

Transition: Advanced Multiplicative to Advanced Proportional Domain: Multiplication and Division

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| <b>Achievement Objectives</b> | <b>Number: Levels Four and Five</b>   |
|                               | <p><b>Level Four</b><br/> <u>Number strategies and Knowledge A01:</u><br/>                     Use a range of multiplicative strategies when operating on whole numbers.</p> <p><b>Level Five</b><br/> <u>Number strategies and Knowledge A02:</u><br/>                     Use prime numbers, common factors and multiples, and powers [including square roots].<br/> <u>Number strategies and Knowledge A06:</u><br/>                     Know and apply standard form, significant figures, rounding, and decimal place value.</p> |

| Strategies being developed   | Problem progression   | References   | Knowledge being developed  | Resources  |
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| Use exponents to solve multiplication problems, including those with areas and volumes | $8 \times 16 = \square$ from $2^3 \times 2^4 = 2^7$<br>$27 \times 243 = \square$ from $3^3 \times 3^5 = 3^8$<br>$64^2 = \square$ from $4^3 \times 4^3 = 4^6$<br>$\sqrt{64} = \square$ from $8^2 = 64$<br>$\sqrt{900} = \square$ from $30^2 = 900$<br>$\sqrt[3]{125} = \square$ from $5^3 = 125$ | <p><b>Teaching Multiplication and Division (Book 6)</b><br/> <a href="#">Powerful Numbers</a> (73-75)</p> <p><b>Teaching Number Sense and Algebraic Thinking</b><br/> <a href="#">Squaring</a> (28)<br/> <a href="#">Square Roots</a> (29)<br/> <a href="#">Cubes and Cube Roots</a> (30)</p> <p><b>Figure It Out</b><br/>                     N3-4.1 <a href="#">Using Exponents</a> (22)<br/>                     N7/8 4.4 <a href="#">Family Trees</a> (13)<br/>                     N7/8 4.4 <a href="#">Building Squares</a> (14)<br/>                     N7/8 4.6 <a href="#">Powerful Thought</a> (4)<br/>                     N7/8 4.6 <a href="#">Factor Towers</a> (7)<br/>                     N7/8 4.6 <a href="#">Tiling Teasers</a> (8)<br/>                     N7/8 4.6 <a href="#">Alien Counting</a> (12)<br/>                     N7/8 4.6 <a href="#">Alien Bacteria</a> (20)</p> | Know simple powers of numbers to 10, e.g. $2^4 = 16$ , $5^3 = 125$ | <p><b>Figure It Out</b><br/>                     N7/8 4.4 <a href="#">Calculator Power</a> (16)<br/>                     N7/8 4.4 <a href="#">Cubic Capacity</a> (17)<br/>                     N7/8 4.4 <a href="#">Growing Pains</a> (18)<br/>                     N7/8 4.4 <a href="#">Fold and Crease</a> (19)<br/>                     N7/8 4.4 <a href="#">Pip's Pay</a> (20)<br/>                     NS&amp;AT3.1 <a href="#">The Power of Powers</a> (14-15)</p> |

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|---|--|---|--|-----------|
| Solve missing factor problems by reversing, e.g. $263 \times ? = 456$ by $456 \div 263 = ?$ | $6 \times \square = 222$ by $222 \div 6 = 37$<br>$\square \times 9 = 657$ by $657 \div 9 = 73$<br>$2.4 \times \square = 20.64$ by $20.64 \div 2.4 = 8.6$<br>$\square \times 0.63 = 23.184$ by $23.184 \div 0.63 = 36.8$  | <b>Teaching Number Sense and Algebraic Thinking (Book 8)</b><br><a href="#">Reversals for Multiplication and Division</a> (10)  | Know what happens when a whole number or decimal is multiplied or divided by a power of ten, e.g. $4.57 \times 100 = 457$ , $6.3 \div 0.9 = 7$<br>Know the divisibility rules for 2,3,4,5,6,8,9 and 10, e.g. 568 is divisible by 4 since 68 is divisible by 4  |           |
| Use estimation to check the answers to multiplication and division problems.                | $48 \times 32 \approx 50 \times 30 = 1500$<br>$196 \times 14 \approx 200 \times 14 = 2800$<br>$2718 \div 9 \approx 2700 \div 10 = 27$<br>$3283 \div 49 \approx 3300 \div 50 = 4966$<br>$7.7 \times 4.3 \approx 8 \times 4 = 32$<br>$57.6 \div 8.2 \approx 56 \div 8 = 7$<br>$591.61 \div 88.3 \approx 600 \div 90 \approx 7$ | <b>Teaching Number Sense and Algebraic Thinking (Book 8)</b><br><a href="#">Checking Multiplication by Estimation</a> (11)<br><a href="#">Checking Division by Estimation</a> (11)<br><b>Figure It Out</b><br>N 3-4 <a href="#">Hard Times</a> (15)<br>N 3-4 <a href="#">Multiplication Roundabouts</a> (16)<br>BF 3-4 <a href="#">Trying Times</a> (2)<br>BF 3-4 <a href="#">Eleventh Heaven</a> (3)<br>BF 3-4 <a href="#">Napier's Bones</a> (8-9)<br>N 7/8 L 2 <a href="#">Planting with the Whānau</a> (6-7)<br>N 7/8 L 2 <a href="#">Fun Times</a> (13)<br>N 7/8 L 2 <a href="#">Divisive Tactics</a> (14)<br>NS 7/8 1 L <a href="#">It pays to win</a> (18)<br>NS 7/8 1 L <a href="#">Grocery Grapplers</a> (20)<br>NS 7/8 1 L <a href="#">Division Dilemmas</a> (24)<br>NS&AT3.2 <a href="#">Pizza Split</a> (6-7)<br>N3 <a href="#">Standing Room Only</a> (4)<br>N 3-4 <a href="#">Division Delights</a> (18)<br>N 3-4 <a href="#">Digital Dilemmas</a> (19) | Perform short multiplication and division with whole numbers and decimals, using standard algorithms, and explain how they work.<br>Perform multiplication of multi-digit whole numbers and decimals, using a standard algorithm, and explain how it works<br>Identify highest common factors and least common multiples, e.g. Highest common factor of 48 and 64 is 8 |           |

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