



The Sutton Academy

# Knowledge Rich Curriculum Plan

Year 10 Intermediate - Ratio and Proportion

| Lesson                                                    | Intended Knowledge:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Tiered Vocabulary                                                                                                             | Prior Knowledge:                                                                                                                                                                                      | Steps to Success:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Feedback |
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| <b>To learn how to share an amount into a ratio.</b>      | <ul style="list-style-type: none"> <li>Students will know how to share a quantity into a two-part given ratio.</li> <li>Students will know how to share a quantity into a three-part given ratio.</li> <li>Students will know how to find quantities within a ratio when the difference between two parts is given.</li> <li>Students will know how to solve ratio problems with context.</li> </ul> <p><b>Opportunity for challenge:</b></p> <ul style="list-style-type: none"> <li>Students will know how to solve more complex ratio problems including those which involve percentages and fractions.</li> </ul>                                                                            | <p><b>Ratio</b> - a way of representing the relationship between two amounts</p> <p><b>Share</b> – split up between parts</p> | <ul style="list-style-type: none"> <li>Students will know how to simplify ratios in their simplest form.</li> <li>Students will know how to simplify ratios in the form of 1 : n or n : 1.</li> </ul> | <p><b>Steps to Success – Sharing an amount into a ratio</b></p> <p><b>Step 1:</b> Represent the parts of the ratio in the form of boxes – remember to assign the ratio in the order of the question.</p> <p><b>Step 2:</b> Count the number of the part. Divide the total amount by the number of parts. This will give you the amount that each part is worth.</p> <p><b>Step 3:</b> Write the value of each part within the box.</p> <p><b>Step 4:</b> Calculate the totals for each section of the ratio.</p> <p><b>Step 5:</b> Check that you have answered the question. You may only need to state one amount rather than every amount.</p> <p><b>Steps to success: Ratio - Given one quantity</b></p> <p><b>Step 1:</b> Represent the parts of the ratio in the form of boxes – remember to assign the ratio in the order of the question.</p> <p><b>Step 2:</b> If you are given one value divide the amount by the number of parts for the person it is referring to.</p> <p><b>Step 3:</b> Write the value of each part within the box</p> <p><b>Step 4:</b> Calculate the totals for each section of the ratio.</p> <p><b>Step 5:</b> Check if the question is asking for one value or for the total amount.</p> <p><b>Steps to success: Ratio – Given the difference</b></p> <p><b>Step 1:</b> Represent the parts of the ratio in the form of boxes – remember to assign the ratio in the order of the question.</p> <p><b>Step 2:</b> Count the <b>difference</b> in the number of the parts. Divide the difference by the difference in the number of parts. This will give you the amount that each part is worth.</p> <p><b>Step 3:</b> Write the value of each part within the box.</p> <p><b>Step 4:</b> Calculate the totals for each section of the ratio.</p> <p><b>Step 5:</b> Check if the question is asking for one value or for the total amount.</p> |          |
| <b>To learn how to solve harder ratio problems.</b>       | <ul style="list-style-type: none"> <li>Students will know how to combine ratios and use them for comparison between three parts.</li> </ul> <p><b>Opportunity for challenge:</b></p> <ul style="list-style-type: none"> <li>Students will know how to combine ratio to express part of the ratio as a fraction.</li> <li>Students will know how to combine ratios to share an amount into the new ratio.</li> </ul>                                                                                                                                                                                                                                                                             | <p><b>Combine</b> – merge together</p>                                                                                        | <ul style="list-style-type: none"> <li>Students need to know how to find the LCM of two numbers.</li> </ul>                                                                                           | <p><b>Steps to Success - Combining ratios</b></p> <p><b>Step 1:</b> Identify the common element between the two ratios.</p> <p><b>Step 2:</b> Find the LCM of the two parts that are in common.</p> <p><b>Step 3:</b> Multiply both ratios in order to make the parts in common equal.</p> <p><b>Step 4:</b> Combine the two ratios, simplify if possible.</p> <p><b>Step 5:</b> Check if the question is asking to share between the combined ratio, the simplified combined ratio or a different ratio.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
| <b>To learn how to identify the best value for money.</b> | <ul style="list-style-type: none"> <li>Students will know how to find the best value for money between 2 or 3 given values.</li> <li>Students will know how to find the best value for money where a conversion in money is needed. E.g. One given in pounds and one given in pence.</li> <li>Students will know how to find the best value for money where a conversion in the amount is needed. E.g. One is given in ml and one in litres.</li> </ul> <p><b>Opportunity for challenge:</b></p> <ul style="list-style-type: none"> <li>Students will know how to find the best value for money in more complex scenarios where percentage discounts or fractions are also involved.</li> </ul> | <p><b>Value</b> – how much money something is worth</p>                                                                       | <ul style="list-style-type: none"> <li>Students will need to know how to find the LCM of two numbers.</li> </ul>                                                                                      | <p><b>Steps to Success – The best value for money</b></p> <p><b>Method 1 – Finding the price of one item</b></p> <p><b>Step 1:</b> Divide the cost by the amount. You must show all of your working.</p> <p><b>Step 2:</b> Write down the full answers and do not round anything.</p> <p><b>Step 3:</b> Pick the smallest value.</p> <p><b>Step 4:</b> Remember to write the name of the item that is the best value for money.</p> <p><b>Method 2 – Finding the LCM of each item</b></p> <p><b>Step 1:</b> Find the lowest common multiple of each quantity. Write down all of your working.</p> <p><b>Step 2:</b> Multiply the cost of each item in order to get the LCM quantity of each item, this is so you can compare.</p> <p><b>Step 3:</b> Pick the smallest value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |

| Lesson                                                                            | Intended Knowledge:                                                                                                                                                                                                                                                                                                                                                                                                                      | Tiered Vocabulary                                                                                                                                                                                                                                                       | Prior Knowledge:                                                                                                                                                                        | Steps to Success:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Feedback |
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|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                         | <b>Step 4:</b> Remember to write the name of the item that is the best value for money.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |
| To learn how to convert currencies.                                               | <ul style="list-style-type: none"> <li>Students will know how to convert between different currencies.</li> <li><b>Opportunity for challenge:</b></li> <li>Students will know how to solve problems involving the conversion of different currencies.</li> </ul>                                                                                                                                                                         | <p><b>Currency</b> – a system of money in general use in a particular country</p> <p><b>Convert</b> – change a value from one form to another</p> <p><b>Cultural capital</b></p>                                                                                        | <ul style="list-style-type: none"> <li>Students need to know how to multiply decimals.</li> <li>Students need to know how to divide decimals.</li> </ul>                                | <p><b>Steps to Success – Currency conversion</b></p> <p><b>Step 1:</b> Highlight the exchange rate given in the question.</p> <p><b>Step 2:</b> Establish which way you are using the exchange rate. Are you going to multiply or divide?</p> <p><b>Step 3:</b> Carry out the calculation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |
| To learn how to solve real life problems involving direct and inverse proportion. | <ul style="list-style-type: none"> <li>Students will know how to solve real life problems involving direct proportion including money problems.</li> <li>Students will know how to solve real life problems involving inverse proportion without using algebra (e.g. number of worker problems etc.).</li> </ul>                                                                                                                         | <p><b>Direct Proportion</b> – if one number increases, then so does the other or if one decreases then so does the other</p> <p><b>Inverse</b> – Opposite</p> <p><b>Inverse Proportion</b> – if one number increases, then the other number decreases or vice versa</p> | <ul style="list-style-type: none"> <li>Students need to know how to multiply and divide decimals.</li> </ul>                                                                            | <p><b>Steps to Success – Direct Proportion</b></p> <p><b>Step 1:</b> Divide each value by the number of items that is equal to it. This will get the value for 1 person/item.</p> <p><b>Step 2:</b> Multiply the amount for 1 person/item by the amount you need.</p> <p><b>Steps to Success – Inverse Proportion</b></p> <p><b>Step 1:</b> Multiply each value by the number of items that is equal to it. This will get the time for 1 worker/machine.</p> <p><b>Step 2:</b> Divide the time for 1 worker/machine by the amount you need.</p> <p><b>Double check that your answer makes sense for what is being asked.</b></p>                                                                                                                                                                               |          |
| To learn how to solve algebraic direct proportion problems.                       | <ul style="list-style-type: none"> <li>Students will know how to set up a direct proportion equation.</li> <li>Students will know how to find the constant of proportion.</li> <li>Students will know how to use the equation of direct proportion to find other values.</li> <li><b>Opportunity for challenge:</b></li> <li>Students will know how to solve algebraic direct proportion problems involving powers and roots.</li> </ul> | <p><b>Constant</b> – a quantity that does not change its value</p>                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Students need to know how to substitute numbers into formulae.</li> <li>Students need to know how to solve one step linear equations.</li> </ul> | <p><b>Steps to Success – Algebraic direct proportion</b></p> <p>If <math>y</math> is directly proportional to <math>x</math>, this can be written as <math>y \propto x</math></p> <p>An equation of the form <math>y = kx</math> represents direct proportion, where <math>k</math> is the constant of proportionality.</p> <p><b>Step 1:</b> Write out the equation <math>y = kx</math>, attaching the appropriate power to the 'x' and using the variables given in the question.</p> <p><b>Step 2:</b> Substitute in the given values.</p> <p><b>Step 3:</b> Solve the resulting equation to find <math>k</math>.</p> <p><b>Step 4:</b> Rewrite the equation with the value for <math>k</math>.</p> <p><b>Step 5:</b> Substitute in the given value to find the missing variable the question asks for.</p> |          |
| Exam Preparation 9                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |