Unit 9
Multiplication and division

Five daily lessons

National **Numeracy** *Strategy*

Year 4
Autumn term

Unit Objectives
Year 4

• Extend understanding of the operations of multiplication and division and their relationship to each other and addition and subtraction.	Page 52
• Use doubling or halving starting from known facts.	Page 58, 60
• Approximate first. Use informal pencil and paper methods to support, record or explain multiplication and divisions.	Page 66, 68
• Develop and refine methods for TU × U, TU ÷ U	Page 68

This Unit Plan is designed to guide your teaching.

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

Link Objectives

Year 3

- Understand multiplication as repeated addition. Read and begin to write related vocabulary. Extend understanding that multiplication can be done in order.

- **Understand division** as grouping (repeated subtraction) or sharing. **Recognise that division is the inverse of multiplication,** and that halving is the inverse of doubling.

- Use doubling or halving, starting from known facts.
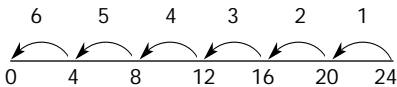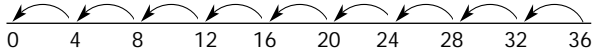
Year 5

- Understand the effect of and relationship between the four operations and the principles (not the names) of the arithmetic laws as they apply to multiplication. Begin to use brackets.

- Use doubling and halving starting from known facts.

- Approximate first. Use informal pencil and paper methods to support, record or explain multiplication and division.
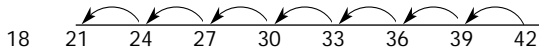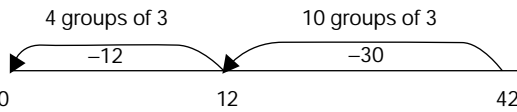
(Key objectives in bold)

Resources needed to teach this unit:

- Activity sheet 9.1
- Counting stick
- Place value cards
- Whiteboards
- Number cards / fans

department for
education and skills

Planning sheet	Day One	Unit 9 *Multiplication and division*		Term: *Autumn*	Year Group: *4*
Oral and Mental		**Main Teaching**			**Plenary**
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**		**Teaching Activities / Focus Questions**

Oral and Mental Objectives and Vocabulary	Oral and Mental Teaching Activities	Main Teaching Objectives and Vocabulary	Main Teaching Activities	Plenary Teaching Activities / Focus Questions

Derive doubles of whole numbers to 50 and the corresponding halves.	• Ask the children to double 30, double 4 and then ask them to double 34. Demonstrate using the place value cards then set children questions. Emphasise the approach used:
	 – partition, double and recombine.
	
	 Remind children that the starting number was half of the answer.
	
	 Get children to double a number and half the answer,
	
	 e.g. double 24 is 48
	        half 48 is 24.
		Use doubling and halving, starting from known facts.	Write on board 2 times table and write 4 times table next to it.
			
			 Q What relationship can we see between these two tables?
			
			 Draw out double and double again.
			 Discuss with the children that one way of multiplying by 4 is to double and double again.
			
			 Demonstrate 15×4 $15 \times 2 = 30$
			                                               $30 \times 2 = 60$
			
			 Demonstrate other examples. e.g. 23 x 4, 31 x 4
			
			 Q Does this rule apply to every number we multiply by 4?
			
			 Give children a few minutes to explore this with a partner.
			 Collect responses and discuss methods.
			
			        Write on the board:
			                        15×8
			
			 Q How would we calculate this?
			
			 Encourage children to make links, double, double and double again.
			
			 Q Find five two-digit numbers you can multiply by 8.
			
			 Collect responses and discuss.
			
			 Q How would you calculate 23×5?
			
			 Emphasis multiply by 10 and halve the answer. Demonstrate other examples.
			 Ask the children to make up multiplying by 5 challenges for each other. Collect some examples for class to work through and to discuss.
				Write on board
				        24×50.
				
				 Q How could we solve this using doubling and halving?
				
				 Encourage children to make links with their ×5 method. Establish ×100 and halve.
				
				 Q What is 24×25?
				
				 Draw out link between 25 and 50, and the fact we can halve the product of 24×50.
				
				 Provide children with a range of examples where they can make connections between known facts and doubling and halving.
				
				 HOMEWORK – Ask the children to work out the 8 times table by doubling the 4 times table.
				
				 By the end of the lesson children should be able to:
				 • **Multiply by 4 by doubling and doubling again;**
				 • **Multiply by 5 by multiplying by 10 and halving.**
				 (Refer to supplement of examples, section 6, page 60.)

RESOURCES Place value cards		VOCABULARY double halve product		

Planning sheet	Day Two	Unit 9 *Multiplication and division*		Term: *Autumn*	Year Group: *4*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities / Focus Questions**
Derive doubles of whole numbers to 50 and the corresponding halves. Find the 8 times table facts by doubling the 4 times table. Know by heart multiplication facts for 4 times tables.	• Get class to chant the 4 times tables and the 8 times tables. Ask: Q How does 2 times tables help you to remember 4 and 8 times tables? Use the Activity sheet 8.1 cards to practise doubling and halving.	Approximate first. Use informal pencil and paper methods to support, record or explain multiplication.	• Write on the board 23×3 Q Can you suggest a way we could work out an approximate answer? Discuss ways that they suggest working out the answer approximately: $$20 \times 3 = 60$$ or $$30 \times 3 = 90$$ Q Why is 60 too small and 90 too big? • Using place value cards show children how we can partition 23 into 20 and 3. Write on the board: $$23 \times 3 = (20 \times 3) + (3 \times 3)$$ $$= 60 + 9$$ Explain that this can be written as a grid and write: | $\times$	20	3	
---	---	---	---
3	60	9	= 69 | Remind children that 69 is the answer and the two estimates were 60 and 90. Repeat using TU $\times$ U examples – approximate each time, and link this back to final answer. • Set class exercise, multiplying by 2, 3, 4 and 5 using the grid method.	Write on the board: | $\times$	?	?
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?	100	5	= 105 Give children 2 minutes to discuss with a partner what the question marks might be. Prompt by looking at the units value or pointing to tens asking why it must only be a multiple of 10. Review grid method by working through. Q What are the steps when calculating 24×3? • Approximate • Partition • Grid multiply • Check **By the end of the lesson children should be able to:** ● **Approximate first, explain orally how method works.** ● **Use grid method (TU×U), for example 23×8 is approximately $20 \times 10 = 200$.** (Refer to supplement of examples, section 6, page 66.)
RESOURCES Activity sheet 9.1		VOCABULARY partition grid method approximate estimate multiply RESOURCES Place value cards		

Planning sheet	Day Three	Unit 9 *Multiplication and division*		Term: *Autumn*	Year Group: *4*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities / Focus Questions**

Know by heart multiplication facts for the 3, 4, and 5 times tables and derive the corresponding division facts.	• Count in 3s from 0 to 30 using the counting stick. Identify points e.g. corresponding to 24 and ask 'how many 3s are in 24'? Ask how they knew that. Stress the inverse aspect of multiplication and division.
	
	• Repeat counting in 4s and 5s.
		Approximate first, use informal pencil and paper methods to support, record or explain divisions.	• Give children the following problem.
			
			Q A class of 24 children has to be organised into teams of 4. How many teams?
			
			• Explain that the important part of the problem is understanding that we are grouping 4 children as many times as we can from the class of 24 children.
			
			Q How could we approximate this?
			
			Remind children
			  5 groups of 4 = 20
			  10 groups of 4 = 40
			
			• Discuss what this means and that the answer will be nearer to 5 groups of 4 than 10 groups of 4.
			
			Model on the board or on large number line:
			
			6 5 4 3 2 1
			
			0 4 8 12 16 20 24
			
			24 ÷ 4 = 6
			
			• Explain that each time we 'hop back' we subtract 4. We can do that 6 times.
			
			Relate to counting stick, counting backwards. Link back to approximation and check.
			
			Q 36 ÷ 4 = approximately how many groups?
			
			• Give children 1 minute to discuss with a partner. Collect and discuss ideas. Model on board or on large number line:
			
			0 4 8 12 16 20 24 28 32 36
			
			Q How many 'hops back'?
			
			Q What does that 9 mean?
			
			• Discuss that it means there are 9 groups of 4.
			
			Give children 35 ÷ 5. Ask them to work through with a partner.
				Ask the question:
				
				Q What happens if we want teams of 4 but there are 22 children in the class?
				
				Demonstrate on the board with hops down the number line.
				
				Revise the word 'remainder'.
				
				Ask the children what it means.
				
				Ask the children which of the following will produce remainders:
				
				  11 ÷ 3? 13 ÷ 5? 20 ÷ 2?
				
				Q How do you know?
				
				Challenge the children to think of division calculations that will give a remainder of 1.
				
				Collect results and work through some examples.
				
				By the end of the lesson the children should be able to:
				
				● **Use informal methods to support, record or explain calculations achieving consistent accuracy. Explain methods.**
				
				● **Use multiples of the divisor.**
				
				(Refer to supplement of examples, section 6, page 68.)

		VOCABULARY remainder groups of equal group of divide RESOURCES Counting stick		
RESOURCES Counting stick				

NNS Unit Plans

Planning sheet	Day Four	Unit 9 *Multiplication and division*		Term: *Autumn*	Year Group: *4*
Oral and Mental			**Main Teaching**		**Plenary**
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities		Teaching Activities / Focus Questions

Oral and Mental

Objectives and Vocabulary

Subtract multiples of 10 from a two-digit number.

Teaching Activities

- Ask the class 47–10, 47–20, 47–30, 47–40? Children to show their answers using digit cards.

- Repeat mixing up numbers and multiples of 10 e.g. 59–30, 73–50, 81–10 etc.

- Explain that the numbers they have been subtracting are all multiples of 10. Ask the class to work out 76 subtract 4 multiples of 10, etc.

VOCABULARY
multiples of 10

RESOURCES
Digit cards

Main Teaching

Objectives and Vocabulary

Approximate first, use informal pencil and paper methods to support, record or explain divisions.

Develop and refine written methods for TU ÷ U.

VOCABULARY
remainder
divide

RESOURCES
Whiteboards

Teaching Activities

- Write $42 \div 3$ on the board. Ask:

Q   How can we approximate this?

Remind children that

$$10 \times 3 = 30 \text{ and } 20 \times 3 = 60$$

Explain that as $10 \times 3 = 30$, $30 \div 3 = 10$ and as $20 \times 3 = 60$, $60 \div 3 = 20$ so the answer to $42 \div 3$ is between 10 and 20.

Revise the hops on number line approach from the last lesson. Model on board or on a number line.

18   21   24   27   30   33   36   39   42

Q   This is taking a long time, is there a quicker way?

- Let children try, using whiteboards, to find a quicker way with a partner. Take feedback.

Model on the board:

4 groups of 3   10 groups of 3
            −12   −30
0   12   42

Ask:

Q   How many groups of 3 have we subtracted?

Point out that 14 is between 10 and 20, which links back to our approximation. Give the children examples to practise.

Bring children back together.

Q   Could we do this an even quicker way?

- Demonstrate vertical recording

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        42
       −30  (3 × 10)
        12
       −12  (3 × 4)
         0          42 ÷ 3 = 14
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- Demonstrate with a further example: $56 \div 4 = ?$ Begin with approximation.

Give children more examples to practise.

Plenary

Teaching Activities / Focus Questions

Pick one of the examples which has a remainder and get children to talk through method. Emphasise steps and importance of knowing times tables.

Q   A class has 8 groups with 4 children in each and 3 other children doing another task. How many children in the class?

Ask children to explain how they worked out the calculation

$4 \times 8 = 32$

$32 + 3 = 35$

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

- **Use informal written methods to support and explain division;**

- **Use approximations to support checking of division methods.**

(Refer to supplement of examples, section 6, page 68.)

Planning sheet	Day Five	Unit 9 *Multiplication and division*	Term: *Autumn*	Year Group: *4*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities / Focus Questions**

Counting forwards and backwards in steps of different sizes.
 	
Know by heart multiplication facts for the 2, 3, 4, 5 and 10 times tables and derive quickly division facts for 2, 3, 4, 5 and 10 times tables.
	• Get class to chant 3, 4 and 5 times tables. Repeat each but stop at a particular point e.g. $6 \times 4 = 24$ and ask for 2 numbers that divide into 24 and say the statements:
	
	  e.g. $24 \div 6 = 4$; $24 \div 4 = 6$
	
	• Play the game Fizz Buzz. Children count around the class but say Fizz Buzz instead of the table that is being practised e.g. 5 times table:
	
	      1, 2, 3, 4 Fizz Buzz 6 etc.
	
	• Ask questions related to multiplication and division, such as
	
	Q Who can think of two numbers that can be multiplied together to equal 20?
	
	Q Who can think of numbers that will divide exactly into 20?
	
	Q What number is 10 times greater than 8?
	
	Q If the product is 24, what are the factors?
	
	Q What number is a multiple of 10?
		Extend understanding of the operations of multiplication and division and their relationship to each other and to addition and subtraction.	• Write on the board:
			$$4 \times 5 = 20$$
			Q What addition facts do we know from this?
			
			Write them on the board:
			$$4 + 4 + 4 + 4 + 4 = 20$$
			$$5 + 5 + 5 + 5 = 20$$
			Q Do we know any related multiplication and division facts?
			
			Write on the board:
			$$5 \times 4 = 20$$
			$$20 \div 4 = 5$$
			$$20 \div 5 = 4$$
			Q What subtraction facts do we know from this?
			
			$$20 - 4 - 4 - 4 - 4 - 4 = 0$$
			$$20 - 5 - 5 - 5 - 5 = 0$$
			Emphasise the inverse of each operation.
			
			• Write these numbers on the board:
			     30 36 21 15
			
			Q If these are the products, what multiplication and division facts do we know?
			
			Let children work with a partner.
			
			Q What are the related addition and subtraction facts?
			
			Take feedback from the children and compare the different answers they may have got.
			
			• Demonstrate the relationship between multiplication and addition using bigger numbers:
			     86×3 $86 + 86 + 86$
			
			Ask children to solve problems like
			$$9 \times 3 = \square$$
			$$8 \times \square = 32$$
			$$\square \times 9 = 45$$
			$$27 \div 3 = \square$$
			using jottings and/or mental calculations.
			
			Q Can you write the inverse operations for each problem?
				• Q What products can you make by using two of these 5 numbers? 2, 3, 4, 5, 10
				
				Give children a few minutes to discuss with a partner.
				
				Q What inverse operations can we make from our calculations?
				
				Let children respond.
				
				• Explain the links between the four rules of number.
				
				By the end of the lesson children should be able to:
				
				• **Understand multiplication is the inverse of division.**
				
				(Refer to supplement of examples, section 6, page 52.)

VOCABULARY product multiple divide factors		VOCABULARY inverse divide		

NNS Unit Plans

Double 4	10

Half of 14	26

Half of 12	8

Double 9	7

10+10	6

11+11	18

Double 13	20

8−4	22

Double 20	4

Twice 15	12

Half of 30	40

Half of 4	30

7+7	15

Double zero	2

Double 6	14

12+12	0

18–9	24

Half of six	28

Twice 8	9

Half of 50	3

Half of 22	16

Half of 2	25

Double 14	11

Double 50	1

Half of 26	100
Half of ten	13
Twice 5	5