

Unit 10

Five daily lessons

North West Consultants

Year 3
Spring term

This Unit Plan is designed to guide your teaching.

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

Unit Objectives
Year 3

- Use doubling and halving, starting from known facts.
- Say or write related multiplication and division statements.
- **Choose appropriate number operations and calculation methods to solve money or real life problems with two steps.**
- Explain and record method.
- Check results, e.g. halving by doubling, multiplication by division.

Pages
62-65
67, 69, 71

Resources needed to teach this unit:

- Whiteboards
- Cubes
- Large display coins
- Notes/coins
- Resource sheet 10.1
- Resource sheet 10.2
- Resource sheet 10.3
- Resource sheet 10.4
- Resource sheet 10.5
- Resource sheet 10.6

Link Objectives

Year 2

Year 4

- **Choose and use appropriate operations.**
- **Solve simple word problems and explain how the problems and explain how the problem was solved.**
- Use mental addition or subtraction, or simple multiplication and own strategies to solve.
- Explain methods orally and where appropriate write a number sentence.

- **Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.**
- Explain methods and reasoning.
- Use all your operations to solve problems.

Planning Sheet	Day 1	Unit 10: Problems involving “real life” and money	Term: Spring	Year Group: 3																
Oral and Mental		Main Teaching		Plenary																
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions																
		<ul style="list-style-type: none"> • Recognise that division is the inverse of multiplication. • Use related facts. • Make decision. • Say or write a division statement corresponding to a given multiplication statement. <p>VOCABULARY multiply division divide double halve inverse</p>	<ul style="list-style-type: none"> • Start from a known fact <ul style="list-style-type: none"> - There are 4 wheels on a car. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">Q How can we work out how many wheels there would be on 3 cars?</div> <ul style="list-style-type: none"> • Demonstrate by using an array. <div style="margin-left: 20px;"> <table style="border: none;"> <tr><td>0000</td><td>1 car</td></tr> <tr><td>0000</td><td>2 cars</td></tr> <tr><td>0000</td><td>3 cars</td></tr> </table> </div> • Revise how we can read and record this as a multiplication number sentence. <div style="margin-left: 20px;"> <table style="border: none;"> <tr><td>4</td><td>x</td><td>3</td><td>=</td><td>12</td></tr> <tr><td>wheels</td><td></td><td>cars</td><td></td><td>wheels altogether</td></tr> </table> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">Q How many cars if there were 12 wheels?</div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">Q What type of calculation is that?</div> <ul style="list-style-type: none"> • Demonstrate with references to the array and show how division is the inverse/reversal of multiplication. • Again using the array show how number sentences can be written 4 in a row, 3 rows: <div style="margin-left: 20px;"> <p>4 x 3 = 12</p> <p>3 in a column, 4 columns</p> <p>3 x 4 = 12</p> </div> 	0000	1 car	0000	2 cars	0000	3 cars	4	x	3	=	12	wheels		cars		wheels altogether	<ul style="list-style-type: none"> • Record three numbers on the board, e.g. 6, 3, 18 and without apparatus (if possible) children provide the 4 related facts. • As each child provides a number sentence they discuss how they know. • If needed, at this point, another child could model the answer using cubes. • Repeat for other sets of numbers. • Use problems to show how these facts can be applied. • If $5 \times 3 = 15$: <div style="margin-left: 20px;"> <p>$15 \div \square = 5$</p> <p>$\square \times 5 = 15$</p> <p>$\square \div 5 = 3$</p> </div> <p>Discuss children's reasoning.</p>
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4	x	3	=	12																
wheels		cars		wheels altogether																

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Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>RESOURCES cubes whiteboards</p>	<p>Discuss corresponding division facts:</p> <p>$12 \div 3 = 4$ $12 \div 4 = 3$</p> <ul style="list-style-type: none"> • Emphasise that there are 4 number sentences for the 3 numbers. • Working in pairs, children using cubes make 2 towers of 6 cubes. <p>Q How many altogether?</p> <ul style="list-style-type: none"> • Record $6 \times 2 = 12$. • Now make 4 towers of 3 and again record $3 \times 4 = 12$. • Put 12 cubes in one tower. • Record $12 \div 2 = 6$. • Divide the 12 cubes into 4 towers. • Record $12 \div 4 = 3$. • Explain when one multiplication sentence is known, then another multiplication sentence and two division are known. • Write $6 \times 5 = 30$. • On whiteboards children record the 4 related facts using the three numbers – using cubes to aid calculation. • Children can then be provided with an appropriate range of sets of numbers and they use apparatus and record the related facts. 	<p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> • Realise that 4 related facts can be recorded from 1 fact. • Record the 4 facts, 2 multiplications and 2 division.

Planning Sheet	Day 2	Unit 10: Problems involving “real life” and money	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<ul style="list-style-type: none"> To solve problems involving numbers in “real life” and money, using one or more steps. To explain how the problem was solved. Relate to known multiplication facts. 	<ul style="list-style-type: none"> Write a story problem on the board. “There are 30 children in a class. They need 5 teams of equal number. How many in each team?” Ask them to try to picture this in their head. <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What can you see?</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What information is important to work out the answer?</div> <ul style="list-style-type: none"> Highlight/underline 30 children 5 teams how many each <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What operation do we need to use to find the answer?</div> <ul style="list-style-type: none"> Division <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What calculation is required?</div> <ul style="list-style-type: none"> $30 \div 5$ <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Q What is the answer?</div> <div style="margin-left: 100px;">6</div>	<ul style="list-style-type: none"> Return to Resource sheet 10.1 and pick out 2 matching facts and ask children for the 2 other facts. Repeat with another example. Using children’s answers from the problems discuss their reasoning. Compare words highlighted. Why? Encourage the use of referring to known multiplication facts. Emphasise reading the problem the answer question correctly.

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Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>VOCABULARY multiply multiplication divide division times table operation calculation check</p> <p>RESOURCES Sheet 10.1 Sheet 10.2</p>	<p>Q How did you work it out?</p> <ul style="list-style-type: none"> Encourage children to refer to multiplication facts, e.g. I know that $5 \times 6 = 30$, so $30 \div 5 = 6$ or any other strategy used. <p>Q How could we check our answer?</p> <ul style="list-style-type: none"> With the related multiplication fact – demonstrate by recording an array to show 5 teams of 6. <p>Q So the answer to the question is?</p> <ul style="list-style-type: none"> There are 6 children in each team. Continue the process with another story problem if required. Resource sheets 10.1 and 10.2 or other related work as children’s activity. 	<p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Solve problems relating to real life. Discuss methods. Relate to known facts.

Planning Sheet	Day 3	Unit 10: Problems involving “real life” and money	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<ul style="list-style-type: none"> To solve word problems in “real life” and money, using one or more steps. To explain how the problem was solved. To choose and use appropriate operations. To choose and use appropriate ways of calculating, mental, mental and written jottings. <p>VOCABULARY multiply multiplication divide division total amount calculate solve</p> <p>RESOURCES whiteboard cubes Resource sheet 10.3</p>	<ul style="list-style-type: none"> Display 5 footballs. “These 5 footballs cost £20. How much does 1 ball cost?” Discuss key words, information, method of solving (division operation (\div), calculation ($20 \div 5$), answer 4. Encourage answers like “I need to divide 20 by 5, I know that $4 \times 5 = 20$, so I can work out that $20 \div 5 = 4$”. <div style="border: 1px solid black; padding: 2px;">Q How should we answer the question?</div> <ul style="list-style-type: none"> The answer is 4. Continue with another single step problem. These answers are easier because you can work them out in your head. Let’s think about this one “I get paid £4 pocket money a week. How many weeks will it take me to buy 10 footballs?” <div style="border: 1px solid black; padding: 2px;">Q How are we going to work this problem out?</div> <div style="border: 1px solid black; padding: 2px;">Q What is the first thing we need to think about?</div> <ul style="list-style-type: none"> Need to make jottings. Important information etc. First step how much the footballs will cost $5 + 5 = 10$ $£20 + £20 = £40$ or $£20 \times 2 = £40$ <div style="border: 1px solid black; padding: 2px;">Q What kind of calculation do we need to do now?</div>	<ul style="list-style-type: none"> Using ideas from children’s work discuss how they worked out the problems. Focus in particular on Q7 a) and b). Demonstrate steps, children can model how they solve but develop the reasoning skills of WHY they chose a particular calculation.

Planning Sheet	Day 3	Unit 10: Problems involving “real life” and money	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
			<p>Q What kind of calculation do we need to do now?</p> <p>Q But what does the question ask?</p> <ul style="list-style-type: none"> • How many weeks? <p>Q So what kind of calculation do we need to do now?</p> <ul style="list-style-type: none"> • $£40 \div 4 = 10$ <p>Q What is the answer to the problem?</p> <ul style="list-style-type: none"> • 10 weeks • Change to the amount of pocket money and the cost of the footballs, e.g. pocket money £2, balls cots £8 for 5, need 15. • Let the children work in pairs and do jottings on a whiteboard. <p>Mini plenary – discuss how they solved the problem. Compare strategies.</p> <p>Resource sheet 10.3 contains questions requiring either 1 step or more than 1 step so this allows for some differentiation.</p>	<p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> • Solve word problems using one or more steps. • Explain how the problem was solved.

Planning Sheet	Day 4	Unit 10: Problem Solving “real life” and money	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<ul style="list-style-type: none"> Choose an appropriate number operation and calculation method to solve word problems. Use known facts. Show working and explain thinking. <p>VOCABULARY addition subtraction multiplication division double halve equal calculation</p> <p>RESOURCES whiteboards Resource sheet 10.4</p>	<ul style="list-style-type: none"> We are going to work on some more problems and are going to think about what we can write down to help us to solve “In a bag there are 12 oranges, but a box of oranges has double that number. If 3 children share a box of oranges how many will they get each?” <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">Q Who thinks they can tell us how to solve this problem?</div> <ul style="list-style-type: none"> $12 \times 2 = 24$ $24 \div 3 = 8$ <p>Concentrate on reasoning skills and use of known facts:</p> <ul style="list-style-type: none"> - double 12 - $3 \times 8 = 24$ <ul style="list-style-type: none"> “In a café there are tables set for 4 people. If 18 people come in and then 14 more, how many tables will be needed?” This is worded slightly differently and children will realise they need to add people together $18+14$ then divide by the first piece of information 4. Children use whiteboards working in pairs. Discuss different strategies and reasoning. Using Resource sheet 10.4 children solve problems. <p>(Shorter activity session slightly longer plenary)</p>	<ul style="list-style-type: none"> Discuss question 3 from resource sheet 10.4. Work through question step by step, asking children to demonstrate their workings Select children who may have used different methods e.g. illustrations <ul style="list-style-type: none"> - number lines - informal methods Tomorrow we are going to work on some more problems but they will be using money. Nora buys ice cream for herself and her friend, £1.30 each and an ice lolly for her brother which costs 60p. What is the total cost? If she gives the shop keeper a £5 note how much change will she get? <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Solve word problems using more than one step. Explain how the problem was solved. </div>

Planning Sheet	Day 5	Unit 10: Problem solving “real life” and money	Term: Spring	Year Group: 3																										
Oral and Mental		Main Teaching		Plenary																										
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions																										
		<ul style="list-style-type: none"> Choose an appropriate operation to solve problems with more than 1 step. Explain and record method informally. <p>VOCABULARY addition subtraction multiplication division strategy method</p> <p>RESOURCES Resource sheets 10.5, 10.6 coins, notes cubes whiteboards</p>	<ul style="list-style-type: none"> In our plenary yesterday we talked about word problems that needed more than one calculation to help us to solve and we worked through a problem using money. This is what we are going to be doing today. <div style="border: 1px solid black; padding: 2px;">Q What operations can we use to help us to solve?</div> <ul style="list-style-type: none"> Addition, subtraction, multiplication and divisions. Quick recap of the methods they used. <div style="border: 1px solid black; padding: 2px;">Q When we are solving money problems can we still use the same operations and strategies?</div> <ul style="list-style-type: none"> Lets look and work through this one together. Frank has a five pound note, three 50 pence coins, four 5 pence coins and three pennies. How much money does he have altogether? Encourage children to discuss how they would record. <table style="margin-left: 40px;"> <tr><td></td><td style="text-align: right;">£</td><td style="text-align: right;">p</td></tr> <tr><td>1 x £5</td><td style="text-align: right;">5</td><td style="text-align: right;">00</td></tr> <tr><td>3 x 50p</td><td style="text-align: right;">1</td><td style="text-align: right;">50</td></tr> <tr><td>4 x 5p</td><td></td><td style="text-align: right;">20</td></tr> <tr><td>3 x 1p</td><td></td><td style="text-align: right;">3</td></tr> <tr><td></td><td style="text-align: right; border-top: 1px solid black;">6</td><td style="text-align: right; border-top: 1px solid black;">73</td></tr> </table> <ul style="list-style-type: none"> Show large version of Resource sheet 10.5, Sports Shop. <div style="border: 1px solid black; padding: 2px;">Q If he bought a T-Shirt how much would he have left?</div> <div style="text-align: center; margin-top: 10px;"> <table style="margin: 0 auto;"> <tr> <td style="text-align: center;">+50p</td> <td style="text-align: center;">+£1</td> <td style="text-align: center;">+50p</td> <td style="text-align: center;">+23p</td> </tr> <tr> <td style="text-align: center;">↘</td> <td style="text-align: center;">↘</td> <td style="text-align: center;">↘</td> <td style="text-align: center;">↘</td> </tr> </table> <p style="text-align: center;">£4.50 £5 £6 £6.50 £6.73</p> <p>= £2.23</p> </div>		£	p	1 x £5	5	00	3 x 50p	1	50	4 x 5p		20	3 x 1p		3		6	73	+50p	+£1	+50p	+23p	↘	↘	↘	↘	<ul style="list-style-type: none"> Using a large version of/or OHT resource sheet 10.5. Select some of the questions from resource sheet 10.6 ask the group, pairs, individuals to demonstrate and explain how they solved.
	£	p																												
1 x £5	5	00																												
3 x 50p	1	50																												
4 x 5p		20																												
3 x 1p		3																												
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+50p	+£1	+50p	+23p																											
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Planning Sheet	Day 5	Unit 10: Problem solving “real life” and money	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
			<div style="border: 1px solid black; padding: 2px;">Q How much would he have left?</div> <div style="text-align: center; margin-top: 10px;"> <p>£5.25 £5.50 £6 £6.50 £6.73</p> <p>= £1.48</p> </div> <ul style="list-style-type: none"> • Activity sheets 10.5 and 10.6 can be used as wished: <ul style="list-style-type: none"> - These could be a group activity with collaborative working. - Working in pairs. - Independent. - Depending upon the ability of the children. 	<div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> • Solve word problems more than one step. • Explain how the problem solved. </div>