The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Intermediate Number 2

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success:	Feedback
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.	**Multiple –** A multiple is a number in the given number's multiplication tables **Factor –** A factor is 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 **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.**	• Students need to know how to identify factors, multiples and prime numbers from a list.	**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.	
To learn how to solve real life problems involving the HCF and LCM.	• Students will know how to solve more complex problems using HCF, LCM and prime numbers including problems involving real life contexts. • Students will know how to solve worded problems involving the LCM. **Opportunity for challenge:** • Students will know how to find the LCM and HCF from index notation. E.g. $A = 2 \times 3^2 \times 5$ and $B = 2^3 \times 3 \times 7$.		• Students need to know how to find the LCM of two numbers from lists.	**Steps to Success- Lowest common factor problems** **Step 1:** List the first 5-10 multiples of both numbers. **Step 2:** Identify the first multiple that is in both multiplication tables, this is the Lowest Common Multiple. **Step 3:** • If the question is asking what the next time the events occur at the same time, then add the LCM to the time given in the question. Take care when going over an hour. • If the question is asking how many packs or packets items are in, then count down your lists to see how many packs of each item you need to get that LCM.	

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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 be able 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 and subtract numbers written in standard form.	• Students will know that to add and subtract numbers written 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.	
To learn how to multiply and divide 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 the index laws for multiplication and division.	**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.	
To learn how to simplify, multiply and divide surds.	• Students will know how to simplify surds by breaking it down into two factors, one of which is a square number • Students will know how to multiply surds in the form $\sqrt{a} \times \sqrt{b}$ • Students will know how to multiply surds in the form $a\sqrt{b} \times c\sqrt{d}$ • Students will know how to simplify their answers once they have multiplied surds. • Students will know how to divide surds in the form $\sqrt{a} \div \sqrt{b}$ • Students will know how to divide surds in the form $\frac{\sqrt{a}}{\sqrt{b}}$ • Students will know how to divide surds in the form $a\sqrt{b} \div c\sqrt{d}$ • Students will know that $(\sqrt{a})^2 = a$	**Surd –** a square root which cannot be reduced to a whole number. Surds are irrational numbers. **Irrational Numbers** – Numbers which, when written in decimal form, would go on forever without any repeating pattern	• Students need to know how to calculate squares and square roots.	**Steps to Success – Simplifying Surds** **Step 1:** Find a factor pair for the number in the root. One of the numbers in the factor pair must be a square number. **Step 2:** Rewrite the surd as $\sqrt{factor\ a} \times \sqrt{factor\ b}$ **Step 3:** Square root the number that can be square rooted. **Step 4:** Rewrite the answer in the form $c\sqrt{b}$ where c is the square root of factor a. **Steps to Success – Multiplying Surds** **Step 1:** Multiply integers by integers. **Step 2:** Multiply roots by roots. **Step 3:** Combine the answer and simplify where possible. **Steps to Success – Dividing Surds** **Step 1:** Divide integers by integers.	

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				Step 2: Divide roots by roots. **Step 3:** Combine the answer and simplify where possible.	
To learn how to add and subtract surds.	• Students will know that to add and subtract surds we use similar rules to collecting like terms and that therefore √a + √a = 2√a etc. • Students will know how to add and subtract surds.		• Students need to know how to simplify surds. • Students need to know their powers and roots.	**Steps to Success – Adding and Subtracting Surds** **Step 1:** Ensure the number under the root is the same, if not simplify each of the surds as much as possible. **Step 2:** Collect any roots with the same number together like you would with algebra (for instance $3\sqrt{a} + 5\sqrt{a} = 8\sqrt{a}$). ***Remember you can only collect the same roots together!***	
Exam preparation 2					