3 - 5 Strategy Progressions

Grade 3	Grade 4	Grade 5
Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8x5=40, one knows 40 ÷5=8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. **Strategies Used** ***Multiplying by 1 and 2 have already been introduced in grade 2.** **a) Multiplying by 10:** Counting by 10s. e.g., 10x3= 10+10+10=30 or 10, 20, 30 **b) Multiplying by 5:** Counting by 5s. e.g., 5x4=5+5+5+5=20 or 5, 10, 15, 20 **c) Multiplying by 0:** If either factor is 0 the product is always 0. e.g., 0x7=0 **d) Multiplying by 3:** Multiply by 2 and add 1 more group. e.g., 3x4= (2x4) + (1x4)=12 **e) Multiplying by 4:** Double a double. e.g., 4x6=(2x6)+(2x6)=12+12=24 **f) Multiplying by 6:** Double a multiple of 3. e.g., 6x5=(3x5)+(3x5)=15+15=30 **g) Multiplying by 9:** The product of x 9 is 1 group less than the product of the same x10 fact. e.g., 9x7= (10x7)-(1x7)= 70-7=63 **h) Multiplying by 8:** Products that are double that of multiplying by 4. e.g., 8x3= (4x3)+(4x3)=12+12=24 **i) Multiplying by 7:** Break apart 7 (distributive property) to find that it is the sum of 5 times the factor and 2 times the factor or use commutative property students already know all of the x7 facts except 7x7. e.g., 7x7=(5x7)+(2x7)=35+14=49	***Fluently multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.*** **Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000* **Strategies Used** **a) Multiplying by 10:** Counting by 10s. e.g., 10x3= 10+10+10=30 or 10, 20, 30 **b) Multiplying by 5:** Counting by 5s. e.g., 5x4=5+5+5+5=20 or 5, 10, 15, 20 **c) Multiplying by 0:** If either factor is 0 the product is always 0. e.g., 0x7=0 **d) Multiplying by 3:** Multiply by 2 and add 1 more group. e.g., 3x4= (2x4) + (1x4)=12 **e) Multiplying by 4:** Double a double. e.g., 4x6=(2x6)+(2x6)=12+12=24 **f) Multiplying by 6:** Double a multiple of 3. e.g., 6x5=(3x5)+(3x5)=15+15=30 **g) Multiplying by 9:** The product of x 9 is 1 group less than the product of the same x10 fact. e.g., 9x7= (10x7)-(1x7)= 70-7=63 **h) Multiplying by 8:** Products that are double that of multiplying by 4. e.g., 8x3= (4x3)+(4x3)=12+12=24 **i) Multiplying by 7:** Break apart 7 (distributive property) to find that it is the sum of 5 times the factor and 2 times the factor or use commutative property students already know all of the x7 facts except 7x7. e.g., 7x7=(5x7)+(2x7)=35+14=49	***Fluently multiply multi-digit whole numbers using the standard algorithm.*** **Strategies Used** **a) Multiplying by 10:** Counting by 10s. e.g., 10x3= 10+10+10=30 or 10, 20, 30 **b) Multiplying by 5:** Counting by 5s. e.g., 5x4=5+5+5+5=20 or 5, 10, 15, 20 **c) Multiplying by 0:** If either factor is 0 the product is always 0. e.g., 0x7=0 **d) Multiplying by 3:** Multiply by 2 and add 1 more group. e.g., 3x4= (2x4) + (1x4)=12 **e) Multiplying by 4:** Double a double. e.g., 4x6=(2x6)+(2x6)=12+12=24 **f) Multiplying by 6:** Double a multiple of 3. e.g., 6x5=(3x5)+(3x5)=15+15=30 **g) Multiplying by 9:** The product of x 9 is 1 group less than the product of the same x10 fact. e.g., 9x7= (10x7)-(1x7)= 70-7=63 **h) Multiplying by 8:** Products that are double that of multiplying by 4. e.g., 8x3= (4x3)+(4x3)=12+12=24 **i) Multiplying by 7:** Break apart 7 (distributive property) to find that it is the sum of 5 times the factor and 2 times the factor or use commutative property students already know all of the x7 facts except 7x7. e.g., 7x7=(5x7)+(2x7)=35+14=49