upper and lowers bounds of numbers given to varying degrees of accuracy. • Students will know how to use inequality notation to specify error intervals due to rounding. • Students will know how to use inequality notation to specify error intervals due to truncation.	**Upper bound** – an element greater than or equal to all the elements in a given set **Lower bound** – an element less than or equal to all the elements in a given set **Error interval** – an expression written using inequalities that shows the range of possible values that a number could have been before it was rounded or truncated. **Inequality –** a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. >, <, ≥ and ≤ **Truncated –** cut off Split the vocabulary up between sections of the lesson.	• Students need to know how to round to different degrees of accuracy.	**Steps to Success – Finding Upper and Lower Bounds** **Step 1:** List the values with the same degree of accuracy that would come before and after the number that has been rounded with the number in the question in the middle. **Step 2:** Find the midpoint of the lowest value and the value that has been rounded – this is the lower bound. **Step 3:** Find the midpoint of the highest value and the value that has been rounded – this is the upper bound.	
Exam preparation 1					