Unit 3
Addition and subtraction

Five daily lessons

National
Numeracy *Strategy*

Year 4
Autumn term

Unit Objectives

Year 4

• Add three or four small numbers mentally.	Page 42
• Solve word problems involving addition and subtraction in the context of money.	Page 84
• **Choose and use appropriate number operations and appropriate ways of calculating to solve problems.**	Page 84-74
• **Develop and refine written methods for: column addition and subtraction of two whole numbers less than 1000; money calculations.**	Page 48

Link Objectives

Year 3

- Use informal paper and pencil methods to support, record and explain addition and subtraction (HTU).
- **Add and subtract mentally a 'near multiple of 10' to or from a two-digit number.**

Year 5

- **Extend written methods to: column addition and subtraction of two integers less than 10 000.**

(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 3.1
- Activity sheet 3.1/OHT 3.1
- Activity sheet 3.2/OHT 3.2
- Dice
- Whiteboards
- Counters

department for
education and skills

Planning sheet	Day One	Unit 3 *Addition and subtraction*	Term: *Autumn*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
To add several numbers mentally. RESOURCES Dice	• Introduce the activity 'Target 50' by dividing the class into four teams. Explain that you are going to roll dice quickly. As you roll the dice the first team is to add the numbers together mentally. This will be their score, for example, with a 6, 5 and 4 the score will be 15. Explain that you will continue to roll the dice until: – you roll a 1 and then the team loses its whole score and goes back to 0; – or the team tells you to stop and 'bank' that score. In the above case the team could bank 15 and this would be their starting score for the next round. If a team makes a mistake adding up its score they return to 0, so it is important that everyone listens carefully. There will be 5 seconds between each roll of the dice. The first team to reach 50 wins. Record the 'bank' running total on the board: Team A B C D Score 12 5 0 21 Continue the game until one team reaches 50 in the 'bank'. Discuss the game. **Q** When is it best to bank? Help children to understand that a 1 can come up at any roll and the teams must take a chance.

Main Teaching

Objectives and Vocabulary	Teaching Activities
To add several numbers mentally. VOCABULARY complement of 10s RESOURCES Activity sheet/OHT 3.1	• Write the following scores on the board: 6 7 5 13 8 9 Explain we need to add these scores to see if a team has won the competition. **Q** Which of these numbers add together to make 20? Children record on whiteboards. **Q** Why did you choose these numbers? Discuss making 10s and 20s. **Q** Can any of the other numbers be added together to make 20? Children record and show. Discuss how $7 + 13 = 20$ and $6 + 5 + 9 = 20$ help us to add together all six numbers $20 + 20 + 8 = 48$ • Ask children to practise adding pairs of numbers to make 10, 20 or 100. On the board write 6 18 80 2 20 4 **Q** Can we add these numbers? How does what we learnt earlier about complements to 100, 20 and 10 help us answer this question? • Children complete calculation and carry out more examples.

Plenary

Teaching Activities / Focus Questions

• Write on the board:
$1 + \square + 6 + 9 + 7 = 37$

Q What is the answer? Explain how you worked out the answer.

Discuss strategies children used to answer the question.

Q Which is the quickest way to add these numbers?

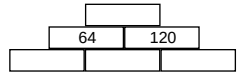
Discuss the complements the children used.

Q I bought sweets from the sweet shop costing 32p + 68p + £1.00. How much did I spend?

Which strategies might I use to answer the question?

Q Which strategy is the best? Why is it the best?

• We are going to apply what we learned to help us answer the 'Brickware question'. Use Activity sheet/OHT 3.1 and show the following



Each brick is the sum of the two bricks it stands on. Use this information to suggest numbers to fit into the top and bottom rows. Extend to more bricks.

Q Can you explain how you found the answer to the top brick?

HOMEWORK – Give out Activity sheet 3.1.

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

- **Use appropriate strategies to add several numbers.**

(Refer to supplement of examples, section 6, page 42.)

Planning sheet	Day Two	Unit 3 *Addition and subtraction*	Term: *Autumn*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
To add and subtract a pair of two-digit numbers, not crossing the 100 boundary. VOCABULARY complements to 10 and 100 complements to £10 and £100 difference RESOURCES Whiteboards	• Remind children how to find complements to 10 and 100. Set complements in context of money. Call out a sum of money and the children show the complement to £10 or £100 using whiteboards. Call out a sum of money in pence and the children show the amount required to make £1.00. Ensure the questions focus on subtraction as well as addition. Ask questions such as: **Q** Mary buys a bag of sweets for 35p. How much change will she get from £1? **Q** What two amounts of money make £1. **Q** I spend £67, what have I left from £100? **Q** A book costs £6.50, what change will I get from £10?

Main Teaching

Objectives and Vocabulary	Teaching Activities
To solve word problems in the context of money. VOCABULARY increase decrease total amount tens boundary hundreds boundary RESOURCES Activity sheet/OHT 3.2	• Discuss the homework and correct any errors and misunderstandings. • Write on the board: "Oranges cost 69p a kilo. I pay for a kilo of oranges with a £1 coin. How much change will I get?" Ask the class to solve this problem in pairs. Collect their responses and discuss their strategies. Write some up on the board. Explain that there is a helpful approach that can be used to solve problems. Display Activity sheet/OHT 3.2 'Solving word problems'. Explain to children how to use the sheet. 1. The first box is where the problem is written. Write this in on the OHT. 2. The second box is where the calculation needed is written. Ask the children to look at the problem and say what the calculation is and why they think so. **Q** What clues did you use? Write in the calculation £1.00 – 69p. **Q** Can you give me an approximate answer? Agree it is about 30p. 3. The third box is for the calculation with any jottings or written methods. The oranges calculation can be done mentally and 31p is written in the box. 4. In the fourth box refer back to the problem – read it again – and then work out how to answer the problem in a sentence. Decide if the answer makes sense and check the answer by comparing it with your approximation. • Ask children to complete the following word problem using Activity sheet 3.2 in pairs. Bikes cost £36 each. How much change will I have from £100 if I buy two bikes? How much more do I need to buy three bikes? Discuss how the problem solving sheet helps. Children complete similar problems individually.

Plenary

Teaching Activities / Focus Questions

• Make a set of cards containing a problem e.g.

The zoo is 10 miles away.

Admission to the zoo in May costs 50p for adults and 26p for children.

The cost includes a trip to the Snake House.

What will it cost for a family of two adults and three children?

As a class activity – distribute the four cards for children read out. All the class decide the operation they will need.

Q Ask children which information is useful. Why? What information isn't useful. Why?

Q Which is the best way to record our calculation?

Record answer on OHT 3.2.

By the end of the lesson the children should be able to solve single-step word problems:

– using a structured approach;
– identifying key vocabulary;
– identifying the appropriate operation;
– undertaking the operation correctly;
– giving a full answer.

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

Planning sheet	Day Three	Unit 3 *Addition and subtraction*	Term: *Autumn*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
To convert amounts of money, £ to pence and pence to £. VOCABULARY pence pounds how much more how much less sum total altogether RESOURCES Whiteboards	Remind children how to convert £ to pence and pence to £. Ask children to convert to either pounds or pence: £4.30 £4.01 60p 392p Children record answers in pairs on whiteboards; on the instruction 'show me' show their work. Discuss any misconceptions. Check children understand the place value in values. e.g. **Q** What does zero stand for in £4.01? **Q** Why does the decimal point come after the 3 in 392p when converting into £s and pence? Use decimal place value cards for children to answer sample addition / subtraction question. e.g. **Q** What is 10p less than £3.90? **Q** I have £1.25 and drop 35p. What have I got left? Collect answers and discuss the children's methods.

Main Teaching

Objectives and Vocabulary	Teaching Activities
To add or subtract two sums of money. VOCABULARY pence pounds how much more how much less sum total altogether RESOURCES Activity sheet/OHT 3.2	• Write on the board: £1.40 + £2.30 Ask the children to carry this calculation out in their heads and then to explain their strategy. On the board, work through an example of partitioning into £ and pence. £1.40 + £2.30 = £1 + 40p and £2 + 30p = £1 + £2 and 40p + 30p = £3 and 70p = £3.70 Repeat with the calculation: £5.20 – £3.60 = £5 + 20p subtract £3 + 60p = £5 – £3 and 20p – 60p **Q** Can you see any problems we will have here? Demonstrate the need to re-partition the numbers as: £5.20 – £3.60 = £4 + 120p subtract £3 + 60p = £4 – £3 and 120p – 60p = £1 and 60p = £1.60 Demonstrate how to check an answer. • Introduce a word problem using money expressed in pounds and pence. Ask the children how they would answer the problem: **Q** What is the total cost of a book at £4.70 and a game at £6.10? Display Activity sheet/OHT 3.2 as guidance. Discuss their methods and show the children how they can record their method and solution using Activity sheet 3.2. • Introduce a two-step problem: **Q** I have £9.60 to spend. If I buy 2 books costing £3.95 each, how much money will I have left? Discuss how the children added £3.95 and £3.95. Show the children how they can record their method and solution following the structure on Activity sheet 3.2. Set children similar problems to solve. Ensure the children use the structured approach to solving the problems. **Q** Which section of the sheet is the most difficult to follow? Why? Correct responses and help children with any particular difficulties. Remind them that the sheet is to help them: – read the problem carefully; – decide on what calculations they need to do; – set out the calculation to get the answer; – write the answer as a sentence; – check the answer is sensible comparing it to their approximation.

Plenary

Teaching Activities / Focus Questions

Split class into two teams, A & B. Play 'Beat the calculator'.

Team A adds the calculation mentally using jottings if necessary.

Team B uses calculators.

Prepare a set of flash cards.

Build up from 2 to 3 numbers to flash.

e.g. 3 + 9 + 7

For more:

e.g. 16 + 5 + 4 + 11 + 9.

Teams switch roles.

Q Were some numbers quicker to add mentally? Why?

Q Did the groups using the calculator always win? Why?

Agree that knowing complements helps to do additions quickly in your head, by findng pairs that add to 10, 20, 100.

Ensure children can use appropriate strategies to add several numbers.

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

- **add several numbers together mentally;**
- **add and subtract two sums of money;**
- **use addition and subtraction to solve problems involving money.**

(Refer to supplement of examples, section 6, page 84.)

Planning sheet	Day Four	Unit 3 *Addition and subtraction*	Term: *Autumn*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary

To choose and use addition and or subtraction and appropriate ways of calculating (mental, mental with jottings, written) to solve problems.

VOCABULARY
difference
total
greater than
less than

RESOURCES
Resource sheet 3.1
counters

Teaching Activities

- Give out resource sheet 3.1 and three counters for each child.

  Ask the children to show two amounts with counters:

  – which total £10;
  – with a difference of £5;
  – which total £15;
  – where the total is greater than £20.

  With three counters show amounts:

  – with a total of £15;
  – totalling less than £2.

Q Jane had £10. She spent £7.50. How much was left?

- Ask children to add two numbers from Resource sheet 3.1 that make another number on the sheet.

Main Teaching

Objectives and Vocabulary

To choose and use addition and or subtraction and appropriate ways of calculating (mental, mental with jottings, written) to solve problems and problems including money.

RESOURCES
Resource sheet 3.1

Teaching Activities

- Explain that the class is to solve word problems. Children can decide the most appropriate ways of calculating the answers – in their heads, with jottings or using written methods. Ask children to suggest materials that might help them.

- Write on the board:

Q I am thinking of a number. I add on 11 and I now have 32. What was my original number?

Identify the key language that will help them solve the problem. Ask what possible strategies they used. Model the strategies suggested. Highlight counting back 11 to subtract, and explain that this is using the inverse operation.

Pose the question:

Q I am thinking of a number and I subtract 28. The answer is 17. What was my number?

Discuss the children's responses.

Identify that the language of the problem does not always refer directly to the operation needed to solve it. Emphasise the use of the inverse operation, this time addition: $28 + 17 = 45$. Use any children's solutions where they used written jottings.

In pairs, ask the children to invent a problem of their own. Invite pairs to pose their problem to the whole class.

- Explain that you are now going to give them problems using money. Write on the board:

Q I have £3.50. The train home will cost £1.75. I spend £1.90. Have I got enough for the train fare home?

Discuss how the children may work this out. Look out for any misinterpretations or errors that lead to the wrong answer. Ask the children to try to express the problem in their own words to their partner. Collect some of these to share with the class. Explain that it is often a useful strategy to try to do this. Ask how they think the answer should be written. Collect their answers on the board and decide which is the most efficient solution to the question.

Set the class problems to answer in their books using whatever method they like. Include some questions of the type:

Q Half of my money has been spent, I then put £20 in the bank and I have £10 left. How much did I have to begin with?

Plenary

Teaching Activities / Focus Questions

- Go back to Resource sheet 3.1. Tell children to work in pairs. They are to use the amounts shown on the grid to make up some questions similar to those you have asked.

  Share some of the questions with the class, and work through them mentally.

Finish by asking;

Q What strategies might I use to add together all the amounts shown on Resource sheet 3.1?

You do not want the answer, only an explanation of the strategies.

Children might suggest:
- use a calculator
- add together those amounts that total complete pounds.

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

- **work out how to solve problems and to give a full answer.**

(Refer to supplement of examples, section 6, pages 74, 82.)

Planning sheet	Day Five	Unit 3 *Addition and subtraction*	Term: *Autumn*	Year Group: *4*

Oral and Mental

Objectives and Vocabulary

To understand addition of two- and three-digit numbers to multiples of 100.

VOCABULARY
two-digit numbers
three-digit numbers
multiples of 100

RESOURCES
Whiteboards
Dice

Teaching Activities

- Draw a 2 × 2 grid on the board. Write in four three-digit numbers

  e.g.

560	290
195	629

Roll a die to generate 100s numbers e.g. 2 gives 200.

Say add 200 on to 195 or subtract 200 from 629. Children write answers on whiteboards and show.

Repeat for the other 3 numbers.

Q Can you explain how you calculated your new numbers?

Q Will your method always work?

Main Teaching

Objectives and Vocabulary

To develop and refine written methods for column addition of two whole numbers less than 1000.

VOCABULARY
column addition
least significant digit
carrying

Teaching Activities

- Write on the board:

  436 + 297

Q How can you work this out?

Collect responses and remind children that adding 297 is the same as adding 300 – 3. The answer is 436 + 300 – 3 = 733.

Explain that this method may not always work

- Write on the board:

  436 + 252

Q How can we partition these numbers?

Collect suggestions and write as:

400 + 30 + 6

200 + 50 + 2

Q How does this help us with the calculation?

Write underneath

600 + 80 + 8 = 688

Give children other examples to do using this method

e.g. 362 + 217, 645 + 133

Ensure children can apply the method correctly.

- On the board write:

  458 + 387

Work through the calculation with the children.

400 + 50 + 8
300 + 80 + 7
700 + 130 + 15 = 700 + 100 + 30 + 10 + 5
= 800 + 40 + 5 = 845

Explain that the last steps are not needed if the children can do it in their heads.

Give children one other example to do e.g. 687 + 153

- On the board write:

```
  687
 +153
 ---
  700
  130
   10
 ---
  840
```

Q Can you explain my calculation?

Collect answers and annotate the calculation as below:

```
  687
 +153
 ---
  700   (600 + 100)
  130   ( 80 +  50)
   10   (  7 +   3)
 ---
  840
```

Make sure children understand that this method is the same as the first method, but requires less recording.

Go through another example if necessary.

Give children some examples to do independently, using this column method.

When children are secure in the method – use the column method without recording the 600 + 100 etc.

Plenary

Teaching Activities / Focus Questions

- Pose the problem.

  There are 536 home fans and 285 away fans at a sports event. How many fans are there altogether?

Q How can we use what we have learnt today to answer the problem?

Ask children to answer the question using the column method they have learned. Collect answers and correct any errors or misunderstandings.

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

- **Use the expanded column method to add three-digit numbers;**
- **Solve a problem by using the expanded method of calculation.**

(Refer to supplement of examples, section 6, page 48.)

Notes

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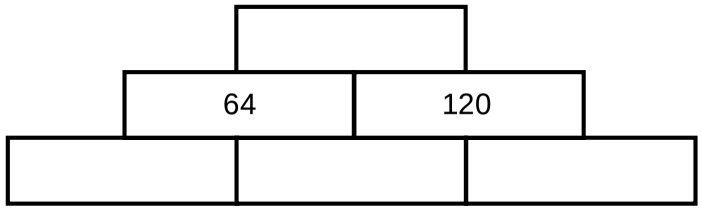
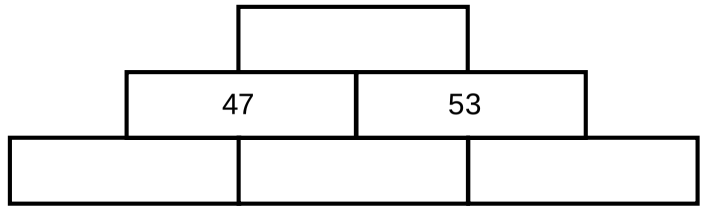
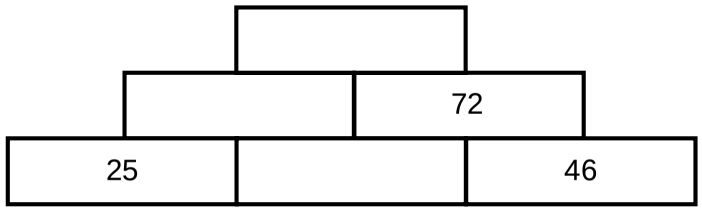
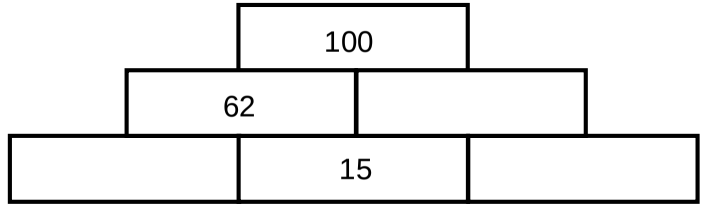
Brickware Question









Extension – Can you add another row of bricks to your walls?

Solving Word Problems

What does your problem ask me to find out?

Which calculations do I need to do?

What is an approximate answer?

My calculation and my working.

My answer in a sentence:

Was my approximation close?

£10.00	£7.50	£1.60
£0.60	£5.00	£0.20
£0.80	£8.40	£0.30
£0.70	£12.50	£2.50