Reasoning and Problem Solving
Step 4: Efficient Multiplication

Teaching Note: Due to the nature of this step, many of the questions have various possible answers. The questions have been designed to allow the children to discuss, explain and demonstrate which methods they find most efficient.

National Curriculum Objectives:

Mathematics Year 4: (4C6a) Recall multiplication and division facts for multiplication tables up to 12 × 12
Mathematics Year 4: (4C6b) Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
Mathematics Year 4: (4C6c) Recognise and use factor pairs and commutativity in mental calculations
Mathematics Year 4: (4C8) Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as *n* objects are connected to *m* objects

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Decide whether or not a calculation has been solved correctly. Calculation uses partitioning and addition and known facts up to 12x.
Expected Decide whether or not a calculation has been solved efficiently. Calculation uses partitioning, addition and subtraction, factor pairs and known facts up to 12x.
Greater Depth Decide whether or not a calculation has been solved efficiently. Calculation uses doubling, halving and known facts up to 12x.

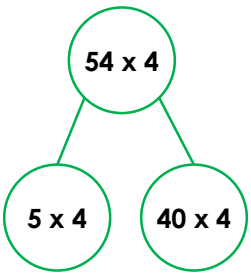
Questions 2, 5 and 8 (Problem Solving)
Developing Create a 2-digit multiplied by 1-digit calculation and solve it using an efficient method. Two forms of scaffolding provided.
Expected Create a 2-digit multiplied by 1-digit calculation and solve it using an efficient method. One form of scaffolding provided.
Greater Depth Create a 3-digit multiplied by 1-digit calculation and solve it using an efficient method.
Questions 3, 6 and 9 (Problem Solving)
Developing Solve a given calculation in an inefficient way followed by a more efficient way. Times table support provided.
Expected Solve a given calculation in an inefficient way followed by a more efficient way.
Greater Depth Solve a given calculation using factor pairs, or doubling and halving. Identify a more efficient method.

More Year 4 Multiplication and Division resources.

Did you like this resource? Don't forget to review it on our website.

Efficient Multiplication

1a. Hannah thinks she has calculated 54 x 4 in the most efficient way.

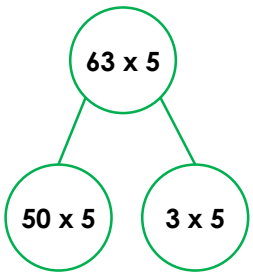


5	x	4	=	20
40	x	4	=	160
20	+	160	=	180

Is she correct in her working? Prove it.

D R

1b. Angus thinks he has calculated 63 x 5 in the most efficient way.

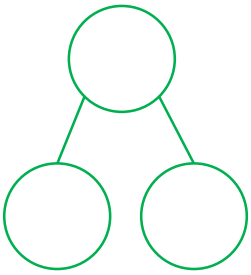


50	x	5	=	250
3	x	5	=	15
250	+	15	=	265

Is he correct in his working? Prove it.

D R

2a. Roll a dice three times to create a calculation that multiplies a 2-digit number by a 1-digit number.

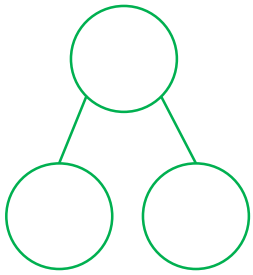


	x		=	
	x		=	
	+		=	

Solve the multiplication above, using an efficient method.

D PS

2b. Roll a dice three times to create a calculation that multiples a 2-digit number by a 1-digit number.



	x		=	
	x		=	
	+		=	

Solve the multiplication above, using an efficient method.

D PS

3a. Solve the multiplication below using an inefficient method followed by a more efficient way.

72 x 4

1 x 4 = 4	7 x 4 = 28
2 x 4 = 8	8 x 4 = 32
3 x 4 = 12	9 x 4 = 36
4 x 4 = 16	10 x 4 = 40
5 x 4 = 20	11 x 4 = 44
6 x 4 = 24	12 x 4 = 48

D PS

3b. Solve the multiplication below using an efficient method followed by a less efficient way.

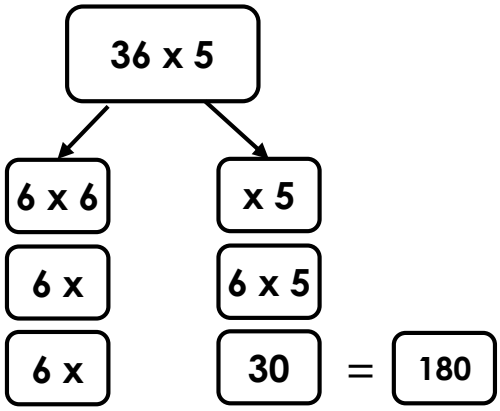
43 x 6

1 x 6 = 6	7 x 6 = 42
2 x 6 = 12	8 x 6 = 48
3 x 6 = 18	9 x 6 = 54
4 x 6 = 24	10 x 6 = 60
5 x 6 = 30	11 x 6 = 66
6 x 6 = 36	12 x 6 = 72

D PS

Efficient Multiplication

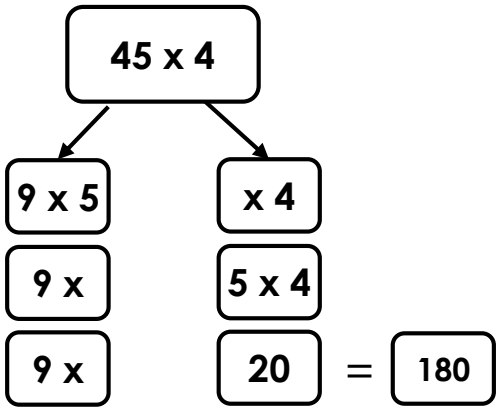
4a. Vanessa thinks she has calculated 36 x 5 in the most efficient way.



Is she correct in her working? Prove it.

E R

4b. Oskar thinks he has calculated 45 x 4 in the most efficient way.



Is he correct in his working? Prove it.

E R

5a. Roll a dice three times to create a calculation that multiplies a 2-digit number by a 1-digit number.

☐ x ☐ = ☐

Solve the multiplication above, using an efficient method.

E PS

5b. Roll a dice three times to create a calculation that multiples a 2-digit number by a 1-digit number.

☐ x ☐ = ☐

Solve the multiplication above, using an efficient method.

E PS

6a. Solve the multiplication below using an inefficient method followed by a more efficient way.

68 x 8

E R

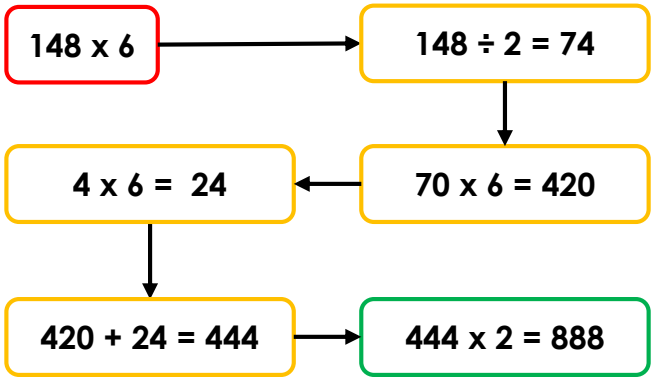
6b. Solve the multiplication below using an efficient method followed by a less efficient way.

25 x 6

E R

Efficient Multiplication

7a. Leroy thinks he has calculated 148 x 6 in the most efficient way.

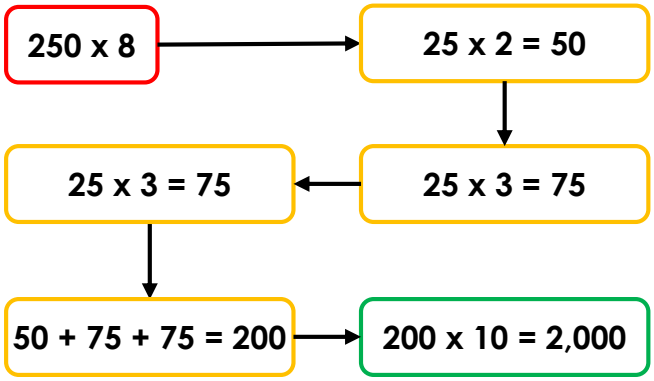


Is he correct in his working? Prove it.

GD

R

7b. India thinks she has calculated 250 x 8 in the most efficient way.



Is she correct in his working? Prove it.

GD

R

8a. Roll a dice four times to create a calculation that multiplies a 3-digit number by a 1-digit number.

Solve the multiplication using an efficient method.

GD

PS

8b. Roll a dice four times to create a calculation that multiples a 3-digit number by a 1-digit number.

Solve the multiplication using an efficient method.

GD

PS

9a. Solve the multiplication below using a method which makes use of factor pairs, or doubling and halving.

63 x 8

Is there a more efficient/inefficient method? Convince me.

GD

R

9b. Solve the multiplication below using a method which makes use of factor pairs, or doubling and having.

49 x 8

Is there a more efficient/inefficient method? Convince me.

GD

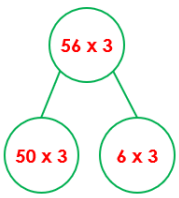
R

Reasoning and Problem Solving
Efficient Multiplication

Developing

1a. Hannah is incorrect because her working out should be: 50 x 4 = 200, 4 x 4 =16 and 200 + 16 = 216.

2a. Various answers, for example:



50	x	3	=	150
6	x	3	=	18
150	+	18	=	168

3a. Various answers, for example:
(inefficient method) 10 x 4 + 10 x 4 + 10 x 4 + 10 x 4 + 10 x 4 + 10 x 4 + 10 x 4 = 280 added to 2 x 4 = 8 which equals 288
(efficient method) 70 x 4 = 280 and 2 x 4 = 8. 280 + 8 = 288

Expected

4a. Various answers, for example:
Vanessa is correct because she has used her knowledge of factor pairs to create an easier multiplication of 6 x 5 = 30 which has created a multiple of 10. Multiples of 10 are then quick to multiply by 6. The answer is 180.

5a. Various answers, for example:
79 x 5 = 395 because 80 x 5 = 400 and 400 – 5 = 395.

6a. 68 x 8 = 544
Various answers, for example:
(inefficient method) double 68 three times
(efficient method) 70 x 8 = 560 – 16 = 544

Greater Depth

7a. Various answers, for example: Leroy is incorrect because multiplying 150 x 6 and then subtracting 2 x 6 would be quicker.

8a. Various answers, for example: 391 x 6 = 2,346 because 400 x 6 = 2,400, 9 x 6 = 54 and 2,400 - 54 = 2,346

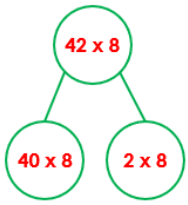
9a. Various answers, for example:
(factor pairs) 63 = 9 x 7, 7 x 8 = 56, 560 x 9 = 560 – 56 = 504
Yes, there is a more efficient way. One example is: 60 x 8 = 480, 3 x 8 = 24 and 480 + 24 = 504.

Reasoning and Problem Solving
Efficient Multiplication

Developing

1b. Angus is incorrect because his working out should be: 60 x 5 = 300, 3 x 5 = 15 and 300 + 15 = 315.

2b. Various answers, for example:



40	x	8	=	320
2	x	8	=	16
320	+	16	=	336

3b. Various answers, for example:
(inefficient method) 2 x 6 = 12, 2 x 6 = 12, 12 + 12 = 24 x 10 = 240, 3 x 6 = 18 and 240 + 18 = 258
(efficient method) 40 x 6 = 240, 3 x 6 = 18 and 240 + 18 = 258

Expected

4b. Various answers, for example: Oskar is incorrect because doubling 45 twice would be quicker. Either way, the answer is 180.

5b. Various answers, for example:
37 x 6 = 222 because 30 x 6 = 180, 7 x 6 = 42 and 180 + 42 = 222.

6b. 25 x 6 = 150
Various answers, for example:
(inefficient method) 25 + 25 + 25 + 25 + 25 + 25 = 150
(efficient method) 50 x 6 = 300, 300 ÷ 2 = 150

Greater Depth

7b. Various answers, for example: India is incorrect because multiplying 25 x 4, doubling the answer and multiplying the answer by 10 would be quicker.

8b. Various answers, for example: 606 x 8 = 4,848 because 600 x 8 = 4,800, 6 x 8 = 48 and 4,800 + 48 = 4,848

9b. Various answers, for example:
(doubling) 49 x 2 x 2 x 2 = 392.
Yes, there is a more efficient way. One example is: 50 x 8 = 400 – 8 = 392.