Unit 9
Multiplication and division

Five daily lessons

Primary
National Strategy

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Year 3
Summer term

Unit Objectives

Year 3

- Begin to find remainders after simple division. — Page 51
- Use known number facts and place value to carry out mentally simple multiplications and divisions. — Page 57
- Solve word problems involving numbers in 'real life' money and measures, using one or more steps, including finding totals and given change, and working out which coins to pay. Explain how the problem was solved. — Pages 61, 67, 69

Link Objectives

Year 2

- Use known number facts and place value to carry out mentally simple multiplications and divisions.
- Use mental addition and subtraction, simple multiplication and division, to solve simple word problems involving numbers in 'real life', money or measures, using one or two steps. Explain how the problem was solved.

Year 4

- **Find remainders after division**.
- Use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).
- Use all four operations to solve word problems involving numbers in 'real life', money and measures, using one or more steps, including converting pounds to pence and metres to centimetres and vice versa.

(Key objectives in bold)

Resources needed to teach this unit:

- Activity sheet 9.1
- Activity sheet 9.2
- Activity sheet 9.3
- OHT 9.1 taken from *Mathematical Challenges for More Able Pupils in Key Stages 1 and 2* (NNS)
- Resource sheet 9.1
- Resource sheet 9.2
- Large digit cards
- Counting stick
- Large, write-on number line
- £1 coins
- 2p and 10p coins and a box to put them in.
- Whiteboards
- Bead string
- Number line 0−100

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Planning sheet	Day One	Unit 9 *Multiplication and division*	Term: *Summer*	Year Group: *3*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Know by heart multiplication facts for the 2 and 5 times tables. RESOURCES Large set of digit cards Whiteboards	• Write on the board 5 x □ • Shuffle the pack of digit cards. Take each card in turn and put it on top of the empty box. Ask the children to record their answers to each calculation on their whiteboards. • Change 5 x to 2 x and repeat the activity. • Write an answer at the end of the calculation, e.g. 2 x □ = 16. Ask the children to write on their whiteboards the number that should be in the box. **Q** If you don't know what number goes in the box, how could you work it out? Agree that you could count in twos until you reach the answer. The number of twos counted is the number that goes in the box. • Repeat with other multiplication statements for the 2 and 5 times tables.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Use known number facts and place value to carry out mentally simple multiplications and divisions. Multiply a two-digit multiple of 10 up to 50 by 2, 3, 4, 5 or 10. VOCABULARY multiple RESOURCES Counting stick Whiteboards	• Show the counting stick. Tell the children that each section is worth 5. Count along the stick and record the multiples of 5 on the board. • Tell the children that each section is now worth 50. Count in 50s and write numbers on the board underneath the corresponding multiple of 5, e.g. 0 5 10 15 20 50 0 50 100 150 200 500 **Q** What do you notice? Agree that each number in the top row has been multiplied by 10 and the digits have moved one place to the left. • Work through some examples, e.g. 5 x 4 = □; 50 x 4 = □; 5 x 5 = □; 50 x 5 = □. • Illustrate how knowing this can add to our list of known facts. For example, we know 5 x 4 = 20, 4 x 5 = 20, 20 ÷ 4 = 5, 20 ÷ 5 = 4 and now we can also find 50 x 4 = 200. **Q** What other facts do we now know? Agree that we now know 4 x 50 = 200, 200 ÷ 4 = 50, 200 ÷ 50 = 4. • Count in twos along the counting stick. Record. Then count in 20s and record. • Ask some questions about multiplying by 20, e.g. 20 x 4 = □. • Write on the board 20 x 3 = □ 50 x 5 = □ 20 x 5 = □ 50 x 3 = □ **Q** How can we find the answer to these calculations using known facts? **Q** How could we do this with other multiplication tables? Ask the children to write down any multiplication facts they know for the 3 and 4 times tables. Take examples from children and show how to multiply the first number by 10 and then the answer by 10, e.g. 3 x 4 = 12 30 x 4 = 120 3 x 5 = 15 30 x 5 = 150 • Ask the children to use this knowledge to record in their books all the new facts they now know using the 3 and 4 times tables as starting points.

Plenary

Teaching Activities/Focus Questions

• Write on the board:

30 60 150

___ x 2 = ____

___ ÷ 2 = ____

___ x 5 = ____

___ ÷ 5 = ____

Q Which two numbers can you use to make the first calculation correct?

Ask the children to record them on their whiteboards.

Repeat for each of the calculations.

Q If we can also use 300, what calculations can you make now?

HOMEWORK – Ask the children to write in their books four new multiplication and division facts using 40, 80, 160 and 400 they will practise remembering from today's lesson. They will be asked to recall them on Friday.

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

- **observe and describe the effect of multiplying by 10;**
- **respond to oral questions like:**
  20 x 3 40 x 5
  and explain method.

(Refer to supplement of examples, section 5, pages 55 and 57.)

Planning sheet	Day Two	Unit 9 *Multiplication and division*	Term: *Summer*	Year Group: *3*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Count on or back in twos starting from any two-digit number. Count on in steps of 3, 4 or 5 from any number to at least 50, then back again. VOCABULARY equal steps multiple	**Q** If we start at 0, and count in twos, what can you tell me about the numbers we will say? Collect responses and count in twos to check the children's suggestions. • Start at 0. Count in multiples of 5. **Q** Will we say number 14/15? Yes/No? Why/Why not? • Tell the children that we want to start at zero, count in equal steps and have 12 in our count. **Q** What steps will we count in? Count in the steps suggested to check. **Q** What steps will we use if we want 21 in our count? Count in the steps suggested to check.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Begin to find remainders after simple division. VOCABULARY remainder RESOURCES Large write-on number line Activity sheet 9.1	• Write on the board □ ÷ 5 = Δ **Q** What whole numbers will fit in here? Record calculations on the board, e.g. 20 ÷ 5 = 4 **Q** What do you know about the numbers in the square boxes? (e.g. 20 ÷ 5 = 4) Agree that they are all multiples of 5. • Ask children to describe two of the calculations as 'real life' problems, one involving grouping and one involving sharing, e.g. 20 children are shared between four teams. How many children are in each team? How many teams of four can you make if there are 20 children? **Q** What if there are 21 children? • Introduce the word remainder. Write the calculation on board, e.g. 21 ÷ 5 = 4 remainder 1. **Q** If you had to teach someone to do this calculation on a number line, what would you show them? Demonstrate division by counting in steps along the number line. • Write on the board 15 ÷ 5 = 3 and □ ÷ 5 = 3 remainder 1 **Q** What is the missing number? How did you work it out? **Q** What other numbers when divided by 5 will give a remainder of 1? Record the children's suggestions. • Ask the children to tell you a number that you can divide by 2 and not have a remainder. Record it on board, e.g. 8 ÷ 2 = 4. • Write on the board □ ÷ 2 = 4 remainder 1. **Q** What number will go in the box? • Give out Activity sheet 9.1, read through it and ask the children to complete it. • Collect and discuss answers, encouraging children to explain their reasons to the class.

Plenary

Teaching Activities/Focus Questions

• Write on the board:

15 10 7 12

Q Which numbers wouldn't have a remainder if you divided them by 5? Why?

Q Which wouldn't have a remainder if you divided them by 2?

Q If I divide by 2, what is the biggest remainder I can get?

Q What could I divide 7 by to get an answer without a remainder?

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

- **give a whole number remainder when one number is divided by another, e.g. 16 ÷ 5 = 3 remainder 1.**

(Refer to supplement of examples, section 5, page 51.)

Planning sheet	Day Three	Unit 9 *Multiplication and division*	Term: *Summer*	Year Group: *3*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Count on in steps of 3, 4 or 5 from any small number to at least 50, then back again. VOCABULARY multiple	Tell children that they will count in steps of 3 starting at 1. **Q** Will we say 32 in our count? Ask children to show thumb up for yes and thumb down for no. Count in threes from 1 to check. **Q** How could we quickly calculate if 32 would be in the count? Agree that you could have looked at the multiples of 3 and add 1 (the starting number). • Repeat with other starting numbers and count in different steps. Ensure that the starting number is less than the counting step.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Begin to find remainders after simple division. VOCABULARY remainder multiple RESOURCES Bead string OHT 9.1 adapted from *Mathematical Challenges for More Able Pupils in Key Stages 1 and 2* (NNS) Whiteboards	• Write on the board □ ÷ 5 = Δ remainder 1 Ask the children to complete the statement in as many different ways as they can and record the number sentences on their whiteboards. Agree that □ will be one more than a multiple of 5. • Change the calculation to □ ÷ 5 = Δ remainder 2/3/4. Agree each time that □ will be 2, 3 or 4 more than a multiple of 5. **Q** If you are dividing by 5, what is the biggest remainder you can get? Agree that it is 4, as otherwise you will get another group of 5. • Change the calculation to □ ÷ 3 = Δ remainder 1. **Q** What do you know about all the numbers that could be in the square box? Agree that they will all be one more than a multiple of 3. **Q** If you are dividing by 3, what is the biggest remainder you can get? Agree that it is 2. Repeat for division by 2 and 4. **Q** How do you decide what the largest possible remainder can be when you divide? Agree that the largest possible remainder will always be one less than the number you are dividing by. Illustrate the point with a bead string. Show that with □ ÷ 3 = Δ remainder 2, the number in the square box will be 2 more than a multiple of 3 or 1 less than a multiple of 3. If □ was 1 more, this would give another group of 3 and therefore no remainder. Repeat for division by 4. • Show OHT 9.1. Remind the children that in Unit 8 they found it useful to record all possibilities in order. **Q** How will you set out your work? **Q** Where will you start/finish? Agree that listing the numbers that are more than each multiple of 3 up to 20 would be helpful, and likewise for 4 more than each multiple of 5. • Ask the children to complete the problem.

Plenary

Teaching Activities/Focus Questions
• Agree that Susie the snake has 19 eggs. • Write on the board: She counted her eggs in threes. She had 1 left over. She counted them in twos. She had 1 left over. **Q** How could you work out the answer? • Agree that the answer is one more than a number which is both a multiple of 2 and 3. One approach could be to list these and then add 1 to the numbers which are multiples of both 2 and 3. List the multiples of 2 and 3 below 20. Ring 6, 12 and 18 and add 1 to these. Point out that there is more than one solution. **By the end of the lesson, children should be able to:** • **give a whole number remainder when one number is divided by another;** • **have a system for finding all possibilities, e.g. start with smallest number.** (Refer to supplement of examples, section 5, page 51 and the table of Problem Solving Strategies).

Planning sheet	Day Four	Unit 9 *Multiplication and division*	Term: *Summer*	Year Group: *3*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Count on and back in tens and twos starting from any two- or three-digit number. VOCABULARY total RESOURCES 10p and 2p coins Small box or tin	• Put 24p into the box. Show the children a 10p coin and drop it into the box or tin. **Q** What is the total amount of money in the box/tin? • Remind the children of counting in tens rather than ones. • Add another 10p to the box/tin. **Q** What is the total now? • Repeat, this time adding a 2p coin, and then another. • Repeat adding 10p or 2p coins and ask children for the total.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Begin to find remainders after simple division. Solve word problems involving numbers, money and measures using one or more steps. Explain how the problem was solved. VOCABULARY grouped multiple remainder RESOURCES £1 coins Number line 0–100 Activity sheet 9.2	• Show 17 £1 coins. **Q** If I were to exchange these so that I had fewer coins, what notes or coins would they be? Agree that they could be exchanged for £10 notes, £5 notes or £2 coins. **Q** If I were to exchange 17 £1 coins for £5 notes, how could I work out how many are needed? Agree that the pound coins could be grouped into fives; there could be jumps of 5 on a number line, or children could use their knowledge of multiples of 5. Demonstrate these. **Q** How would we write the calculation that we did? Agree that it is 17 ÷ 5 = 3 remainder 2. **Q** What is 3 representing in this calculation? Agree that it is the number of £5 notes. **Q** What is 2 representing? Agree that it is the two left-over pound coins. • Write on the board: Jasper has 21 £1 coins. If he exchanged these for £2 coins, how many £1 coins would be left over? Illustrate different ways of calculating, emphasising using knowledge of the two times table as the most efficient method. • Agree calculation and answer, e.g. 21 ÷ 2 = 10 remainder 1. There would be one £1 coin left over. • Give out Activity sheet 9.2, read it and ask the children to complete it. They should write the number sentence for each question. • Collect and discuss answers and methods.

Plenary

Teaching Activities/Focus Questions

Q If Abby has £36 in £1 coins, should she exchange her coins for £10 notes or £5 notes to have the smallest number of £1 coins left over?

• Ask children to convince the class. Agree the calculations:
36 ÷ 5 = 7 remainder 1
36 ÷ 10 = 3 remainder 6

Agree a suitable answer would be: She should exchange her coins for £5 notes if she wants the smallest number of coins.

• Explain that all of today's calculations should have been done by using knowledge of multiplication and division facts for the 2, 5 and 10 times tables.

• Ask the children to show how confident they feel with finding remainders by showing thumbs up, level or down.

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

- **solve story problems about numbers in 'real life';**
- **write a number sentence to show how the problem was solved.**

(Refer to supplement of examples, section 5, page 67.)

Planning sheet	Day Five	Unit 9 *Multiplication and division*	Term: *Summer*	Year Group: *3*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Multiply a two-digit multiple of 10 up to 50 by 2, 3, 4, 5 or 10. VOCABULARY multiplication RESOURCES Several copies of Resource sheet 9.1 cut up to give each child one of the calculations. Resource sheet 9.2	• Ask each child to say one of the multiplication facts they learned for homework and tell their partner the other three. • Give each child one or two calculations from Resource sheet 9.1. Ask them to write in the answer. • Write a calculation from Resource sheet 9.2 on the board. • Ask the children to stand up if they have the known fact that helps us to work out the calculation shown (e.g. teacher writes 50 x 4; child holds up 5 x 4 = 20). **Q** If we know 5 x 4 = 20, what is 50 x 4? • Repeat for all calculations on Resource sheet 9.2.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Use known number facts and place value to carry out mentally simple multiplications and divisions. Solve word problems involving money and measures, using one or more steps, including finding totals and giving change, and working out which coins to pay. Explain how the problem was solved. VOCABULARY two-step problem operation RESOURCES Resource sheet 9.2 Activity sheet 9.3 Whiteboards	• Show 50 x 5 = □ from Resource sheet 9.2. **Q** What if this was five 50 pence coins? What would be the answer? Agree the answer would be 250p or £2.50. Ask a child to draw a picture of 50p x 5. • Show 20 x 3 = □ from Resource sheet 9.2. **Q** How would you write the answer if this was 20p x 3? Agree 60p or £0.60. **Q** What if I had five 50p coins and three 20p coins? Agree that the calculations would be: (50 x 5) + (20 x 3) 250 + 60 = 310 Agree the answer is 310p or £3.10. • Give out Activity sheet 9.3. Ask the children to discuss with their partner which of the four operations they might use to solve each problem. Remind them that, as with the example given, they might use more than one operation. Read through the problems and discuss the children's suggestions for working them out. Agree that people might use different methods of calculating, the important part of this task will be to show the calculations used. Ask children to complete Activity sheet 9.3.

Plenary

Teaching Activities/Focus Questions

• Write on the board: John has £1.40 in 50p and 20p coins. What coins does he have?

Q Could this be only 50p coins? How do you know?

Agree that multiples of 50 end in 50 or 00 and so John cannot only have 50p coins.

Q Could this be only 20p coins? How do you know?

Agree that multiples of 20 end in 00, 20, 40, 60 or 80 and so, as 140 ends in 40, John could have 20p coins only.

Ask the children to work out the possible solutions and show their calculations on their whiteboards.

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

- **use any of the four operations and own strategies to solve money problems;**
- **explain methods with a number sentence to show how the problem was solved (recognised two-step operation).**

(Refer to supplement of examples, section 5, page 69.)

Year 3 Unit 9 (Summer term) Support Session 2
Division

Objectives
Count in fives.
Find remainders after division.

Vocabulary
multiples
divided by
remainder

Resources
Numbered cards 1-50
Interlocking cubes in a variety of colours

Oral and mental starter

Ask the children to count in fives from zero, using their fingers as a tally (one finger for each 5).
Stop at 35.

Q How many fives in 35?

Write on the board 35 ÷ 5 = 7.
Repeat for other multiples of 5.

Q If we count in fives will we say 26 in our count? Why not?

Establish that the only numbers in the count will be multiples of 5.

Main activity

Ask the children to put interlocking cubes in towers of 5 of the same colour.

Count the multiples of 5 together.
Take a handful of towers of 5 and tell the children how many bricks you have altogether, e.g. 50.

Q How many towers of 5 do I have?

E.g. 50 bricks is 10 towers of 5.
Write 50 ÷ 5 = 10.
Underneath write 52 ÷ 5 = ☐ and take two extra single bricks.
Establish that there are 10 towers of 5 in 52 and 2 left over. Record this as 52 ÷ 5 = 10 remainder 2.

Take a numbered card (up to 50) and ask the children if it will have a remainder when divided by 5.
Demonstrate how to count in fives to check, and or use towers of bricks.

Give a group of cards to each pair of children and ask them to sort the cards into two piles; those that will give a remainder when divided by 5 and those that won't.

Plenary

Write some of the numbers from each of the piles of numbers on the board.
e.g.

NO REMAINDER	REMAINDER
10 15 25 20 5	37 46 17 24

Q. What do you notice about the numbers in the 'no remainder' box?

Establish that they are all multiples of 5.

Write on the board 17 ÷ 5 and show 17 cubes in groups of 5.

Establish 17 ÷ 5 = 3 remainder 2, because there are 3 groups of 5 cubes and 2 cubes left over.

Year 3 Unit 9 (Summer term) Support Session 1
Division

Objectives
Count on in tens.

Find remainders after division.

Vocabulary
multiples
divided by
remainder

Resources
Whiteboards
Bead string
0-100 numbered cards

Oral and mental starter
Ask the children to count in tens from zero, using their fingers as a tally holding up one finger for each ten. Stop at 90.

Q How many tens in 90?

Write on the board: 90 ÷ 10 = 9.
Start again from zero and stop at 70.

Q How many tens in 70? What number sentence can we write?

Repeat. Ask the children to write calculations on white boards.

Main activity

Ask the children to read out some of their number sentences.
Demonstrate a couple of these on a bead string, e.g. 40 ÷ 10 = 4

Say 40 divided into groups of 10 gives exactly 4 groups.

Q What if I had 41 ÷ 10?

Establish that there would be 1 left over and record this as 41 ÷ 10 = 4 remainder 1.

Pick out a number card (two-digit number) and divide it by 10,
e.g. 74 ÷ 10 = 7 remainder 4.

Ask the children to pick out their own two-digit numbers, divide them by 10 and to record the calculation.

Plenary
Write on the board:
60 57 29 30 43 70

Q. Which of these numbers can you divide by ten without a remainder?

Establish that dividing 60, 30, 70 by 10 will not give a remainder.

Q. How do you know that the other numbers will give a remainder if you divide by 10?

Establish that the other numbers have tens and ones, not just multiples of 10.

Write these calculations in the correct box below.

25 ÷ 5	51 ÷ 5	45 ÷ 5	26 ÷ 5
10 ÷ 5	36 ÷ 5	11 ÷ 5	35 ÷ 5
14 ÷ 2	20 ÷ 2	13 ÷ 2	21 ÷ 2

These calculations will not have a remainder	**These calculations will have a remainder**

Make up some more of your own for each box.

Robert has 27 £1 coins

If he exchanges his coins for £10 notes, how many £1 coins will be left over?

If he exchanges his coins for £5 notes, how many £1 coins will be left over?

If he exchanges his coins for £2 coins, how many £1 coins will be left over?

Kate has 45 1p coins

If she exchanges her coins for 10p coins, how many 1p coins will be left over?

If she exchanges her coins for 5p coins, how many 1p coins will be left over?

If she exchanges her coins for 2p coins, how many 1p coins will be left over?

Write a similar problem for 68 ÷ 5 = ☐

Find out how much money each person has

- Emma has three 50p coins and three 20p coins.

Calculations:

Answer: Emma has _____

- Jen has five 20p coins and seven 10p coins.

Calculations:

Answer: Jen has _____

- Ali has four 50p coins and three 20p coins.

Calculations:

Answer: Ali has _____

How many coins in the purse?

£3.50 (350p) in 50p coins

Calculation:

_____50p coins

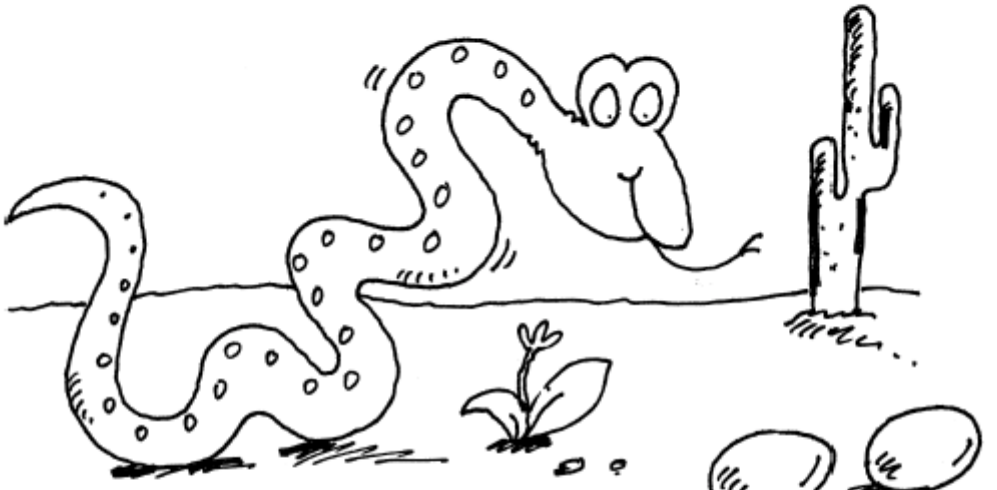
£1.80 (180p) in 20p coins

Calculation:

_____20p coins

Susie the snake

Susie the snake has up to 20 eggs.

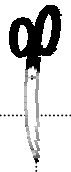


She counted her eggs in threes.
She had one left over.

She counted them in fives.
She had four left over.

How many eggs has Susie got?

Taken from *Mathematical Challenges for More Able Pupils in Key Stages 1 and 2* (NNS publication).



2 x 2 = ☐	3 x 2 = ☐
4 x 2 = ☐	5 x 2 = ☐
2 x 3 = ☐	3 x 3 = ☐
4 x 3 = ☐	5 x 3 = ☐
2 x 4 = ☐	3 x 4 = ☐
4 x 4 = ☐	5 x 4 = ☐
2 x 5 = ☐	3 x 5 = ☐
4 x 5 = ☐	5 x 5 = ☐

20 x 2 = ☐	30 x 2 = ☐
40 x 2 = ☐	50 x 2 = ☐
20 x 3 = ☐	30 x 3 = ☐
40 x 3 = ☐	50 x 3 = ☐
20 x 4 = ☐	30 x 4 = ☐
40 x 4 = ☐	50 x 4 = ☐
20 x 5 = ☐	30 x 5 = ☐
40 x 5 = ☐	50 x 5 = ☐