Unit 9
Calculation and problem solving

Five daily lessons

National **Numeracy** *Strategy*

Year 6
Summer term

Unit Objectives
Year 6

• **Carry out short multiplication and division of numbers involving decimals.**	**Pages 67, 69**
• **Carry out long multiplication of a three-digit by a two-digit integer.**	**Pages 67, 69**
• **Identify and use appropriate operations (including combinations of operations) to solve problems involving numbers and quantities, and explain methods and reasoning.**	**Pages 82–89**
• Choose and use appropriate number operations to solve problems and appropriate ways of calculating: mental, mental with jottings, written methods, calculator.	Page 75
• Factorise numbers into prime factors.	Page 21
• Develop calculator skills and use a calculator effectively.	Page 71

Link Objectives

Year 5

- Use informal paper and pencil methods to support, record or explain multiplications and divisions.
- **Extend written methods to: short multiplication of HTU or U.t by U; long multiplication of TU by TU; short division of HTU by U (with integer remainder).**
- **Use all four operations to solve simple word problems involving numbers and quantities and explain methods and reasoning.**
- Choose and use appropriate number operations to solve problems and appropriate ways of calculating: mental, mental with jottings, written methods, calculator.
- Find all the pairs of factors of any number up to 100.
- Develop calculator skills and use a calculator effectively.

Year 7

- **Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers.**
- **Solve word problems and investigate in the context of number; compare and evaluate solutions.**
- Enter numbers in a calculator and interpret the display in different contexts (decimals, money, metric measures).

(Key objectives in bold)

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet 9.1
- Resource sheet 9.2
- Resource sheet 9.3
- OHT 9.1
- OHT 9.2
- OHT 9.3
- OHT 9.4
- Self-assessment sheet 9.1
- Self-assessment sheet 9.2
- OHP calculator
- Calculators

department for education and skills

Planning sheet	Day One	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Recognise and extend number sequences. Recognise multiples up to 10×10. VOCABULARY multiples	• Write on the board: 3 5 Quickly rehearse the multiplication tables for 3 and 5 with the whole class. **Q** What numbers appear both in the 3 and the 5 times tables? Divide the class into two groups. Set one group to count in 3s and the other to count in 5s to generate the sequence: 3, 5, 6, 9, 10, 12, 15,… **Q** What numbers do not appear in the line sequence? Why? • Establish that only multiples of 3 or 5 (or both) can be in the sequence. Draw on the board: 3p 5p Ask the children to imagine that, as from today, the Government has decided it will issue only 3p and 5p coins. **Q** What sums of money can we make using only 3p and 5p coins? Quickly collect responses and record on the board. **Q** Can you make 4p? Establish that 4p cannot be made. **Q** Does this mean we could not buy anything that costs 4p?

Main Teaching

Objectives and Vocabulary	Teaching Activities
• Identify and use appropriate operations (including combinations of operations) to solve problems involving numbers and quantities, and explain methods and reasoning.	• Tell the children that you want them to think about how they could pay for goods if they could only use 3p and 5p coins. **Q** How could you pay for a 2p sweet? Establish that you could give 5p and get 3p change. Record as: $5p - 2p = 3p$. **Q** How could you pay for an item costing 29p? Collect and compare answers; $8 \times 3p + 5p = 29p$ $7 \times 5p - 2 \times 3p = 29p$ **Q** What method of payment involves fewest coins changing hands? Agree on: $4 \times 5p + 3 \times 3p = 29p$ **Q** How would you pay for a 49p can of cola? • Collect and compare answers. Ensure that the children understand the nature of this problem. Point out that 49p is 20p more than 29p and that one way of solving this problem is to build on the answer from the previous question. Ask the children, in pairs, to explore how they would pay for goods costing different amounts, and to look for patterns. Stop the class and discuss their observations. Draw out that they are using and combining multiples of 3p and 5p. • Write the following statement on the board; 'Using only 3p and 5p coins, you can pay for goods of any price.' Ask the children whether they think this is true or false. Let the children work in pairs to explore the statement. Stop the class and ask the children whether they have changed their views and, if so, why. • Write, in a column, on the board; 1p, 2p, 3p, 4p, 5p, 6p, 7p, 8p, 9p, 10p. **Q** Which of these amounts can you pay? Fill in the obvious amounts, such as 3p, 5p, 6p, 9p and 10p and 2p from earlier. Let the children work on the remaining amounts. • Invite children to write their answers on the board. Ensure that each amount has an answer.

Plenary

Teaching Activities/Focus Questions

Q Can we pay for goods costing 10p, 20p, 100p, 200p…?

• Establish that only 5p coins will be needed.

Q How could we pay 7p?

• Return to the list on the board, to establish that 7p could be paid by giving 10 ($2 \times 5p$) and receiving a 3p coin in change. Ask the children to think how they might convince someone that you can pay for goods of any price using only 3p and 5p coins. Collect their reasons and explain that communicating and reasoning are important skills in mathematics.

Q What other pairs of coins could the Government introduce? What about 7p and 10p?

HOMEWORK – Ask the children to decide whether 7p and 10p coins would work and to prepare a convincing argument for the next lesson.

ASSESSMENT – Explain to the children that, during the week, they will be completing 'My Mathematics' Self-assessment sheets that they will take to their secondary school.

Planning sheet	Day Two (page 1 of 2)	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

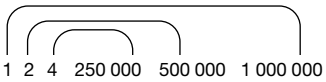
Oral and Mental

Objectives and Vocabulary	Teaching Activities
Explain methods and reasoning. Use a calculator effectively. VOCABULARY commutative RESOURCES OHT 9.1 OHP calculator Class set of calculators	• Quickly rehearse the 7 times table. Present the children with the following problem. **Q** Using only the numbers 7 and 10 and the operations + and –, can you make all the numbers from 1 to 10? Explain that they can use the numbers and operations more than once, for example the number 4 can be made as follows: $7 + 7 - 10 = 4$. • Remind the children of the last lesson and ask how this problem is similar to the one in the homework they were set. Discuss the children's reasons and explanations and make connections between their reasons and the above problem. Show OHT 9.1. Explain that they are going to work on a problem in which numbers will represent the letters of the alphabet. Say that every word is to have a value that is found by multiplying the values of the letters in the word, for example. 'PLAN' will have a value: $16 \times 12 \times 1 \times 14 = 2688$ Demonstrate this on the OHP calculator. Let the children use their calculators to check.

Main Teaching

Objectives and Vocabulary	Teaching Activities
• Choose and use appropriate number operations to solve problems and appropriate ways of calculating. • Develop calculator skills and use a calculator effectively. • Factorise numbers into prime factors. VOCABULARY factor RESOURCES Resource sheet 9.1 Self-assessment sheet 9.1 Calculators	• Give out Resource sheet 9.1. **Q** What is the value of the word 'MILLION'? With the class, establish that the answer is 31 842 720. Ask the children to say the number and note that this value is much more than a million. Say that today they are going to try to find a word with a value of exactly 1 000 000. Refer to the above example and point out that the solution is not necessarily going to be a long word. • Let the children work in pairs to explore the values of different words. After a time, bring the children together and discuss some of the words they have found. On the board, record the five words with values closest to 1 000 000. Explain that sometimes it is useful to look at the problem another way. Write BAD, CAT and SIT in a list on the board and ask the children to find their values. Write their responses on the board, as shown: | Word | Value | Factors of the word's value (≤ 26) | | BAD | 2 x 1 x 4 = 8 | 1, 2, 4, 8 | | CAT | 3 x 1 x 20 = 60 | 1, 2, 3, 4, 5, 6, 10, 12, 15, 20 | | SIT | 19 x 9 x 20 = 3420 | 1, 2 ,3, 4, 5, 6, 9, 10, 12, 15, 18, 19, 20 | Establish why BAD has a small value compared with SIT. **Q** Which letters can you use to make a word with a value of 8? • Establish that the only letters that can be used are A, B, D and H and that these represent the factors of 8. Record the factors of 8 in the third column, as shown. **Q** Which letters can you use to make a word with a value of 60? • Establish that the letters that can be used are A, B, C, D, E, F, J, L, O and T and record their values in the third column of the table. Explain that these numbers are some of the factors of 60. **Q** Can you find any other factors of 60? • Agree that the missing factors are 30 and 60.

Plenary

Teaching Activities/ Focus Questions
• Work with the class to begin to find the factors of 1,000,000. Remind the children that factors come in pairs. Let them use calculators, with the method below, to find the factors.      Stop after the first few factors. **Q** Which factors are we interested in? • Explain that we are looking for the factors that are less than 26. Establish that these are 1, 2, 4, 5, 8, 10, 16, 20 and 25 and that the associated letters are A, B, D, E, H, J, P, T and Y. • Let the children work in pairs to make up a 'new' word that 'hits a million'. Explain that it need not be a real word, it may be just a group of letters. With the class, collect some of their 'new' words and check that their value is 1 000 000. **Q** Can any word that has a value of 1 000 000 include C or K? • Ensure that the children recognise that neither 3 (C) nor 11 (K) is a factor of 1,000,000 and that the only letters that can ever be used to make a million are A, B, D, E, H, J, P, T and Y.

Planning sheet	Day Two (page 2 of 2)	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/ Focus Questions**
	Q What would be the value of the word 'TEAR'? **Q** Can you find another word that will have the same value as 'TEAR'? • Ask the children to work in pairs. Discuss children's solutions and establish that one method is to use the same letters from the original word. Use this to highlight the commutative property of multiplication. **Q** What word can you find that has the smallest value? • Establish that two-letter words and words containing the letter A often give the smallest values, but that letters towards the end of the alphabet are to be avoided (for example, BE = 10 but MY = 325). **Q** What is the value of the world 'LONE'? **Q** What is the value of the word 'ALONE'? • Establish that the value of the two words is the same and that this is because multiplying any number by 1 does not change its value.		**Q** Why do you think any factor greater than 26 is not important? • Establish that factors greater than 26 are not necessary as there are only 26 letters in the alphabet. Point out the heading in the third column (≤ 26). **Q** How can we use factors to help us find a word with a value of 3420? • Take responses. Use the factors of 19, 9 and 20 to identify all the factors of 3,420 ≤ 26. • Set the children to work in pairs to find words with the value of 36, using the ideas discussed above. Remind the children that they can use A as many times as they wish. • Collect different words and note any common letters used.	ASSESSMENT – • Give out Self-assessment sheet 9.1. Explain that, during the rest of the week, the children will be asked to say how well they can do some of the mathematics they have been working on. Say that there will be some time at the end of each lesson to complete their sheet. • Refer to the first multiplication on the sheet. Explain that they can choose to multiply 257 by 2, 3, 5, 8 or 9 and that the number they choose will depend on how confident they feel. • Tell the children they should choose the number that they think shows how well they can multiply without using a calculator. • When they have done the multiplication they should share their work with a friend. • Some of the children may need help, from you or another child. • When the child has completed the question they should then tick the box that records whether they required help. • Give the children a few minutes to work on the first multiplication question. • Give out answers and discuss.

Planning sheet	Day Three	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Carry out short and long multiplication. Recognise prime numbers to at least 20. RESOURCES OHT 9.1 Resource sheet 9.1	• Ask the children to recite quickly the sequence of prime numbers starting at 2, going as far as they can. Remind the children that 1 is not a prime number (because it does not have two different factors). • Ask the children to describe the work from yesterday's lesson. Show OHT 9.1 and ask the children to calculate the value of the word 'TODAY'. Confirm the answer is: $20 \times 15 \times 4 \times 1 \times 25$ $= (20 \times 15) \times (4 \times 25)$ $= (300) \times (100)$ $= 30{,}000$ Say that they are going to continue using numbers to represent letters. The relationship between them is still as set out on Resource sheet 9.1. **Q** A four-letter word contains the letter A and three other letters with values that are all prime numbers. The value of the word is 66. What could the word be? • Establish that the product of the three letters will be 66 and that the three prime numbers will be 2, 3 and 11. So the letters are B, C and K, but as A can always be used, the word is BACK. Ensure that the children can identify letters with values that are prime numbers. **Q** What other words can you make that just use letters with prime number values and the letter A? • Let the children work in pairs to find words made from letters that have prime number values and the letter A and work out their values. • Pick two of the children's words, without revealing them to the class. Give other children the values and ask them to identify the words.

Main Teaching

Objectives and Vocabulary	Teaching Activities
• Choose and use appropriate number operations to solve problems and appropriate ways of calculating. • Carry out short division, and short and long multiplication. • Factorise numbers into prime factors. Vocabulary: prime factor RESOURCES Self-assessment sheet 9.1 Calculators	• Ask the children to work in pairs to find words made from the 'prime letters', B, C, E, G, K, M, Q, S and W. Say that they are going to begin by finding only two-, three- and four-letter words. After at time, collect the children's answers and note the value of each word, e.g. SEEM = $19 \times 5 \times 5 \times 13 = 6175$ MESS = $13 \times 5 \times 19 \times 19 = 23{,}465$ Point to one of the answers (for examples, SEEM = $19 \times 5 \times 5 \times 13 = 6175$). Say that all the numbers are factors of the word's value and we know all the factors are prime numbers. Explain that the word's value is represented as the product of its prime factors. Write for SEEM its value: $6175 = 5 \times 5 \times 13 \times 19 = 25 \times 13 \times 19$. **Q** If we wanted to find a word with a value of 50, what letters if any, have prime values we could use? • Establish first that the letters must have values that are factors of 50 and these are 1, 2, 5, 10, 25, therefore the letters represented are A, B, E, J and Y. Write these letters on the board. **Q** Why can we not use the letters A, J and Y? • Establish that all the letters used have to be prime numbers and that A, J and Y do not have prime number values. Cross out these letters. **Q** What is the value of BE? Agree it is $2 \times 5 = 10$. **Q** What prime number will multiply this number up to 50? • Establish that the prime is 5, represented by the letter E. Confirm that the value of word BEE is 50 and is the product of the primes 2, 5 and 5. Let the children work in pairs to find the set of 'prime letters' to make the totals 230, 330, 2185 and 3575. They should use short division to find the factors, then try to make a word from the letters. Collect words and check answers. Explain that the activities they have been working on represent an important topic of mathematics. In trying to find words with particular values they have been trying to express a number as the product of its prime factors. Write on the board: 'Every whole number apart from 1 can be expressed as a product of primes – true or false?' **Q** How can we express 90 as a product of primes? • Get the children to list all the factors of 90. Remind them that they come in pairs; 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 25, 90. Underline the prime numbers 2, 9 and 5. **Q** How can we use the numbers 2, 3 and 5 to make a multiplication statement equal to 90? • Establish that $90 = 2 \times 3 \times 3 \times 5 = 2 \times 3^2 \times 5$. Say that this is how 90 is expressed as a product of its primes. Confirm that it will always be possible to do this and the above statement is true.

Plenary

Teaching Activities/ Focus Questions
• Write the following list on the board: 1, 2, 4, 5, 8, 10, 18, 20, 25. Remind children that these are the factors of 1 000 000 that are less than 26. **Q** Which of these numbers are prime? • Establish that only 2 and 5 are prime and that the letters represented by these numbers are B and E. **Q** If a 'hit a million' word could be made up only of Bs and Es, how many Bs and Es would there be in the word? Let the children work in pairs to find how many Bs and Es are required. Establish that six Bs and six Es would be needed. Write on the board: $1\,000\,000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 2^6 \times 5^6$ ASSESSMENT – • Ask the children to refer to Self-assessment sheet 9.1. Explain that you want them to do the second multiplication question (multiply 456 by 12, 23, 54 or 67). Remind the children of the choice of numbers they have and give them time to work on the question and to discuss the answer with a friend. • Again, ask them to record whether they did the calculation on their own or with help. • Give out answers and discuss.

Planning sheet	Day Four	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

Oral and Mental

Objectives and Vocabulary

Carry out short division of numbers.

Use tests of divisibility.

VOCABULARY
exact
remainder

RESOURCES
OHP calculator

Teaching Activities

- Write on the board:
  - A 168 ÷ 2
  - B 168 ÷ 6
  - C 168 ÷ 4
  - D 168 ÷ 3
  - E 168 ÷ 5
  - F 168 ÷ 10
  - G 168 ÷ 8
  - H 168 ÷ 9

  Ask the children to work in pairs to decide which calculations:

  – they can do mentally or with jottings
  – require a written method.

  Discuss their responses and ensure that children can carry out at least A, C and F mentally.

  Remind the children of the tests of divisibility and discuss how they can be used to establish if each division is exact.

  - A Yes – 168 is even
  - B Yes – the digits 1, 6 and 8 sum to 15 (a multiple of 3) and 168 is even.
  - C Yes – 16 and 8 are divisible by 4.
  - D Yes – the digits 1, 6 and 8 sum to 15 (a multiple of 3).
  - E No – 168 does not end in zero or 5.
  - F No – 168 does not end in zero
  - G Yes – repeated halving will show this.
  - H No – the sum of the digits 15 is not divisible by 9.

  Let the children work in pairs, using a written method, or mental, if appropriate, to work out B, D, E, G and H, giving any remainders that occur. Use an OHP calculator to confirm answers interpreting the display carefully. Check all answers with a multiplication, explaining how to deal with the remainders.

Main Teaching

Objectives and Vocabulary

- Carry out short multiplication and division numbers involving decimals.
- Carry out multiplication of a two-digit number by a two-digit number.

VOCABULARY
dimensions

RESOURCES
OHT 9.2
OHT 9.3
Self-assessment sheet 9.1
Class set of calculators

Teaching Activities

- Present the following problem: Jane has a square cake and wants to share it equally among three children. Jane likes squares and decides that all the pieces give to the three children will be square.

  Q How could Jane give each of the three children a square piece of cake?

  Discuss the children's suggestions and solutions.

  Q How should Jane cut the cake so that each child gets the biggest square possible?

  Agree that cutting into four squares ensures that each child could receive the largest square piece and that there would be one square piece left over. Show OHT 9.2 and say that the area of the cake is 324 cm^2.

  Q How can we work out the area of each piece of cake the children would get if they were given one of the squares?

  Establish that the required calculation is 324 ÷ 4. Ask the children to do the short division to confirm that the area of each square is 81 cm^2.

  Q Is there another way we could find the area of one of the squares?

- Remind the children that the area is found by multiplying the length by the breadth. Since the cake is square, the length and breadth of the cake will be the same.

  Q How can we find a number that, multiplied by itself, gives 324?

- Explore different ways of finding the dimensions of the cake. Confirm that the cake is 18 cm by 18 cm. Agree that the dimensions of each piece of cake are 9 cm by 9 cm so the area of each piece is 81 cm^2.
- Jane has decided to take the remaining piece of cake and cut it into squares to give to the three children.

  Q How will the remaining square piece of cake be cut into four squares?

  On OHT 9.2, demonstrate how the remaining square is cut into four smaller squares.

  Q What will be the area of each of the smaller squares?

- Establish that the calculation is 81 ÷ 4. Ask the children to confirm that the area of each piece is 20.25 cm^2. Agree that the dimensions of the smaller squares are 4.5 cm by 4.5 cm and ask the children to carry out a multiplication to confirm that the area of each small square is 20.25 cm^2.

  Q How much cake will each child have altogether now?

- Ask the children to add the area of the two squares; 81 + 20.25 = 101.25 cm^2. Explain that Jane keeps dividing the remaining square into four smaller squares, and giving out three squares.
- Show OHT 9.3. Explain that this table shows the calculations for the first and second cuts. Give out calculators. Ask the children to work out the calculation for the third cut, using a calculator. Collect answers and record on OHT 9.3. Repeat for the fourth and fifth cuts.

  Q How many rows do you think there will be in this table?

  Discuss the children's responses and explore the idea of infinity and convergence.

Plenary

Teaching Activities / Focus Questions

Q Is there a way that we can calculate the total area of cake for each child by looking at the problem another way?

- Establish that eventually there will be no cake left so all of the cake will have been shared among the three children.

  Ask the children to carry out the calculation 324 ÷ 3. Record the answer on OHT 9.3. Compare this answer of 108 cm^2 with the answer following the fourth and fifth cuts to confirm that after five cuts there is very little of the cake left to be shared.

ASSESSMENT –

- Ask the children to take out their Self-assessment sheet 9.1 and to work on the third multiplication question (multiply 34.8 by 2, 4, 6, 7 or 9) and the division question (£31.68 ÷ 2, 4, 6 or 8). Remind them that their choice of number should show how well they can perform each calculation. Give out answers and discuss. Say 'Tomorrow we shall be looking at the 3p and 5p problem.'
- Remind the children about the work they did on day 1 and how they thought about their reasons for the answers they gave. Tell them that they will have the chance to look at the question tomorrow but they should refer back to their work on the problem for homework.

Planning sheet	Day Five	Unit 9 *Calculation and problem solving*	Term: *Summer*	Year Group: *6*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Carry out multiplication of three-digit by two-digit numbers.	• Write on the board: □□□ × □□ = 4340. **Q** Using the digits 1, 2, 3, 4 and 5, how can we complete this multiplication statement? • Help the children by presenting the problem in a formal compact form or using a missing digits grid method. • Discuss the different strategies that the children used and explain key points such as where the 5 must go (124 × 35). Write on the board: □□□ × □□ = 4928. **Q** How have the numbers been rearranged? Explain that again, they may only use 1, 2, 3, 4 and 5 once. Discuss the children's strategies. Point out the only way to get 8 is 4 × 2 and that, as the answer is about the same size as in the previous question, the 3 and the 1 must have been swapped (352 × 14). Give the final rearrangement; □□□ × □□ = 12,312. **Q** What information can we use to find the numbers in this rearrangement? Discuss the children's answers and reasoning (513 × 24).

Main Teaching

Objectives and Vocabulary	Teaching Activities
• Identify and use appropriate operations (including combinations of operations) to solve problems involving numbers and quantities, and explain methods and reasoning. RESOURCES Resource sheet 9.2 Resource sheet 9.3 OHT 9.4 Self-assessment sheet 9.1 Self-assessment sheet 9.2.	• Give the children Resource sheet 9.2 and ask them to read through the problem, in pairs, and think about how they might solve it. Suggest that they jot down their methods of tackling the problem in the box on the sheet. • Stop the class and discuss the problem with the children and the methods they propose using. Ask questions to help them. **Q** How much money will be given by the children who gave the minimum amount? **Q** How much is given by those giving 12p extra? • Set the children to work, in pairs, to calculate how much money will be collected altogether. Tell them that they should record all their working and make a note of any partial solutions such as the answers to the questions above. Collect answers and discuss their methods. • Show OHT 9.4. Explain that the table is a way of recording how much money will be collected. Discuss what the headings might be for each column and, with the children, complete the group sizes and the 'money to be collected per month' row. Discuss how to find the total money to be collected for one month. Work through the table with the children and establish the required calculation for each cell. Record the calculations on OHT 9.4 Give out Resource sheet 9.3 and ask the children to fill in the amounts, using the calculations recorded on OHT 9.4. **Q** How do we calculate the amount of money to be collected in one year? Set the children to undertake the calculations and record their answers, using the statements on Resource sheet 9.3.

Plenary

Teaching Activities/Focus Questions

ASSESSMENT –

- Give out Self-assessment sheet 9.2. Allow time for the children to consider the question on the sheet. Ensure that they are able to recall the context of the problem presented on the first day.
- Work with individual children to discuss their reasons and explanations.
- Ask the children to say whether they needed help in deciding if Luke was right or wrong, and why.
- Discuss the solution to the problem, with the class. Explain that the table on the bottom half of the sheet is for the children to summarise how well they have been able to answer each question.
- Ask the children to look at the statements in the left-hand column. The questions alongside each statement are intended to remind the children what each statement means. Ask the children to look back on their work to help them fill in the table.
- Encourage the children to complete each statement by putting a tick in one box and to put a circle around the number they chose for their calculation.
- Ask the children to think about all the different calculations and reasoning strategies they have been working on. Ask them to complete the target statement by choosing an area that they think they need to improve.
- For those children who were able to answer all the questions without any help, discuss the learning objectives for Year 7 shown on the front page of the unit.
- Get the children to stick Self-assessment sheets 9.1 and 9.2 in their books under their work.

A	B	C	D	E	F	G	H	I
1	2	3	4	5	6	7	8	9

J	K	L	M	N	O	P	Q	R
10	11	12	13	14	15	16	17	18

S	T	U	V	W	X	Y	Z
19	20	21	22	23	24	25	26

A class of 32 children decide to save for charity for one year. The children agree that the minimum amount to be given by each child every month is 35p. Eight children agree to give the minimum amount. Nine children agree they will each give the minimum amount plus an extra 12p. Seven children agree they will each give the minimum amount plus 24p. Five children agree they will each give twice the minimum amount. The rest of the class each give 75p. The teacher gives £1. How much will the class collect for charity in one year?

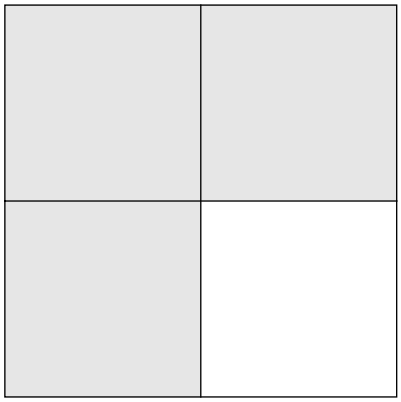
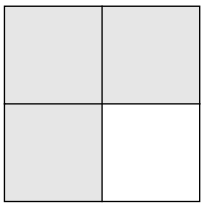
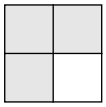
Space for jottings and ideas;

Group	Number in group	Money to be collected per month					
		35p					£1
A							
B							
C							
D							
E							
F							1 x £1 = £1

Statements

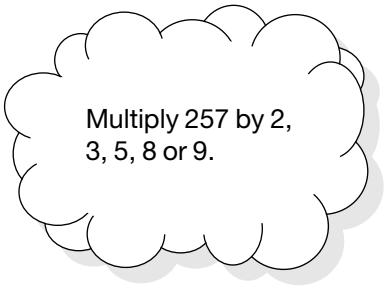
Group A	The eight children will give:
Group B	The nine children will give:
Group C	The seven children will give:
Group D	The five children will give:
Group E	The three children will give:
Group F	The one teacher will give:

Total for the year is: £

Cut	Area of each piece of cake	Total area of cake for each child
First Cut 	$324 \div 4 = 81\ cm^2$	$81\ cm^2$
Second cut 	$81 \div 4 = 20.25\ cm^2$	$\begin{array}{r} 81 \\ + \quad 20.25 \\ \hline 101.25\ cm^2 \end{array}$
Third cut 		
Fourth cut 		
Fifth cut		

Group	Number in group	Money to be collected per month					
A							
B							
C							
D							
E							
F							

My Mathematics by .....



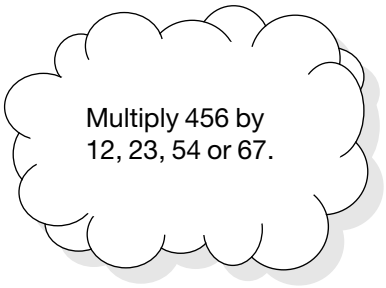
My calculation

Show or discuss with a friend

I did this calculation:

on my own ☐

with some help ☐



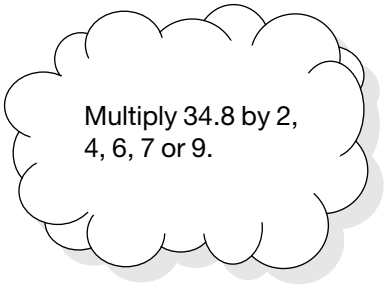
My calculation

Show or discuss with a friend

I did this calculation:

on my own ☐

with some help ☐



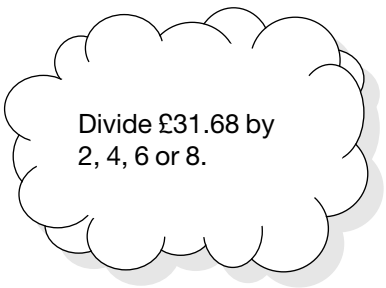
My calculation

Show or discuss with a friend

I did this calculation:

on my own ☐

with some help ☐



My calculation

Show or discuss with a friend

I did this calculation:

on my own ☐

with some help ☐

My Mathematics by .....

The money problem

The Government wants to issue only 2p and 6p coins. Luke says, 'You can buy items of any price'. He explains:

10p = 2p + 2p + 6p

So you can buy items costing 10p, 20p, 30p, and so on, forever.

You can also buy items costing 2p, 4p, 6p and so on, forever, so you can pay for any item.

Is Luke right or wrong?

I think Luke is right/wrong because:

Show or discuss with a friend

I explained my reasons:

on my own ☐

with some help ☐

Name:	**School:**
What I can do	
I can multiply and divide numbers involving decimals: on my own ☐ with some help ☐	Multiply 34.8 by 2, 4, 6, 7 or 9 Divide £31.68 by 2, 4, 6, 8
I can multiply a three-digit number by a one-digit and two-digit number: on my own ☐ with some help ☐	Multiply 257 by 2, 3, 5, 8 or 9 Multiply 456 by 12, 23, 54 or 67
I can use operations to solve problems, and explain by methods and reasoning: on my own ☐ with some help ☐	The money problem: 2p 6p

My next target:

I want to get better at _____

_____

_____