SPRINGBOARD 6 LESSON 4
MULTIPLICATION AND DIVISION 3

TOTAL TIME

30 MINUTES

Objective:

- Use informal written methods to support, record or explain multiplications

Vocabulary:

- factorise

By the end of the lesson children should be able to:

- use the grid method for multiplying three-digit numbers by two-digit numbers or by numbers to one decimal place.

Resources:

- whiteboards
- Resource Sheet 4.1

ORAL AND MENTAL STARTER

5 MINUTES

Write $22 \times 10 = 220$ on the board.
Emphasise that when you multiply a number by 10, the digits move one place to the left and the 0 is put in the units place as a place holder. Explain that 'add a 0' is not acceptable as this does not work when multiplying decimals. Work through $2.2 \times 10 = 22$ to confirm this.

Write on the board $22 \times 20 = \square$.

Q: Can you work this out and explain how you did it?

Demonstrate that $22 \times 20 = 22 \times 2 \times 10$.
Point out that the 20 has been factorised as $20 = 2 \times 10$.

Write on the board $22 \times 60 = \square$.

Q: What can we multiply 22 by this time?

Write $22 \times 60 = 22 \times 6 \times 10$.
Again highlight that the 60 has been factorised as $60 = 6 \times 10$.

Ask children to work out the answers to 22×50, 22×30 and 22×70, presenting each of their answers in turn on their whiteboards.

Write 6×0.7 and 6×7 below one another on the board.

Q: Which one can you answer?

Establish that 7 is ten times bigger than 0.7 and that 0.7 is 10 times smaller than 7.

Q: How can we use the answer to 6 × 7 to work out 6 × 0.7?

Establish that we need to divide the answer to 6 × 7 by 10.
Write 6 × 7   = 42, 42 ÷ 10 = 4.2
so   6 × 0.7 = 4.2

Q: Can you work out 6 × 0.07?

Establish that this time 42 has to be divided by 100, so
6 × 0.07 = 42 ÷ 100 = 0.42.
Write on the board 8 × 3, 8 × 0.3 and 8 × 0.03. Ask the children to show the answers on their whiteboards.

Repeat for other examples, emphasising how one calculation can be used to obtain the other answers.

MAIN TEACHING ACTIVITY

Write 37 × 234 on the board.

Q: How can we estimate the answer?

Take children's estimates and explanations. Include the estimates 40 × 200 and 40 × 250 and work out the answers mentally.

Q: Which do you think is the better estimate?

Q: Why?

Emphasise that for 40 × 250 = 10 000, each number has been made bigger, so the answer to 37 × 234 will be much smaller than 10 000.

Work through the left-hand grid on the board and demonstrate, using partitioning, that it represents the calculation 37 x 234. Complete the grid with the children to get the right-hand grid.

×	200	30	4
30			
7			

×	200	30	4
30	6000	900	120
7	1400	210	28
	7400	1110	148

Ask questions such as:

Q: Which boxes did we fill in quickly?

Q: How can we get the answer to 37 × 234 from the grid?

Establish that we need to add the numbers in the columns to get the bottom row. Use column addition to add 7400, 1110 and 148. Record the answer 37 × 234 = 8658 and check against the estimates.

Say that you want to use the grid method to calculate 37 × 23.4. Discuss the partitioning as you set out the grid on the board. Estimate the answer.

×	20	3	0.4
30			
7			

Q: What is the answer to 30 × 0.4?

Draw on the lesson's starter. Remind children that:
30 × 0.4 = 3 × 10 × 0.4 = 3 × 4
so the answer as 12.

Q: What is the answer to 7 × 0.4?

Remind them that 7 × 4 = 28 and as 0.4 is 10 times smaller than 4, so
7 × 0.4 = 28 ÷ 10 = 2.8.

Complete the grid and record the answer 37 × 23.4 = 865.8. Ask children if they can see any connection with the answer to 37 × 234.

Work through another example of the type 236 × 4.6. Highlight the key calculations 200 × 0.6 and 30 × 0.6.

PLENARY

5 MINUTES

Set the children 24 × 51.7. Make sure children can explain the key steps in the calculations.
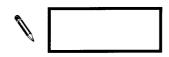
Remember:

- When multiplying by a decimal such as 0.4, first multiply by 4 and then divide by 10.

- When multiplying by a decimal such as 0.04, first multiply by 4 and then divide by 100.

**LESSON 4 RELATED TEST QUESTION
1999 TEST A (NON-CALCULATOR) PAPER**

12 Calculate **549 x 6**

1 mark

MARK SCHEME

3294

ANALYSIS OF CHILDREN'S ANSWERS

▪ Children working at Levels 3 and 4 had difficulties multiplying a three-digit number by a one-digit number. Most children tackled the calculation using the conventional vertical method for multiplication.

▪ Children had difficulty keeping track of the numbers they multiplied when using a compact form of multiplication.

IMPLICATIONS FOR PLANNING

▪ Children should always make an estimate to check whether their answer appears sensible.

▪ Time should be allocated to ensuring that all pupils have one written method for undertaking multiplication calculations that they can use with confidence.

▪ Children need to keep revisiting multiplication to rehearse and hone their mental and written methods.