M1. Any set of four digits which make the calculation correct, eg:

3 5 0 ÷ 10 = 3 5

Accept 300 ÷ 10 = 30
All four digits must be given.
***Do not** accept*

□ 3 0 ÷ 10 = 3 □

[1]

M2. Award **TWO** marks for the correct answer of 288

If the answer is incorrect, award **ONE** mark for an appropriate calculation such as

12 × 24 = incorrect answer.

up to 2

[2]

M3. £56

Accept also £56 00 (with clear space between 6 and 0) or £56.00p.

[1]

M4. 5600

[1]

M5. 3294

[1]

M6. (a) £22.50 **OR** 2250p

*Accept £22.50p **OR** 22.50 **OR** 2250 **OR** 22 50.*
***Do not** accept £2250 **OR** 22.50p **OR** £22.5.*

1

(b) Award **TWO** marks for the correct answer of 42

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, eg

840 ÷ 20 **OR** 8.4 ÷ 0.2

*Accept for **ONE** mark, £42 **OR** 42p as evidence of an appropriate method.*

Answer need not be obtained for the award of the mark.

No method mark is awarded for 8.40 ÷ 20 alone.

Up to 2

[3]

M7. 32.45 × 7.8 = 253.11

[1]

M8. 8340

[1]

M9. 3624

[1]

M10. Calculation completed correctly as shown:

6	**3**	×	**6**	=	3	7	8		

OR

5	**4**	×	**7**	=	3	7	8		

OR

4	**2**	×	**9**	=	3	7	8		

[1]

M11. 18 456

[1]

M12. 271.8

[1]

M13.

7	×	**8**	×	**9**

Numbers may be given in any order.

U1

[1]

M14. Award **TWO** marks for all four values correct as shown:

15	×	100	=	1500

150	×	10	=	1500

15000	÷	100	=	150

150	÷	10	=	15

If the answer is incorrect, award **ONE** mark for three values correct.

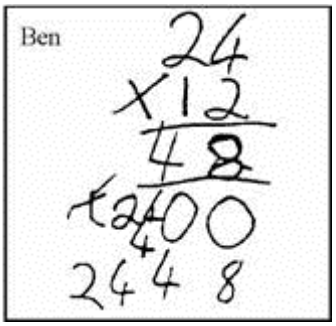
Up to 2

[2]

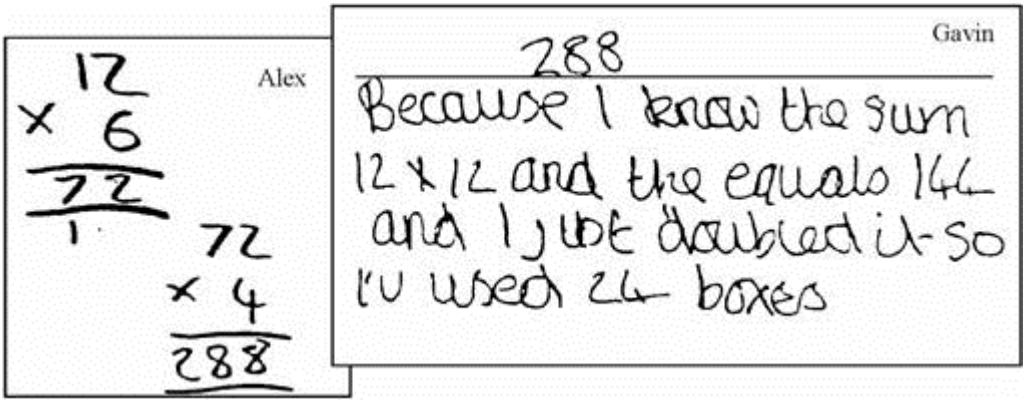
E1. No comment available.

E2. The 1996 *Standards* report identified a weakness in children's understanding of multiplication and division and the relationship between them. There is some evidence that children have made progress. For example, in this question the children were given a situation to interpret and all children achieving Level 4 or 5 overall, together with most children achieving Level 3, showed that they knew to multiply or divide when each was appropriate.

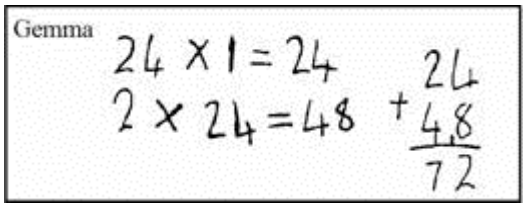
However, although children knew that multiplication was required, more were successful in their calculation when a calculator was available than when it was not. Children's ability to handle the mechanics of multiplication using a paper and pencil method were not strong, particularly at the lower levels. Where children tried to apply a standard algorithm they often went astray. For example, in this question, which required a multiplication of 24 by 12, Ben (who achieved Level 5 overall) became confused by the place value aspect.



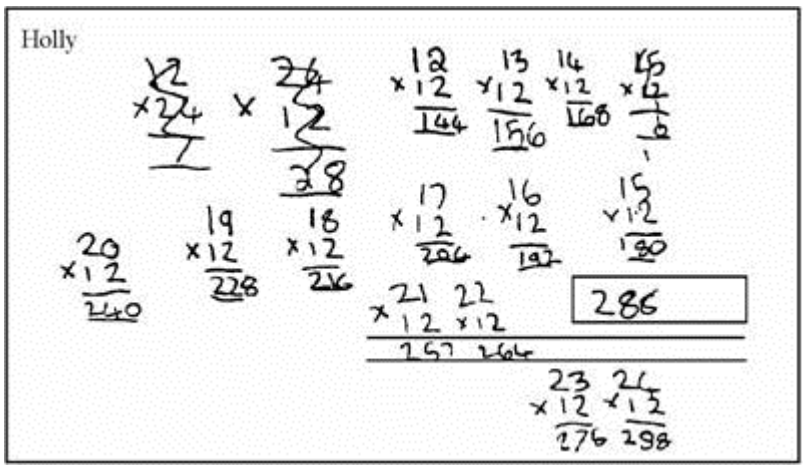
More commonly children used a non-standard approach, for example a staged approach, shown here by Alex (who achieved Level 4 overall), or the application of knowledge, as demonstrated by Gavin (who achieved Level 4 overall).



However, non-standard approaches depend on understanding, and it is when they do not work that the limits of children's understanding is revealed, as in this example by Gemma (who achieved Level 3 overall).



Children's informal methods can also be highly inefficient, even though successful, as Holly shows. Holly's approach is based on multiplication as repeated addition, and many children who achieved Level 3 overall used this approach.



E4. Analysis of children's responses revealed difficulties with place value; only 26% of those achieving Level 3 overall gave the correct answer. Common incorrect responses included 560 and 156.

E5. 64% (31% at level 3, 70% at level 4 and 91% at level 5) answered this question correctly.

This question explicitly accessed multiplication of a 3-digit number by one digit. Children's success rate ranged from a confident performance at level 5 to significant difficulty at level 3. The majority of children at every level followed (or attempted to follow) the conventional vertical algorithm using carrying figures. Only a small minority chose repeated addition in preference to multiplication.

E6. (a) Children working at level 3 overall found this question harder than children working at levels 4 and 5. Just over half of children awarded level 3 answered correctly compared with most of those children awarded level 4 or 5 overall. However, omission rates were still relatively low, showing that most children were able to engage with the question.

Just over 15% of children were able to perform the correct calculation but went on to give their answer without any units; these children were still awarded the mark. This response was more common among children achieving level 3 overall than those achieving level 5.

Approximately 5% of children gave written working for this question, suggesting that they did not have, or chose not to use, a calculator.

(b) There were two marks available for this question. Two marks were awarded for a correct answer, with one mark available for an appropriate method with an incorrect answer. Few children who were awarded the mark for their method failed to gain the extra mark for a correct answer. Children awarded level 3 overall found the question much harder than children awarded level 4s and 5. Boys generally found this question easier than girls at all three levels.

A few children used units inappropriately to give answers of *42p* or *£42* for the number of 20p coins that Michelle had. Only about 5% of children failed to show the

method they used to reach their answer, which shows that children were generally able to follow the instruction to show their method. Over half the children reached their answer using a formal division method. This method was more common among children achieving levels 4 and 5 overall than among children achieving level 3. Repeated addition or subtraction methods were used by just over 10% of children working at level 3 overall, but these methods were uncommon among children working at levels 4 and 5.

Since children were asked to show the method they used it was hard to determine which children had answered the question using a written calculation and which had recorded their calculator method as instructed. However, just under half the children used either a written method that was unlikely to have been carried out on a calculator or recorded some form of carrying in their calculation. These children may have misinterpreted the instruction *Show your method* to mean that they were required to solve this calculation without using a calculator.

E7. This question is designed to assess children's understanding of division as the inverse of multiplication. Children are required to find the missing number to complete a multiplication and are expected to use a calculator.

Eighty-five per cent of children at level 4 gave a correct answer, as did nearly all at level 5 and 40% of children at level 3. Nearly 15% of children at level 3 omitted the question, which is unsurprising since it involves calculation with decimal numbers and requires the use of inverse rather than trial and improvement.

Errors were varied, with no common patterns.

E8. This question assesses children's ability to multiply a three-digit integer by twenty.

Over two-thirds of children at level 4 answered correctly, as did over 90% of those at level 5. Children at level 3 did less well, with just over 20% giving the correct answer and about 15% omitting the question.

The answer 834 was given by 5% of children at level 3, suggesting they doubled 417 but did not attempt a second step of multiplying the result by 10. Other errors were varied.

Children were not asked to record their method for answering this question, however the majority chose to do so. Over 40% of children at levels 4 and 5, attempted to use the standard vertical multiplication method. The method was also used by over 30% of children at level 3. Grid methods were used by 10% of children at each level. Informal methods based on partitioning were used by about 10% of children at each level. Other informal methods were also seen. They were given by nearly 20% of children at levels 4 and 5, and by 10% of those at level 3.

Eighty per cent of children at level 4 who used the grid method reached the correct answer, as did all children at level 5 who used this method. Success rates were less high for those using a standard vertical algorithm; two-thirds of children at level 4 who used a this method reached the correct answer, as did almost all children at level 5 who used the method. The choice of method made little difference for children at level 3, whose success levels were low whichever method they used.

E10. Target Level: 4

Curriculum Coverage (POS ref: Ma2/3a, 3k)

This question assesses children's reasoning and their ability to solve a number problem involving multiplication.

Performance

Over 70% of children working at level 4 answered correctly as did nearly all those working at level 5 and over one-third of those at level 3.

Over one-third of children working at level 3 and more than 10% of those working at level 4 omitted this question.

Common errors and misconceptions

- Errors were varied for this question with no common trends.

Methods

- Of the three possible correct answers, 42 × 9 was the most common with children working at levels 3 and 4. The answer of 63 × 6 was the most common with children working at

level 5.

E11. Target Level: 4

Curriculum Coverage (POS ref: Ma2/3j)

This question assesses children's ability to multiply a four-digit integer by eight.

Performance

Over half of children working at level 4 gave the correct answer as did nearly 90% of those working at level 5 and over 15% of those working at level 3.

Common errors and misconceptions

- Nearly 15% of children working at level 4 were unable to work out correctly the multiplication fact for 7 × 8.

Methods

- Over half the children working at levels 4 and 5, who reached the correct answer, used a standard written multiplication method.
- About one-third of children working at levels 4 and 5, who were successful, used informal methods.
- Just over 10% of children working at level 4 and less than 5% of those working at level 5, who reached the correct answer, used the grid method.

Resource currently unavailable.