The National **Numeracy** *Strategy*

SPRINGBOARD *4*

Mathematics catch-up
programme for Year 4

SPRINGBOARD 4 PREFACE

In 2000 there was an increase of 9% in the proportion of children obtaining Level 2B or better in the Key Stage 1 national tests for mathematics, a significant improvement in standards since the previous year. However, 17% of children were only awarded Level 2C. A high proportion of these children have the potential to improve on this performance, given a well-planned programme and targeted teaching. Springboard 4 addresses the crucial mathematical knowledge and skills required for these children to reach age-related expectations in the subject.

These materials are based on tried and tested units of work that were originally developed by the Hamilton Maths Project and used successfully in schools in the Oxford Education Action Zone. Some changes have been made to make the programme suitable for use nationwide, but the mathematical content and approach to teaching are essentially the same.

Springboard 4 is designed for teaching in the first half of the school year, and aims to bring children's understanding to a level where they can more easily benefit from the Year 4 teaching programme in the *Framework for teaching mathematics from Reception to Year 6*. It does not replace this programme, but complements it. The Springboard 4 sessions should be linked carefully to the appropriate teaching units and be done in the same weeks as the topic in the daily mathematics lesson.

This guide is for teachers and teaching assistants working in Year 4 and for mathematics co-ordinators. It is organised in three sections:

- Section 1 contains introductory notes on the planning and teaching of the programme, including the role of the teaching assistant

- Section 2 sets out the teaching objectives of the weekly teaching units and their link with the Year 4 teaching programme

- Section 3 contains the teaching materials: 10 weekly units of work with teaching notes for the sessions, photocopiable activity sheets and resource sheets, and homework tasks.

PART *1*

INTRODUCTION

CONTENTS

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PART 1

AIMS

Springboard 4 is intended for those children in Year 4 who achieved Level 2C in the Key Stage 1 national tests in mathematics and who, with extra help, are likely to catch up and achieve Level 3 by the end of Year 4. It aims:

- to support the identified children and to remedy particular weaknesses in number so that they are in a better position to access and benefit from the teaching programme in Year 4 and beyond;

- to set the expectation that these children catch up with their peers;

- to help teachers to prepare a teaching programme enabling children to fully benefit from the main teaching programme for Year 4 as soon as possible.

THE SPRINGBOARD 4 MATERIALS

The materials focus on key areas of number. They provide additional tuition for small groups of six to eight children outside the daily mathematics lesson (DML) during the weeks when these areas are being taught in the DML.

The ten units of work are designed to be used flexibly over the first term and a half of the school year. A diagram on page 14 shows how schools following the planning grids for Year 4 in the *Framework for teaching mathematics from Reception to Year 6* can fit in the units over this period. Each unit consists of two sessions, of 30 minutes each, that are led by a teaching assistant and consolidates the work introduced by the teacher in the DML. The teaching assistant should have worked with the group in the DML before leading the two sessions. In each session, the teaching assistant introduces and explains an activity sheet to be completed before the next Springboard session. It is intended that teachers will mark these before the next session and deal with any misconceptions individuals may have. There is also a short weekly homework task.

Each unit covers carefully selected teaching objectives mainly from the Year 3 teaching programme, which children must meet if they are to tackle with confidence the key objectives of the Year 4 programme. There is a detailed plan for each session, following the three-part lesson model developed by the National Numeracy Strategy and based on the teaching strategies outlined in the Introduction to the *Framework for teaching mathematics from Reception to Year 6*. The programme includes detailed teaching points and key questions, and teaching objectives, vocabulary and resources are listed for each unit.

Schools receiving funding for catch-up purposes may decide to use it to support the use of these materials with children in Year 4. Year 4 teachers in other schools can decide to deliver the course in full or draw on the materials for use with children who have an insufficiently firm grasp of the groundwork required for the Year 4 teaching programme.

TEACHING TIME

The materials are designed on the assumption that children will be working for several days in the DML on the same topic as in a Springboard unit. The two additional sessions should take place during the same period of time. Schools should decide when the sessions with a teaching assistant will take place. It may be possible to find temporary slots during the school day for the weeks in which the additional help is required. If not, it may be possible to establish a breakfast or after-school club, or to slot in sessions in the lunch break if time allows.

USING THE MATERIALS

The materials provide support for the topics being taught. Teachers will, however, need to take into account the responses of their children and help their teaching assistants to **adjust the session according to the progress the children make.** In particular, assistants will need help with developing appropriate lines of questioning for the group. While the materials provide a firm structure for teaching assistants to follow, individual children will not all be at the same level of attainment in all their mathematical work. Some will need more help and opportunities for consolidation in some areas than in others.

THE VIDEO SEQUENCES

The eight video sequences show ways in which catch-up sessions can be tackled. They show how the material should be broken down into small steps and demonstrate appropriate lines of questioning. Each sequence is based on the same teaching objectives as the corresponding session in these materials. While the content is very similar, the video sessions have been slightly amended, where necessary, to meet the specific needs of the children being filmed.

The National Numeracy Strategy is indebted to colleagues and children who made arrangements for, and took part in, the filming from Church Cowley First School, Oxford, St Luke's Church of England (Aided) Primary School, Cambridge, Abbey Meadows Community Primary School (formerly Priory Junior School), Cambridge, and Rowanfield Junior School, Cheltenham.

The NNS would also like to thank colleagues from the Hamilton Oxford Schools Partnership, Cambridgeshire County Council and Gloucestershire County Council for their help and co-operation.

ROLE OF THE TEACHING ASSISTANT

A high degree of continuity can be achieved if teaching assistants are able to work with children identified for the Springboard programme in the DML. The assistants will know the children and have a good idea of their achievements and any particular difficulties they have encountered. The teacher will, however, still need to brief the assistant and ensure that the materials are adjusted to meet the needs of the children concerned, particularly in the light of the progress they make in the DML. Although the session notes are detailed, they cannot cater exactly for a specific group of children. Funding for the initiative should allow the assistant to spend time discussing the session notes with the teacher and mapping out exactly what needs to be done and the best way to approach it.

The teaching assistant will work with the children in the two sessions in exactly the same way as s/he often does in the DML. The assistant must not lecture the children, but involve them through questioning and practical demonstration. Although s/he introduces and explains the activity sheet, it should be completed at another time, if this is appropriate and fits in with the on-going work. This is because the sessions are essentially oral.

It is important that teachers know about and reinforce the progress children make in the sessions with the teaching assistant. A good way to ensure this is for the assistant to make brief entries on the feedback sheet (see page 12) after each session, ensuring that this vital information is recorded systematically.

INVOLVING CHILDREN IN THEIR LEARNING AND SETTING TARGETS

Children are better motivated when they understand what they are to achieve and recognise the progress they are making. Teachers can help them improve their performance by discussing with them what they can do, and what they need to improve.

Children can also be encouraged to assess their own progress. The recommended individual target sheet (see page 13) brings together the child's assessment and that of the teacher. The teacher's assessment should be based on the child's ability to apply what has been learned and consolidated in the Springboard sessions when answering questions and carrying out written tasks in the DML. Information from the teaching assistant should, of course, also be taken into account. It would help to introduce the children to the targets linked to a particular unit before that unit is taught, and then for the child and teacher to make the necessary judgements immediately after the unit is finished. Where a child is still some way from reaching a target, the teacher will need to decide what action needs to be taken.

INVOLVING PARENTS AND CARERS

The support and interest of parents and carers is also important in motivating children to succeed. Teachers should aim to keep them informed about the catch-up programme from the beginning and to discuss their child's targets and progress with them when there is a suitable opportunity. It is helpful to send home a copy of the child's individual target sheet so that parents and carers know what the current priorities are. The homework tasks are designed for the child to share with others at home. They involve simple activities and games that do not take too long to do.

SPRINGBOARD 4 FEEDBACK SHEET

Group

Unit of work

Date of sessions

Look carefully at the teaching objectives for your sessions

List those children who, you feel, have now achieved these objectives.

List those children who, you feel, are well on the way to achieving these objectives but need further consolidation.

List any children who, you feel, are still some way from achieving these objectives.

What particular achievements have been made in the two sessions?

What particular difficulties have children had in the two sessions?

SPRINGBOARD 4 — MY TARGETS

Name   Class

I CAN NEARLY REACH MY TARGET: ✳   **I CAN DO IT WELL:** ✔

I HAVE REACHED MY TARGET: ☺

Target	What I think	What my teacher thinks	My teacher says that I have reached my target (date)
I can read and write whole numbers to at least 1000 **(U1)**			
I can order whole numbers to at least 1000 **(U1)**			
I know by heart my addition and subtraction facts to 20 **(U2)**			
I know all pairs of multiples of 5 with a total of 100 **(U2)**			
I can partition a number into hundreds, tens and ones and recombine **(U3)**			
I can count in steps of 3 or 4 **(U4)**			
I can count on or back in twos and recognise odd and even numbers **(U4)**			
I know that division is the inverse of multiplication and I know that halving is the inverse of doubling **(U5)**			
I know by heart facts of the 2-, 5-, and 10- times tables **(U5)**			
I can use the right operation to solve a word problem **(U6)**			
I can recognise fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, and $\frac{1}{10}$. I can find the fractions of shapes and numbers **(U7)**			
I can read the time to 5 minutes on a 12-hour digital clock and on an analogue clock **(U8)**			
I can add or subtract a near multiple of 10 to or from a two-digit number **(U9)**			
With money, I can find a total, give change and work out which coins to pay **(U10)**			

I CAN PRACTISE MY TARGETS AT HOME

LINKING SPRINGBOARD 4 UNITS TO THE PLANNING GRIDS
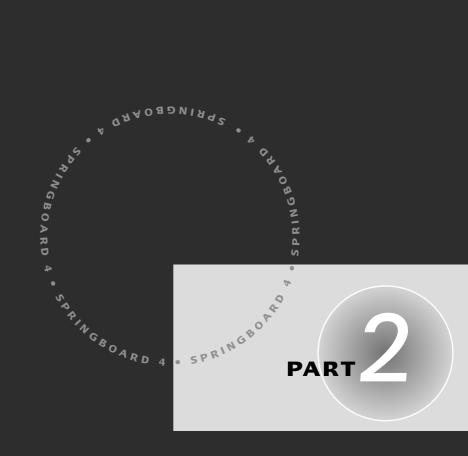
Year 4: Autumn

Unit	Days	Pages	Topic	Associated Springboard 4 Units
1	3	2-15 94-95	• Place value, ordering, estimating, rounding • Reading numbers from scales	1
2-3	10	34-37 40-47 48-51 82-85 72-75	• Understanding + and − • Mental calculation strategies (+ and −) • Pencil and paper procedures (+ and −) • Money and 'real life' problems • Making decisions and checking results	2 3
4-6	13	86-101 102-111 76-81	• Measures, including problems • Shape and space • Reasoning about shapes	
7	2		**Assess and review**	

Year 4: Autumn

Unit	Days	Pages	Topic	Associated Springboard 4 Units
8	5	16-21 76-81	• Properties of numbers • Reasoning about numbers	4
9-10	10	52-57 60-65 66-69 82-85 72-75	• Understanding + and − • Mental calculation strategies (+ and −) • Pencil and paper procedures (+ and −) • Money and 'real life' problems • Making decisions and checking results	5 6
11	5	22-31	• Fractions and decimals	7
12	5	34-37 40-47 48-51 98-101 88	• Understanding + and − • Mental calculation strategies (+ and −) • Pencil and paper procedures (+ and −) • Time, including problems	 8
13	5	114-117	• Handling data	
14	2		**Assess and review**	

Year 4: Spring

Unit	Days	Pages	Topic	Associated Springboard 4 Units
1	3	2-15 94-95	• Place value, ordering, estimating, rounding • Reading numbers from scales	
2-3	10	34-37 40-47 48-51 82-85 72-75	• Understanding + and − • Mental calculation strategies (+ and −) • Pencil and paper procedures (+ and −) • Money and 'real life' problems • Making decisions and checking results	9 10
4-6	13	86-101 102-111 76-81	• Measures, including problems • Shape and space • Reasoning about shapes	
7	2		**Assess and review**	

PART *2*

OBJECTIVES

UNIT OBJECTIVES UNITS 1–4

Unit Objectives	Linked to the Y3 teaching programme	Working towards these objectives from the Y4 teaching programme
1 Read and write whole numbers to at least 1000	**Read and write whole numbers to at least 1000** in figures and words	Read and write whole numbers to at least 10 000 in figures and words, and know what each digit represents. Partition numbers into thousands, hundreds, tens and ones
Know what each digit represents and partition three-digit numbers into a multiple of 100, a multiple of ten and ones	**Know what each digit in a two-digit number represents,** and partition three-digit numbers into a multiple of 100, a multiple of ten and ones (HTU)	
Order whole numbers to at least 1000, and position them on a number line	**Order whole numbers to at least 1000,** and position them on a number line	Read and write the vocabulary of comparing and ordering numbers. **Use symbols correctly, including <, > and =.** Give one or more numbers lying between two given numbers and order a set of whole numbers less than 10 000
2 **Know by heart all addition and subtraction facts for each number to 20**	**Know by heart: all addition and subtraction facts for each number to 20**	Consolidate knowing by heart addition and subtraction facts for all numbers to 20
Derive quickly all pairs of multiples of 5 with a total of 100	Derive quickly all pairs of multiples of 5 with a total of 100 (for example, 35 + 65)	Derive quickly all pairs of multiples of 50 with a total of 1000 (for example, 850 + 150)
3 Partition into tens and ones, then recombine	Partition into tens and ones, then recombine (eg 34 + 53 = 30 + 50 + 4 + 3)	Partition into tens and ones, adding the tens first
4 Count on or back in twos and recognise odd/even numbers	Count on or back in twos starting from any two-digit number, and recognise odd and even numbers to at least 100	Recognise and extend number sequences formed by counting from any number in steps of constant size, extending beyond zero when counting back; for example, count on in steps of 25 to 500, and then back to, say, −100
Count in steps of 3 or 4	Count in steps of 3, 4 or 5 from any small number to at least 50, then back again	
Count on or back in tens or hundreds	**Count on or back in tens or hundreds, starting from any two- or three-digit number**	Recognise odd and even numbers up to 1000, and some of their properties, including the outcome of sums or differences of pairs of odd/even numbers
Say the number that is 1, 10, 100 more or less than any given two- or three-digit number	Say the number that is 1, 10, 100 more or less than any given two- or three-digit number	Recognise multiples of 2, 3, 4, 5 and 10, up to the tenth multiple

Key objectives in the *Framework* are in bold red type. Information about how yearly teaching programmes relate to the National Curriculum levels can be found on page 42 of the Introduction to the *Framework*

UNIT OBJECTIVES • UNITS 5–8

Unit Objectives	Linked to the Y3 teaching programme	Working towards these objectives from the Y4 teaching programme
5 **Understand division** as grouping or sharing. Read and begin to write the related vocabulary	Understand division as grouping (repeated subtraction) or sharing. Read and begin to write the related vocabulary	Extend understanding of the operations of $\times$ and $\div$, and their relationship to each other and to $+$ and $-$
Recognise that division is the inverse of multiplication and that halving is the inverse of doubling	Recognise that division is the inverse of multiplication and that halving is the inverse of doubling	Find remainders after division
Know by heart the facts of the 2-, 5- and 10- times tables	Know by heart multiplication facts for the 2-, 5- and 10- times tables	**Know by heart multiplication facts for the 2-, 3-, 4-, 5- and 10- times tables**
	Derive quickly division facts corresponding to the 2-, 5- and 10- times tables	**Derive quickly division facts corresponding to 2-, 3-, 4-, 5- and 10- times tables**
6 **Choose and use appropriate operations (including multiplication and division) to solve word problems**	**Choose and use appropriate operations (including multiplication and division) to solve word problems**, and appropriate ways of calculating: mental, mental with jottings, pencil and paper	**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 orally	**Explain methods and reasoning** orally and, where appropriate, in writing	Explain methods and reasoning about numbers orally and in writing
7 **Recognise unit fractions such as $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and use them to find fractions of shapes and numbers**	**Recognise unit fractions such as $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and use them to find fractions of shapes and numbers**	Use fraction notation. **Recognise simple fractions that are several parts of a whole**, such as $\frac{2}{3}$ or $\frac{5}{8}$, **and mixed numbers**, such as $5\frac{3}{4}$; **recognise the equivalence of simple fractions** (for example, fractions equivalent to $\frac{1}{2}, \frac{1}{4},$ or $\frac{3}{4}$)
8 Read the time to 5 minutes on a 12-hour digital clock, and use the notation 9:40	Read the time to 5 minutes on an analogue clock and a 12-hour digital clock, and use the notation 9:40	Read the time from an analogue clock to the nearest minute and from a 12-hour digital clock
Read the time to 5 minutes on an analogue clock and a 12-hour digital clock, and use the notation 9:40	**Use units of time and know the relationships between them**	Use am and pm and the notation 9:53

Key objectives in the *Framework* are in bold red type. Information about how yearly teaching programmes relate to the National Curriculum levels can be found on page 42 of the Introduction to the *Framework*
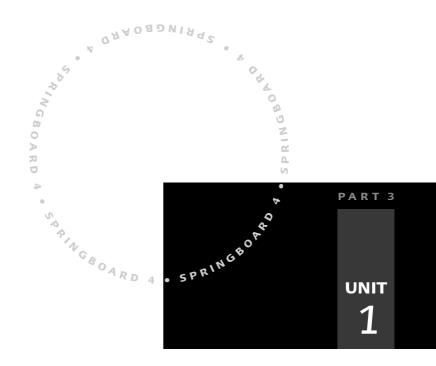
UNIT OBJECTIVES • UNITS 9–10

Unit Objectives	Linked to the Y3 teaching programme	Working towards these objectives from the Y4 teaching programme
9 **Add and subtract a 'near multiple of 10' to or from a two-digit number** by adding or subtracting 10, 20, 30 and adjusting	**Add and subtract mentally a 'near multiple of 10' to or from a two-digit number** by adding or subtracting 10, 20, 30 and adjusting	Add or subtract the nearest multiple of 10, then adjust
10 Understand and use £.p notation Find totals and work out which coins to use Give change	**Understand and use £.p notation** (for example, know that £3.06 is £3 and 6p) Solve word problems involving money including finding totals and giving change, and working out which coins to pay	Use all four operations to solve word problems involving money including converting pounds to pence and vice versa

Key objectives in the *Framework* are in bold red type. Information about how yearly teaching programmes relate to the National Curriculum levels can be found on page 42 of the Introduction to the *Framework*

PART *3*

TEACHING MATERIALS

PART 3

UNIT
1

PLACE VALUE AND ORDERING

Unit 1
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVES

- Read and write whole numbers to at least 1000.
- Know what each digit represents, and partition three-digit numbers into a multiple of 100, a multiple of ten and ones
- Order whole numbers to at least 1000, and position them on a number line.

VOCABULARY

three-digit number

multiple of 100

multiple of 10

multiple of 1

hundreds

tens, ones

partition

digit

represents

RESOURCES

place value cards (resource sheet 2); 1-6 paperclip spinner (resource sheet 1)

HOMEWORK

Play *Spinning Digits* using a 1-6 spinner (resource sheet 1)

STARTER

5 MINUTES

Remind children that they have three types of place value cards: multiples of 100, multiples of 10 and multiples of 1. Show an example of each and how they fit together to make a three-digit number. They are to use their place value cards to show you three-digit numbers such as the following: 125, 329, 937, 568. Avoid numbers that have a zero among their digits at this stage. Tell the group to read aloud the number. *What does each digit represent?* For example, in the number 125 the one represents 100, the two represents 20 and the five represents 5.

KEY QUESTION

☐ **What does each digit represent?**

MAIN ACTIVITY

20 MINUTES

Write the number 400 on the board and tell the group to read it together. Now ask everyone to use their place value cards to make this number. Ask them to tell you what each digit represents (4 hundreds, no tens and no ones). Repeat for 450 and then 452. Ensure that everyone understands that the zero tells us that there are no tens or no ones.

⫸➔

Write 405 on the board and ask the children to make this number. Ask what each digit represents.

Now write a selection of numbers on the board, including ones that have zero as one of their digits; for example 567, 420, 999, 104, 745, 280.

Take each number in turn and ask the group to read the number together and then to use the place value cards to make it.

Now partition each number into hundreds, tens and ones and record as follows:

567 = 500 + 60 + 7; 420 = 400 + 20; 999 = 900 + 90 + 9, and so on.

When asking the children to read the numbers, ensure that they read them as 'one hundred and four' rather than 'one, zero, four' or 'one, oh, four' as this will help them to understand how the numbers are put together.

Explain Activity Sheet 1.1, which the children will have to complete before the next session. Introduce the *Spinning Digits* game for homework.

KEY QUESTIONS

- **In the number 801, what digit is in the tens place?**
- **What does each digit represent in this number?**

PLENARY

5 MINUTES

Ask everyone to hold up a three-digit number with either no tens or no ones in it. They read their numbers and explain what the zero in each represents. Repeat several times in order to gauge their confidence.

Unit 1
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Read and write whole numbers to at least 1000
- Know what each digit represents, and partition three-digit numbers into a multiple of 100, a multiple of ten and ones
- Order whole numbers to at least 1000, and position them on a number line

VOCABULARY

three-digit number
multiple of 100
multiple of 10
less than
more than
between

RESOURCES

counting stick;
place value cards
(resource sheet 2)

STARTER

5 MINUTES

Use the counting stick to count in tens from 0 to 100. Then point to 50, 10, 60, 40 and 90 in turn, asking the children which number is at that point and how they know.

Now count from 100 to 200 in tens. Point to 150, 110, 190, 140 and 160 in turn, asking the group which number is at that point. How do they know?

KEY QUESTIONS

☐ **How do you know that this number is 90 (it is ten less than 100)?**
☐ **How do you know that this number is 60 (it is ten more than 50)?**

MAIN ACTIVITY

20 MINUTES

Use the counting stick to count from 0 to 100 in tens again. Point to halfway between 0 and 10 (the 5) and ask the group what number lies there and how they know. Then point to other multiples of five, putting the same questions.

Now point to positions either side of the divisions to indicate 49, 51, 1, 99, 9, 11, 19, 21, 29 and 31, each time asking the children to say which number you are pointing to and how they know.

Repeat this process, this time with 100 at one end of the stick and 200 at the other. Again, start by counting in tens, then pointing to multiples of five, and then to numbers just before and after the divisions.

⫸➔

Now count in hundreds from 0 to 1000 using the counting stick. Point to several of the divisions asking which number belongs at each. Point to halfway between 0 and 100 and ask what number belongs there, then halfway between 100 and 200, 200 and 300 and so on. When the children are confident, ask them to come and point to where given multiples of 50 are, explaining their reasoning each time.

If time allows, ask children to come and point to where they think numbers such as the following might be: 1, 999, 25, 125, 225, 510, 490.

Explain Activity Sheet 1.2, which the children will have to complete before the next session.

KEY QUESTIONS

> ☐ **How do you know where 450 is (it's halfway between 400 and 500)? What about 999 (it's the number before 1000)?**

PLENARY

5 MINUTES

Consider the key questions above.

Ask the children to show you a number between 100 and 200 using place value cards. Each child then reads her or his number. Now ask everyone to show you a number between 100 and 200 that is closer to 100 than 200, then closer to 200 than 100. Ask some children to read out their numbers.

Repeat the process for numbers between 900 and 1000. *What is the smallest whole number between 900 and 1000? What is the largest?* How do they know?

UNIT

1

Name ....

Date ....

Dear Parents/Carers,
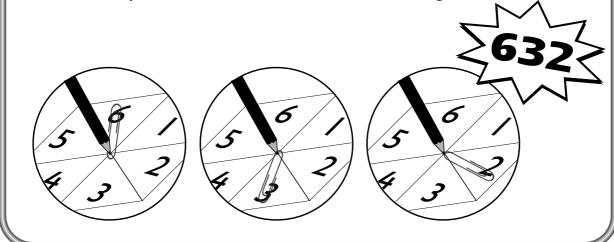
In our mathematics lessons, we have been learning about how three-digit numbers are made, for example that 326 is made from 300 and 20 and 6. Please help your child by playing the following game.

Thank you for your help.

Your child's teacher
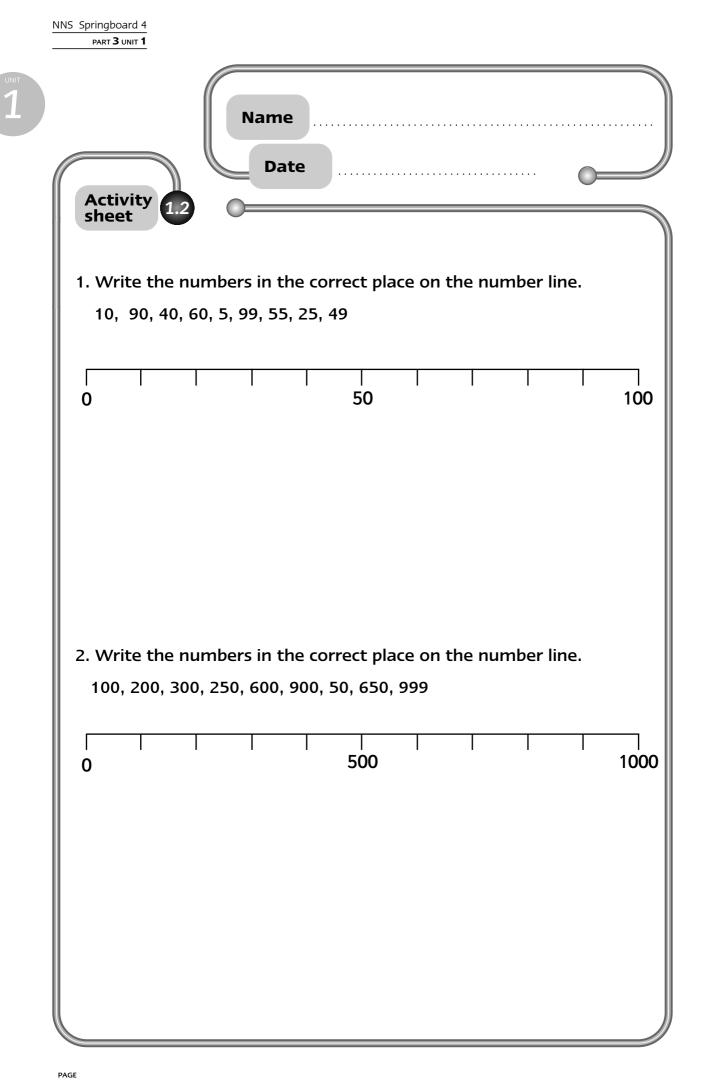
Spinning Digits
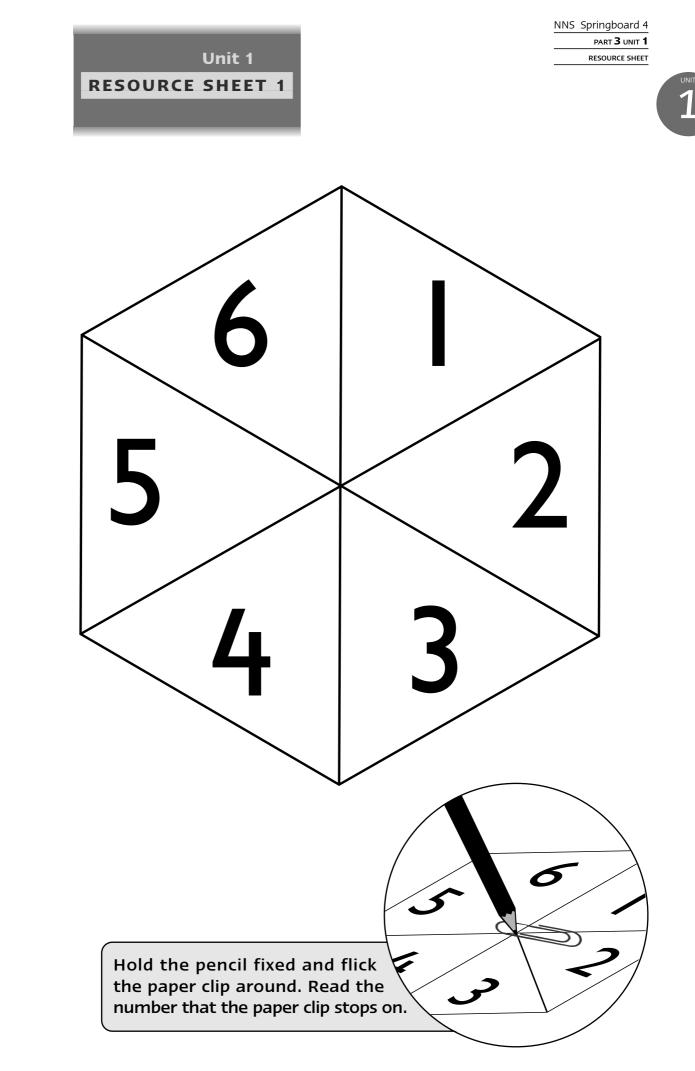
- **Take it in turns to spin the paperclip three times on the spinner.**

- **Write down the numbers you get, such as 3, 2 and 6.**

- **Decide which digits you want to be the hundreds, tens and ones, for example, 600 and 30 and 2. Write the resulting number 632.**

- **The aim is to get the biggest three-digit number.**

- **The first person to win three rounds wins the game.**

632

UNIT
1

Name ....

Date ....

Activity sheet **1.1**

$$427 = 400 + 20 + 7$$

427 = 400 + 20 + 7

1. Complete these number sentences.

346 = 300 + ⬚ + 6

218 = ⬚ + 10 + 8

120 = ⬚ + 20

307 = 300 + ⬚

2. Make up four of your own, using any cards you like.

....

....

....

....

3. Now make up four of your own, using just two place value cards.

....

....

....

....

UNIT
1

Name ....

Date ....

Activity sheet **1.2**

1. Write the numbers in the correct place on the number line.

    10, 90, 40, 60, 5, 99, 55, 25, 49

```
├────┼────┼────┼────┼────┼────┼────┼────┼────┤
0                          50                        100
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2. Write the numbers in the correct place on the number line.

    100, 200, 300, 250, 600, 900, 50, 650, 999

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├────┼────┼────┼────┼────┼────┼────┼────┼────┤
0                         500                       1000
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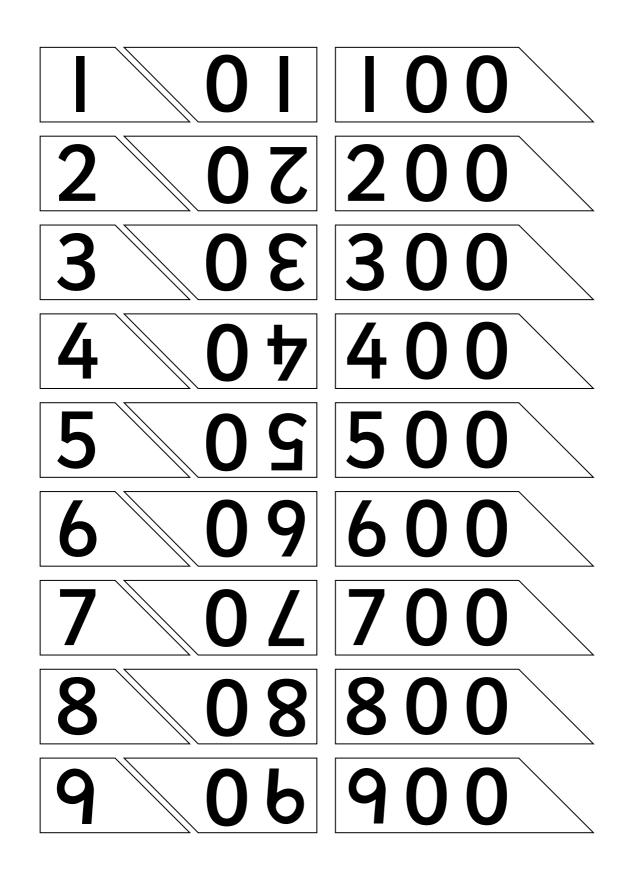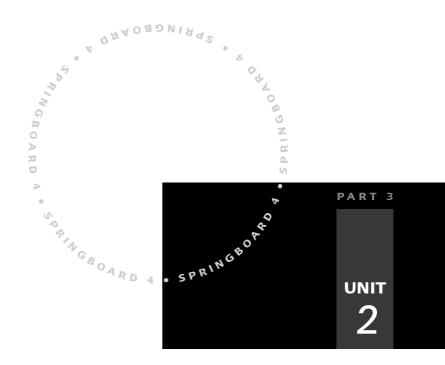
National Numeracy Strategy
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Unit 1
RESOURCE SHEET 1

Hold the pencil fixed and flick the paper clip around. Read the number that the paper clip stops on.

Unit 1
RESOURCE SHEET 2

1	10	100
2	20	200
3	30	300
4	40	400
5	50	500
6	60	600
7	70	700
8	80	800
9	90	900

ADDITION AND SUBTRACTION FACTS

Unit 2
• SESSION 1 •

	OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
TOTAL TIME **30** MINUTES	• Know by heart all addition and subtraction facts for each number to 20. • Derive quickly all pairs of multiples of 5 with a total of 100.	multiple of ten plus total addition subtraction	wipe-on, wipe-off blank 10 × 10 number grid; place value cards (resource sheet 2, Unit 1); number cards 0–20, including two 10s (resource sheet 3); 100-grid jigsaw (resource sheet 4)	Play *Speedy Facts* using 0-20 number cards (resource sheet 3)

STARTER

5 MINUTES

Draw 20 dots on the board as below.

⬤⬤⬤⬤⬤   ⬤⬤⬤⬤⬤
⬤⬤⬤⬤⬤   ⬤⬤⬤⬤⬤

Count them together, telling the children to emphasise the multiples of 5 by clapping on each one.

Ask the children to close their eyes, then rub out five of the dots. When they open their eyes, the children have to use the single-digit place value cards to show you how many have been rubbed out. Encourage children to use the groups of five as a clue, rather than counting each individual spot.

⬤⬤⬤⬤⬤   ⬤⬤⬤⬤⬤
⬤⬤⬤⬤⬤

Rub out one more group of five and repeat. Ask how many have been rubbed out altogether.

⬤⬤⬤⬤⬤   ⬤⬤⬤⬤⬤

Continue to draw numbers of dots on the board using groups of five and part groups. Ask how many more are needed to make 20. Ask the children to answer using their place value cards. After the first few, record the number statements for each on the board like this: $14 + \square = 20$.

KEY QUESTION
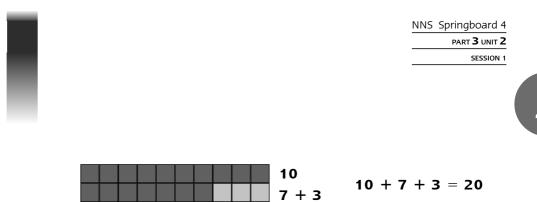
> ☐ **What can we use to help us find pairs of numbers that total 20 (addition facts to 10)?**

MAIN ACTIVITY

20 MINUTES
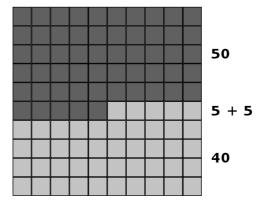
Show the children two lines on a 10 × 10 blank number grid. Point out that each line has 10 squares. Quickly shade in 17 squares and ask the children how many squares are unshaded. Annotate the lines as below, pointing out that 10 and two numbers that total 10 will combine to make 20 altogether.

⟫➔

10

7 + 3

10 + 7 + 3 = 20

Repeat with other numbers, writing each statement on the board as you go, for example 15 + ☐ = 20, and then filling in the missing number. Point out that this question is the same as 10 + 5 + ☐ = 20, so they can use their knowledge of pairs of numbers that total 10 to help.

Now ask the children to close their eyes and imagine the two lines on the grid with 16 squares coloured in. Then ask them to use number cards to show you how many squares are not coloured in.

Show the children a blank grid with 55 squares shaded in. Ask them to discuss in pairs how many squares are unshaded. *How did you work this out?* Write this on the board as 55 + ☐ = 100, filling in 45 afterwards.

50

5 + 5

40

Ask the children to imagine 75 squares coloured in, and the other part of the jigsaw coming to meet it to form the grid. *How many squares would be in this bit of the jigsaw?* Repeat for other multiples of 5 (such as 45, 65, 85), and ask the children to show the answer using place value cards.

Explain Activity Sheet 2.1, which the children will have to complete before the next session. Introduce the *Speedy Facts* game for homework.

KEY QUESTIONS

☐ **What can we use to help us find pairs of numbers which total 20 (addition facts to 10)?**

☐ **What can we use to help us find pairs of numbers which total 100?**

PLENARY

5

MINUTES

Ask a child to give you an addition sentence with an answer of 100. Write it on the board. Can anyone make this into a different sentence? Can anyone make it into a subtraction sentence, for example 75 + 25 = 100; 100 − 75 = 25?

UNIT
2

Unit 2
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Know by heart all addition and subtraction facts for each number up to 20.
- Derive quickly all pairs of multiples of 5 with a total of 100.

VOCABULARY

multiple of ten

multiple of five

count on

addition

subtraction

RESOURCES

demonstration number line from 0 to 100, marked in fives;

place value cards (resource sheet 2, Unit 1);

individual white boards or pieces of paper to hold up;

STARTER

5 MINUTES

Count in fives along a number line from 0 to 100. Point to 75 and say that you are going to find out how much needs to be counted on to reach 100. *What is the next multiple of ten after 75? How many would you count on to get to 80?* Ask everyone to select 5 from their place value cards. *How many would you count on from 80 to get to 100?* If necessary, count in tens to demonstrate the quick way of doing this. Ask them to select 20 from their place value cards and put the two cards together to make 25. Explain that this is the amount they have to count on from 75 to get to 100.

Repeat with other multiples of 5, speeding up as you go, and asking each question as one step, for example 'What do you add on to 65 to get to 100?'

KEY QUESTIONS

> ☐ **When you add two multiples of five together to make 100, what do the tens add up to? Why?**

MAIN ACTIVITY

20 MINUTES

Draw 20 dots on the board as below.

●●●●●   ●●●●●
●●●●●   ●●●●●
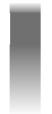
Count them together, emphasising the multiples of 5 and telling children to clap on each one of them.

Say that today we want 15 spots to begin with.

●●●●●   ●●●●●
●●●●●

Ask the children to close their eyes while you rub six of them out. They open their eyes and tell you, using cards, how many you have rubbed out. Record this as: $15 - 6 = 9$. *How many would you need to draw to get 15 spots again?* Record this as $9 + \square = 15$. Redraw the dots to check, and to help children visualise where they were before you rubbed them out. Repeat for other numbers between 10 and 20.

≫→

Now ask the children, in pairs, to write as many addition and subtraction statements as they can for a number between 10 and 20. Model first with, say, 13:

$9 + 4 = 13; 4 + 9 = 13; 13 - 9 = 4; 13 - 4 = 9$

$7 + 6 = 13; 6 + 7 = 13$ and so on.

If necessary, demonstrate why these statements are true by drawing dots as before.

Explain Activity Sheet 2.2, which the children will have to complete before the next session.

KEY QUESTION

☐ **If you know that 9 + 6 = 15, what other facts do you know?**

PLENARY

5 MINUTES

Give an addition sentence where the answer is 20, such as $13 + 7 = 20$. The children have to write down on their white boards or pieces of paper a subtraction sentence using the same numbers, for example $20 - 7 = 13$. Repeat for other sentences, recording each on the board.

UNIT

2

Name ....

Date ....
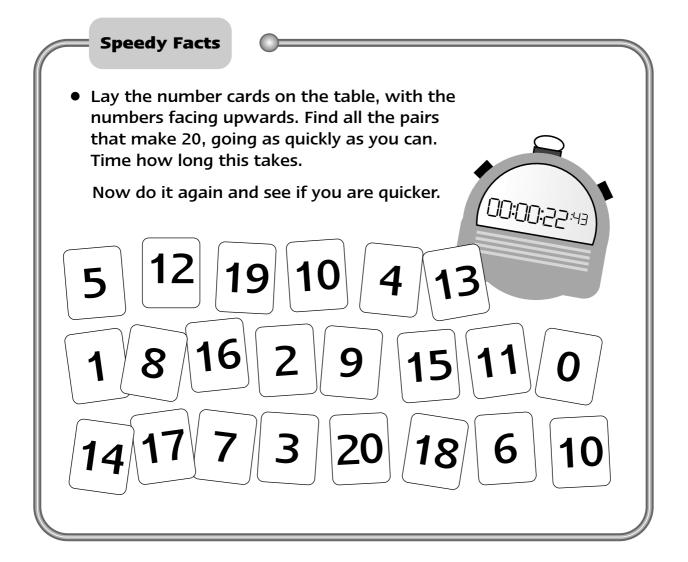
Dear Parents/Carers,

We are learning by heart pairs of numbers that make 20. Please help your child by playing the game outlined below.

Thank you for your help.

Your child's teacher

Speedy Facts

- **Lay the number cards on the table, with the numbers facing upwards. Find all the pairs that make 20, going as quickly as you can. Time how long this takes.**

  Now do it again and see if you are quicker.

00:00:22:43

| 5 | 12 | 19 | 10 | 4 | 13 |

| 1 | 8 | 16 | 2 | 9 | 15 | 11 | 0 |

| 14 | 17 | 7 | 3 | 20 | 18 | 6 | 10 |

Name ....

Date ....
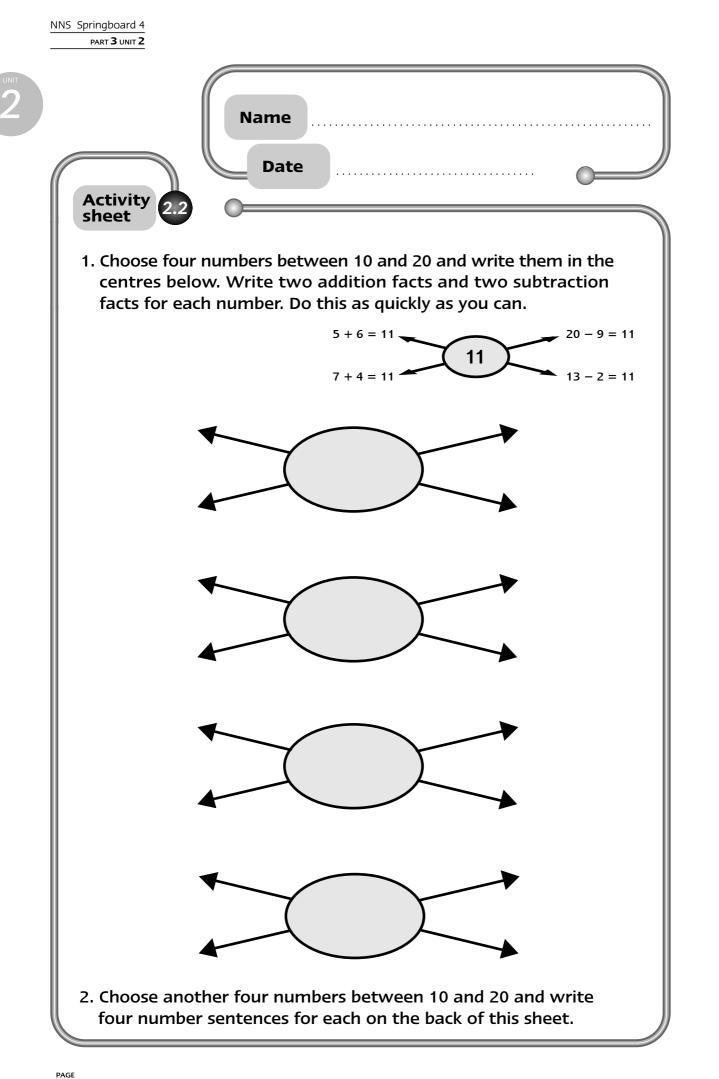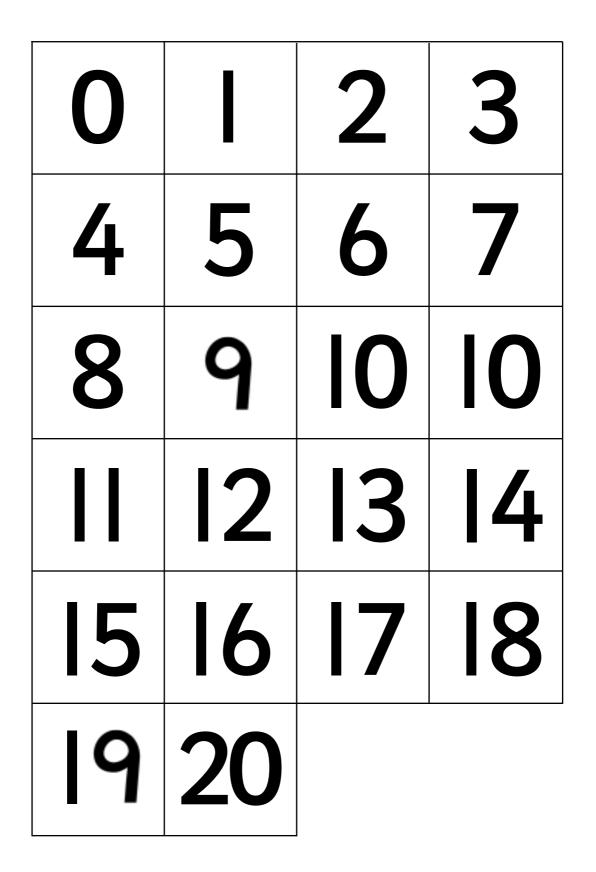
1. Look at the resource sheet and find the jigsaw pieces that go with those below to make 100 squares. Write a number sentence underneath each one that explains what you have done.

A.

B.

C.

D.

E.

F.

2. Write all the pairs of multiples of five that total 100, such as 95 + 5 = 100, on the back of this sheet.
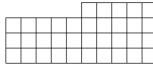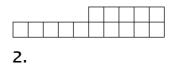
UNIT
2

Name ....

Date ....

Activity sheet 2.2

1. Choose four numbers between 10 and 20 and write them in the centres below. Write two addition facts and two subtraction facts for each number. Do this as quickly as you can.

$5 + 6 = 11$ **11** $20 - 9 = 11$

$7 + 4 = 11$ $13 - 2 = 11$

2. Choose another four numbers between 10 and 20 and write four number sentences for each on the back of this sheet.

Unit 2
RESOURCE SHEET 3

0	1	2	3
4	5	6	7
8	9	10	10
11	12	13	14
15	16	17	18
19	20		

Unit 2

RESOURCE SHEET 4

1.

2.

3.

4.

5.

6.

MENTAL CALCULATION STRATEGIES

Unit 3
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVE

• Partition into tens and ones, then recombine.

VOCABULARY

multiple of ten
partition
ones, tens
add, plus

RESOURCES
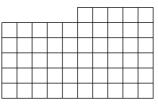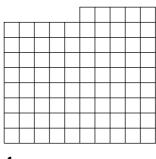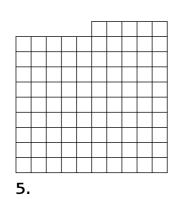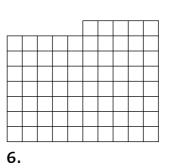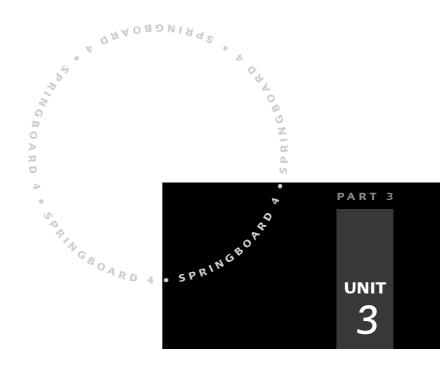
place value cards (resource sheet 2, Unit 1);
1-6 paperclip spinner (resource sheet 1, Unit 1)

HOMEWORK

Play the *Coins Game* using a 1-6 spinner (resource sheet 1, Unit 1) and 10p and 1p coin cards (resource sheet 5)

STARTER

5 MINUTES

Rehearse adding and subtracting single digits, then multiples of 10, for example 4 + 5 and 40 + 50. Ask the children to use place value cards to answer.

KEY QUESTION
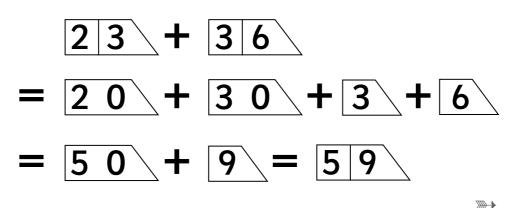
☐ **If you know that 5 + 3 = 8, what is 50 + 30?**

MAIN ACTIVITY

20 MINUTES

In this session ensure that additions do not cross the tens and hundreds barrier. This will be covered in the follow-up session.

Make 23 and 36 using place value cards. Put them on the table and ask one child to take the 'tens' (20 and 30) and another to take the 'ones' (3 and 6). Together, help the first child to add the tens and choose the correct card from the place value cards (50). Do the same with the other child, who will choose the 9 card from the pack. Take the cards from each child and recombine them to make 59. Say that 23 + 36 = 59. Write this down. Ask the children how they worked out the answer. *We split each number into tens and ones, added the tens, added the ones and then put the numbers back together again.*

$$23 + 36$$
$$= 20 + 30 + 3 + 6$$
$$= 50 + 9 = 59$$

≫→

Repeat this process with another pair of two-digit numbers, then ask the whole group more questions of the same type, this time telling them to answer using place value cards. Write each addition statement on the board.

Explain Activity Sheet 3.1, which the children will have to complete before the next session.

KEY QUESTIONS

☐ **In 23, what does the digit 2 represent?**
☐ **In 70, what does the digit 0 (zero) represent?**

PLENARY

5 MINUTES

Make the number 42 using place value cards. Say that you want to add something to this number to make 63, and write this on the board as 42 + ☐ = 63. Give the 40 card to one child and ask the others what should be added to it to make 60. Then give the 2 card to another child and ask what should be added to this card to make 3. Ask what has been added on altogether.

Repeat with 21 + ☐ = 63, asking a child to explain what is happening. If there is time, try 64 + ☐ = 96 and 32 + ☐ = 96.

Unit 3
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVE

- Partition into tens and ones, then recombine.

VOCABULARY

multiple of ten
partition
ones, tens
add, plus

RESOURCES

place value cards
(resource sheet 2,
Unit 1)

STARTER

7 MINUTES

Revise addition facts for the numbers 11 to 18 as the children will need these in the main activity.
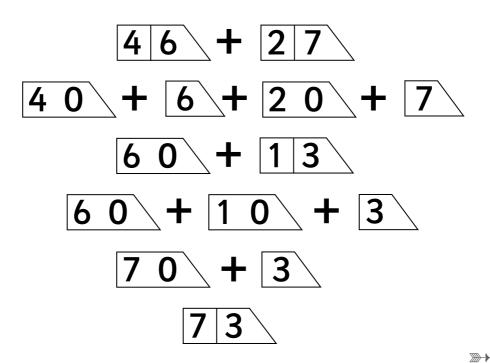
Quickly ask questions such as $7 + 5$, $9 + 9$ and $6 + 8$, asking the children to respond using their place value cards.
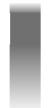
KEY QUESTIONS

☐ **Which place value card did you have to pick up each time to answer all of these questions? Why?**

MAIN ACTIVITY

Say that today you are going to teach everyone to add together two two-digit numbers where the ones add up to more than ten. Remind them that in the previous session they always added up to less than 10. Demonstrate this using place value cards to work out $46 + 27$

$$46 + 27$$

$$40 + 6 + 20 + 7$$

$$60 + 13$$

$$60 + 10 + 3$$

$$70 + 3$$

$$73$$

Repeat for other two-digit numbers where the ones total more than ten but the answer is less than 100, such as 37 + 26 and 29 + 56.

Explain Activity Sheet 3.2, which the children will have to complete before the next session.

KEY QUESTIONS

> **When you add 57 + 38, the answer will be bigger than which multiple of ten? Why?**

PLENARY

5 MINUTES

Ask the children to imagine buying two items, one costing 47p and the other 38p. Say that they only have 10p and 1p coins. *How many 10p coins would you need? How many 1p coins would you need?* Have the coins available in case children need them.

Repeat for two items costing 67p and 23p.

UNIT

3

Name ....

Date ....

Dear Parents/Carers,
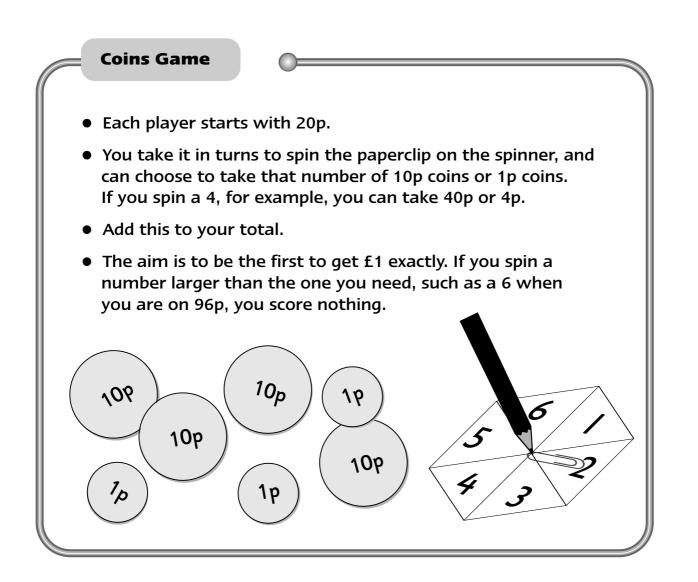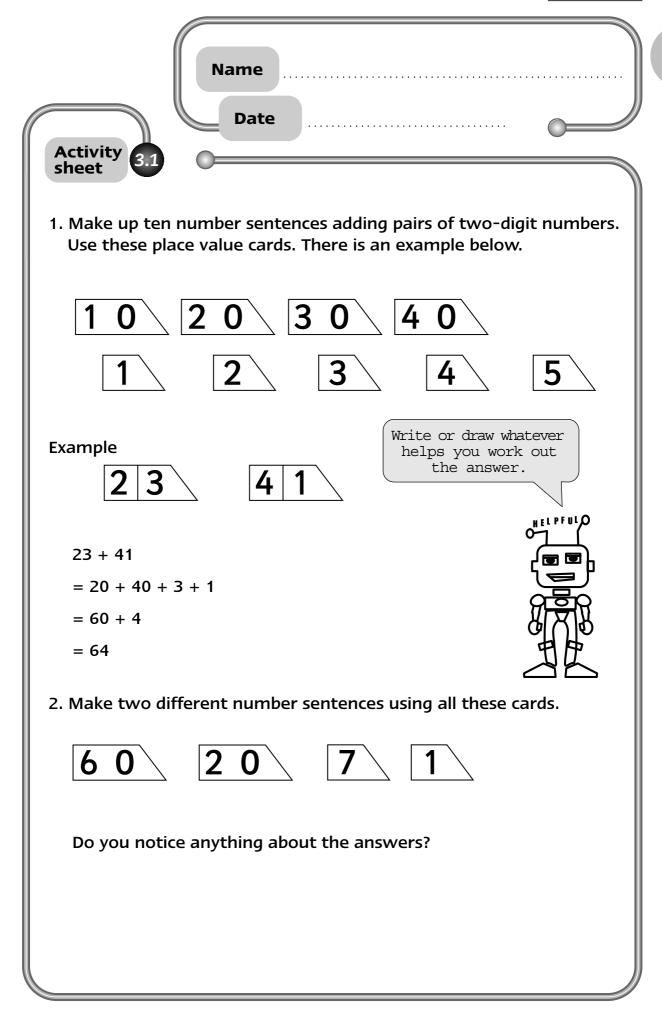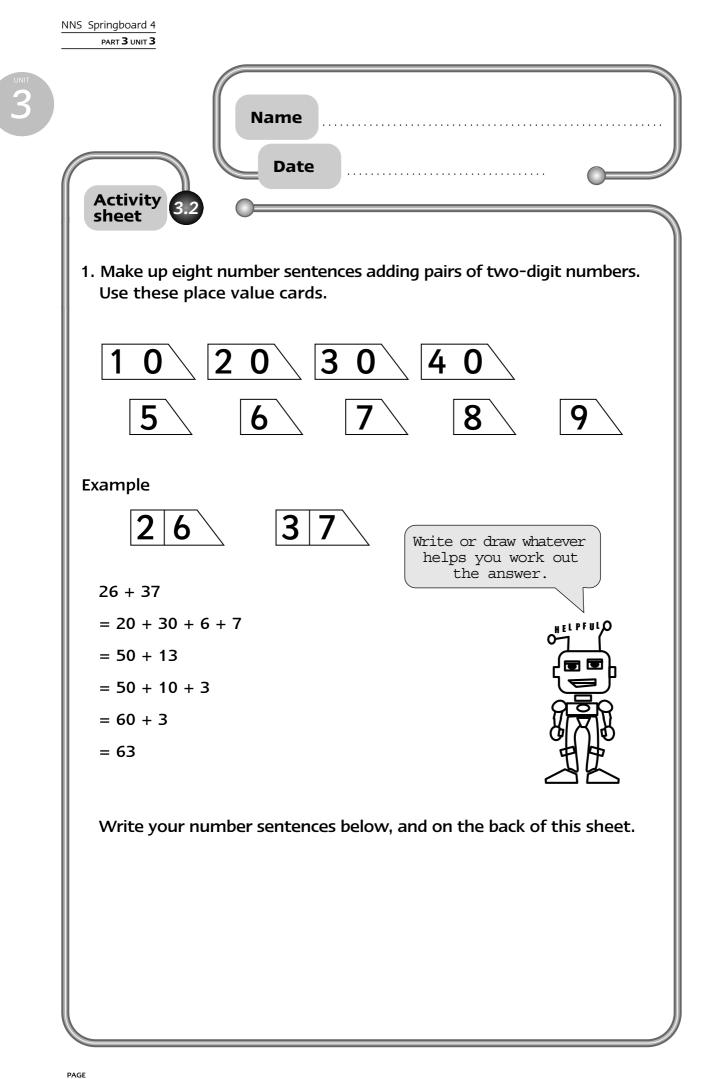
In our mathematics lessons, we are learning to add together pairs of
two-digit numbers. Please help your child to practise this by playing the
game below.

Thank you for your help.

Your child's teacher

Coins Game

- **Each player starts with 20p.**

- **You take it in turns to spin the paperclip on the spinner, and
  can choose to take that number of 10p coins or 1p coins.
  If you spin a 4, for example, you can take 40p or 4p.**

- **Add this to your total.**

- **The aim is to be the first to get £1 exactly. If you spin a
  number larger than the one you need, such as a 6 when
  you are on 96p, you score nothing.**

UNIT
3

Name ....

Date ....

Activity sheet 3.1

1. **Make up ten number sentences adding pairs of two-digit numbers. Use these place value cards. There is an example below.**

| 1 0 | 2 0 | 3 0 | 4 0 |

| 1 | 2 | 3 | 4 | 5 |

Example

| 2 | 3 | | 4 | 1 |

> Write or draw whatever helps you work out the answer.

HELPFUL

23 + 41

= 20 + 40 + 3 + 1

= 60 + 4

= 64

2. **Make two different number sentences using all these cards.**

| 6 0 | 2 0 | 7 | 1 |

Do you notice anything about the answers?

UNIT

3

Name ....

Date ....

Activity sheet **3.2**

1. **Make up eight number sentences adding pairs of two-digit numbers. Use these place value cards.**

1 0   2 0   3 0   4 0

5   6   7   8   9

Example

2 6   3 7

> Write or draw whatever helps you work out the answer.

HELPFUL

26 + 37

= 20 + 30 + 6 + 7

= 50 + 13

= 50 + 10 + 3

= 60 + 3

= 63

Write your number sentences below, and on the back of this sheet.

Unit 3

RESOURCE SHEET 5

1p	1p	1p	1p	1p	1p
1p	1p	1p	1p	1p	1p
1p	1p	1p	1p	1p	1p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p

PART 3

UNIT
4

PLACE VALUE

Unit 4
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVES

- Count on or back in twos and recognise odd/even numbers.
- Count on or back in tens or hundreds.
- Say the number that is 1, 10, 100 more or less than any given two- or three-digit number.

VOCABULARY

odd/even numbers
hundreds, tens, ones
one/ten more, one/ten less

RESOURCES

demonstration 1–100 number grid;
small 1–100 number grids (resource sheet 6);
place value cards (resource sheet 2, Unit 1);
1–9 digit cards (resource sheet 7)

HOMEWORK

Make five three-digit numbers using 1–9 digit cards (resource sheet 7) and find the number ten more and ten less than each number.

STARTER

5 MINUTES

Start at zero and count in twos. Write the numbers on the board as the children say them. Continue up to 40. What do the children notice about the units? Explain that these are even numbers. *What do we call the numbers that come in between, such as 1, 3, 5?* Explain that we call these numbers odd. Write 354 on the board. *Is this even or odd?* Encourage them to look at the ones and compare these with the ones digits in the numbers we counted. Establish that 354 is even. Repeat with 643. Ask each pair of children to write two three-digit numbers, one odd and one even. Remind them to think about the ones digit. Check each pair's answers.

KEY QUESTIONS

■ **How do we know if a number is odd or even? What are the ones digits of even numbers? Of odd numbers?**

MAIN ACTIVITY

20 MINUTES

Point at 67 on the number grid. Ask the children to say the number. *What is the number that is one more?* Show the children how you move your finger one space along on the number grid. *What is the number one less?* Demonstrate moving your finger one space back. Repeat this for the number 10 more and the number 10 less. Repeat the whole process, this time starting with 54. Demonstrate how to use the grid to help find the number one more/less or ten more/less.

Write 467 on the board. Ask the children to say the number in unison. Cover the hundreds digit with your hand. Say: 'four hundred and sixty-seven'. Point at 67 on the grid to demonstrate that the tens and ones are the same in both numbers.

≫→

What is one more than four hundred and sixty-seven? Remind everyone how the grid can help them to find this out. Write 468 to the right of 467 on the board. Repeat the process to show children how to use the grid to find the number one less, and write 466 to the left of 467, and then again to find the number ten more and the number ten less, writing 457 above 467 and 477 below it.

Go through the whole process again to find one more and one less, ten more and ten less than 854.

Explain Activity Sheet 4.1, which the children will have to complete before the next session.

KEY QUESTIONS

■ **How do we use the number grid to find the number 1 or 10 more or less? Which digit always changes when we have ten more? When we have ten less?**

PLENARY

5 MINUTES

Ask a child to make the number 527 using place value cards. Ask another to explain how to change the cards so that the number is ten less. Demonstrate. Return to the original number and ask a third child to explain how to change the cards to show the number that is ten more. Repeat with 711.

Unit 4

SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Count in steps of 3 or 4.
- Count on or back in tens or hundreds.
- Say the number that is 1, 10, 100 more or less than any given two- or three- digit number.

VOCABULARY

odd/even numbers

hundreds, tens, units

one/ten more, one/ten less

RESOURCES

number line 0–100; place value cards (resource sheet 2, unit 1); set of cards displaying −10, −100, +10 and +100

STARTER

5 MINUTES

Count in fours along a number line from 0 to 50. Write the first 12 numbers on the board. Encourage the children to tell you what they know about the numbers in this series; for example, that they are all even, or that every other multiple of ten (those that have an odd number of tens) is missed out.

Count in threes along a number line from 0 to 50. Write the first 12 numbers on the board. Encourage the children to tell you what they know about the pattern (even, odd, even, odd).

KEY QUESTIONS

■ **What do you know about the numbers when you count in fours from 4? What is the pattern when you count in threes from 3?**

MAIN ACTIVITY

20 MINUTES

Say the number five hundred and seventy three. Ask pairs of children to use place value cards to make that number and hold it up. Check that they have all made 573. Write this on the board.

Ask each pair to change the tens digit to make the number 10 more. Check that they have all made 583. Write this on the board. Explain that you are now going to write the number 100 more. *Which digit do I need to change?* Encourage the children to see that they must change the hundreds digit. Write 683 on the board below 583. Ask the children to change the hundreds card to create 683. Now ask the children to make the number 100 more than this (783). Encourage them to change the hundreds card.

≫→

Repeat this activity, starting with the number 829. Ask the children to show, with their cards, the number that is 10 more, then the number that is 100 more. Encourage them to think which digit they are changing each time. Repeat for the number 268, focusing on the numbers 10 less and 100 less.

Explain Activity Sheet 4.2, which the children will have to complete before the next session.

KEY QUESTIONS

> ☐ **Which digit do we need to change to add 100 or subtract 100?**
> ☐ **Which digit do we need to change to find the number 10 more or 10 less?**

PLENARY

5 MINUTES

Ask the children to explain how they can work out 100 more than a given number. What about 100 less? Ask them to explain how to work out 10 more. What about 10 less?

Write 634 in the middle of the board, then write the following numbers underneath and tell the group to hold up the correct card to show what operation you have performed: 644, 734, 534, 624. If time allows, pick another three-digit number as a starting point, write up a new set of numbers and carry out this exercise again.
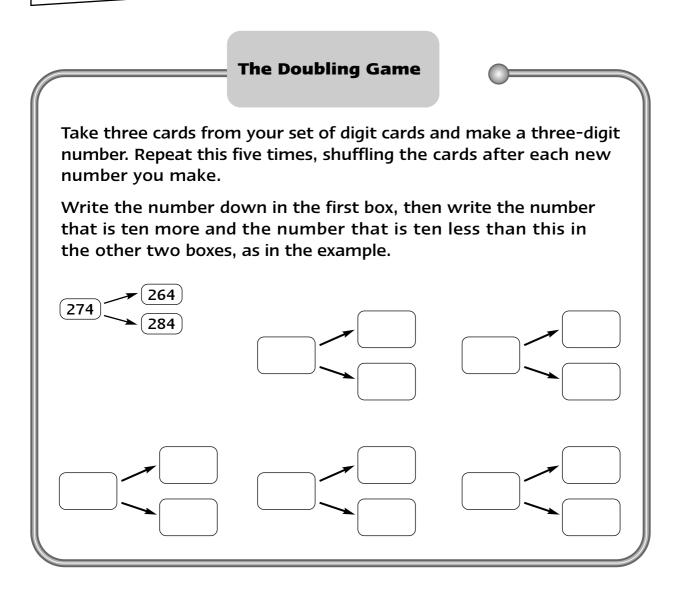
UNIT

4

Name ....

Date ....

Dear Parents/Carers,

In our mathematics lessons, we have been finding the number that is 1, 10 or 100 more or less than a given number. Please help your child to carry out the exercise below, using the set of 1–9 digit cards provided.

Thank you for your help.
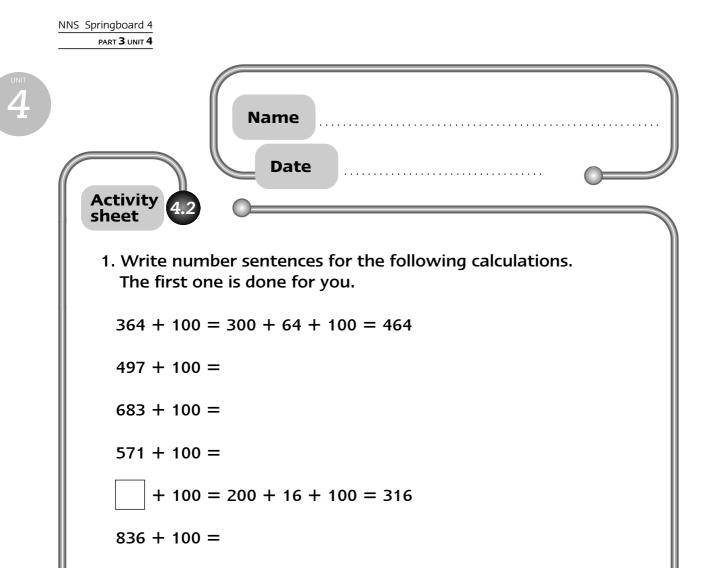
Your child's teacher

The Doubling Game

Take three cards from your set of digit cards and make a three-digit number. Repeat this five times, shuffling the cards after each new number you make.

Write the number down in the first box, then write the number that is ten more and the number that is ten less than this in the other two boxes, as in the example.

274 → 264
274 → 284

UNIT
4

Name ....

Date ....

Activity sheet **4.1**

Use the 1–100 number grid.

1. Choose three numbers on the grid. Mark each of them with a cross, then circle the numbers 1 more and 1 less, 10 more and 10 less than each of them.

2. Write the numbers 10 more and 10 less than each number.

10 less						
	257	639	461	275	188	307
10 more						

3. Write the numbers 1 more and 1 less than each number.

1 less						
	478	820	259	171	945	307
1 more						

UNIT
4

Name ....

Date ....

Activity sheet **4.2**

1. Write number sentences for the following calculations.
   The first one is done for you.

   364 + 100 = 300 + 64 + 100 = 464

   497 + 100 =

   683 + 100 =

   571 + 100 =

   ☐ + 100 = 200 + 16 + 100 = 316

   836 + 100 =

2. Write the numbers 10 more and 10 less than each number.

10 less						
	482	940	271	382	931	729
10 more						

3. Write the numbers 100 more and 100 less than each number.

100 less						
	452	856	299	101	388	307
100 more						

Unit 4

RESOURCE SHEET 6

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Unit 4

RESOURCE SHEET 7

1	2	3
4	5	6
7	8	9

UNDERSTANDING
MULTIPLICATION AND DIVISION

Unit 5
• **SESSION 1** •

TOTAL TIME	**OBJECTIVES**	**VOCABULARY**	**RESOURCES**	**HOMEWORK**
30 MINUTES	• Understand division as grouping. Read and begin to write the related vocabulary. • Know by heart the facts of the 2-, 5- and 10-times tables.	divided by how many…in…? count on in fives	counting stick; demonstration number line that includes 0–20; unnumbered lines (resource sheet 8); 1–100 number grids (resource sheet 6, Unit 4)	Play *Four in a Row*

STARTER

5 MINUTES

Rehearse counting in tens and fives using a counting stick.

Ask questions such as 'How many fives do we count to get to here (pointing to where 30 is on the stick)?' and 'How many tens do we count to get to here (pointing to where 70 is on the stick)?'

KEY QUESTIONS

> ☐ **How can we work out how many fives are in 25? How many tens are in 70?**

MAIN ACTIVITY

20 MINUTES

Either draw 20 spots randomly on the board or stick 20 counters on to a white board. Say that these are one-penny coins and we want to exchange them for five-pence coins. *How many five-pence coins will we get?*

Either draw loops around groups of five, or move groups of counters, counting how many groups of five as you do so. Explain that we can write this as $20 \div 5 = 4$. Stress that this can mean 'How many fives are in twenty?'

Now draw 20 pennies in a line. Draw a loop around each group of five, pointing out that it was easier this time.

Now point to 20 on a number line (with all numbers marked on it) and ask how many fives we would count to get there. Demonstrate.

⟫→

Use the counting stick to count in fives to 20 and ask how many fives were counted.

Tell everyone to count in fives on their blank number lines to 20, and then to count how many fives that would be. Check that they all understand.

```
    ┌────┬────┬────┬────┬────┐
    0                        20
```

They now count to 15 and write 15 on the line. Ask how many jumps of five there were. Record this on the board as 15 ÷ 5 = 3, reading it as 'How many fives are in 15?' Repeat for other multiples of five.

Look at the 1–100 number grid and ask how many lines of ten there are in 50. Count the lines to ensure that all the children understand.

How could we mark our number line to find out how many tens there are in 70? Count in tens to 70, mark on 70 and then count how many tens are counted on the way.

```
    ┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
    0                    70
```

If we had 70 pennies how many 10p pieces could we get?

Explain Activity Sheet 5.1, which the children will have to complete before the next session. Introduce the *Four in a Row* game for homework.

KEY QUESTIONS

> ☐ **How can we rewrite 'How many tens are in 70?' using mathematical symbols?**
> ☐ **How did you work out the answer (perhaps they counted in tens, or used a known fact from their tables)?**

PLENARY

5 MINUTES
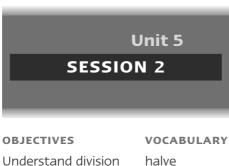
For a party, we need 40 balloons. They come in packs of ten. How many packets do we need? Ask a child to explain how to tackle this problem. *If they came in packets of five, how many would we need then? Would we need more packets or fewer packets? Why?*

Emphasise that in this session you have been asking everyone to work out how many equal groups there are in a given number. Say that we often talk about a number of groups when we are multiplying and that there is a link between multiplication and division as there is between addition (counting on) and subtraction (counting back). Say that you will look at this link in the next session.

Unit 5
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Understand division as grouping or sharing. Read and begin to write the related vocabulary.
- Recognise that division is the inverse of multiplication and that halving is the inverse of doubling.
- Know by heart the facts of the 2-, 5- and 10- times tables.

VOCABULARY

halve
double
multiplication
multiply by
division
divide by
inverse

RESOURCES

place value cards (resource sheet 2, Unit 1);
you're great at maths stickers (resource sheet 9)

STARTER

5 MINUTES

Show the children the number 14 using place value cards. Partition the number into 10 and 4, giving each part to a different child. Ask everyone to double 10 and help the child to pick up the right card, 20. Everyone now doubles 4. Help the child to find the right card, 8. Recombine these two cards to make the number 28. Explain that double 14 is 28, but if they forget this, they can partition the number and double each part before recombining.

Ask the children other doubles from 11 to 20. They respond by holding up place value cards. Demonstrate the partitioning for any that they find difficult.

Show everyone the number 14 again, partition it, and ask them what half of 10 is? *What is half of 4?* They now add 5 and 2 to make 7. Explain that half of 14 is therefore 7. Stress that partitioning can help them to find the answer if they cannot remember this fact. Ask them to give half of 12, 16, and 18, using place value cards to answer. Demonstrate by partitioning for any that they find difficult.

KEY QUESTION

☐ **Doubling is the same as multiplying by what?**

MAIN ACTIVITY

20 MINUTES

Hold up the sheet of stickers from Resource Sheet 9. *How many stickers are on it?* (There are 24). Fold the sheet so that half of the stickers are showing. *How many can you see now?* Write on the board: half of 24 = 12.

⫸➔

Open out the sheet again. *How many stickers can you see now?* Write on the board: double 12 = 24. Point out that when you doubled 12, you got back to the number you started with before you halved it. Explain that doubling is the opposite of halving, so if you halve a number and then double that answer you get back to what you started with. Explain that we say that doubling is the inverse of halving. Do they know of another way of saying doubling? Explain that multiplied by 2 means we have two lots of what we started with or, in other words, double. Do they know of another way of saying halving? Dividing into two equal groups. Explain that division is the opposite of multiplication. We say that one is the inverse of the other.

Ask the children to imagine a sheet of 8 stickers. Ask a child to draw on the board how they are arranged. It might be like this:

or this:

Ask them to close their eyes and imagine the sheet being folded so that they can see half of the stickers. *How many can you see now?* They then imagine it being opened up again. *How many can you see now?* Ask the children to help you write on the board some halving and doubling facts about this sheet of stickers, such as half of 8 is 4, double 4 is 8, 8 ÷ 2 = 4, 4 × 2 = 8. Repeat this process for other numbers of stickers, such as 10, 16, 20.

Go through a couple of questions orally from each section on Activity Sheet 5.2, which the children will have to complete before the next session.

KEY QUESTION

> ☐ **Doubling is the same as multiplying by two. What is halving the same as?**

PLENARY

5 MINUTES

Ask the children to close their eyes and imagine a 1–100 number grid. Ask them to imagine it being cut in half. How many squares would it have now? What is double 50?

Now ask them to imagine a domino with 6 spots on one side. It is a double and so has 6 spots on the other. *What is double 6?* Can they think of a corresponding halving fact to go with this?

What if the domino had 20 spots on one side? *How many spots would there be altogether?* Can the children think of a halving fact to go with this? *If a doubles domino has 20 spots altogether, how many are on each half?* Can the children think of a doubling fact to go with this?

UNIT
5

Name ....

Date ....

Dear Parents/Carers,

In our mathematics lessons, we have been learning how to find out how many fives there are in a particular number. Please help your child to practise this by playing the game below.

Thank you for your help.

Your child's teacher

Four in a Row
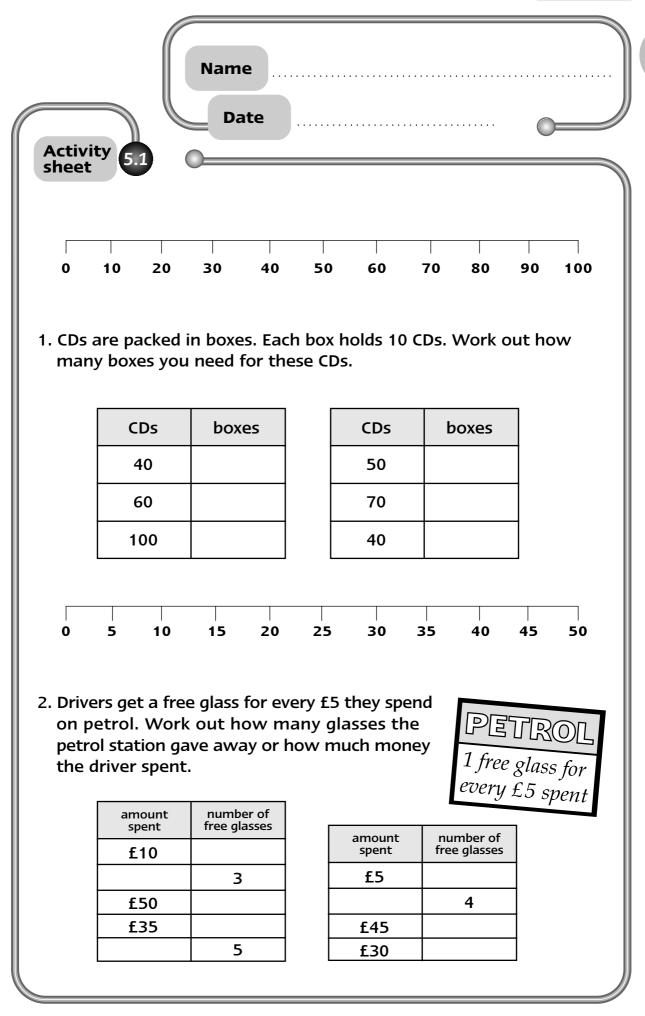
- **Players take it in turns to choose a number from the grid and say how many fives there are in it. Count 5p coins to check (saying, for example, 5, 10, 15, 20, that's four lots of 5 in 20). If the player is right, he or she should put a coin or counter on the square to claim it.**

30	40	50	25	60
55	5	15	35	25
35	45	10	40	50
10	20	25	15	45
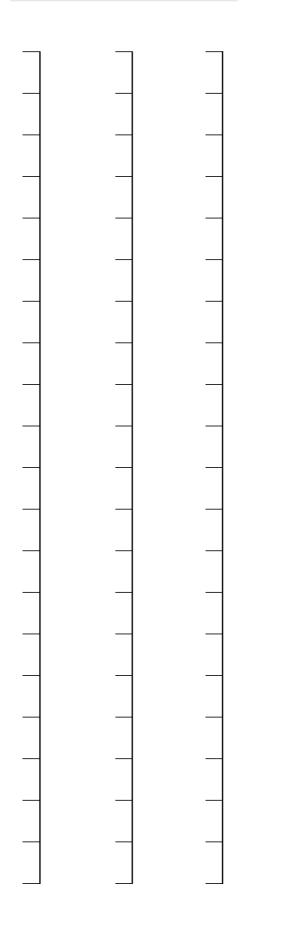
- **The winner is the first player to get four counters in a row, up ↑, along →, or diagonally ↘ ↙.**

Name ....

Date ....

Activity sheet 5.1

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

1. CDs are packed in boxes. Each box holds 10 CDs. Work out how many boxes you need for these CDs.

CDs	boxes
40	
60	
100	

CDs	boxes
50	
70	
40	

| 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |

2. Drivers get a free glass for every £5 they spend on petrol. Work out how many glasses the petrol station gave away or how much money the driver spent.

PETROL
1 free glass for every £5 spent

amount spent	number of free glasses
£10	
	3
£50	
£35	
	5

amount spent	number of free glasses
£5	
	4
£45	
£30	

UNIT
5

Name ....

Date ....

Activity sheet **5.2**
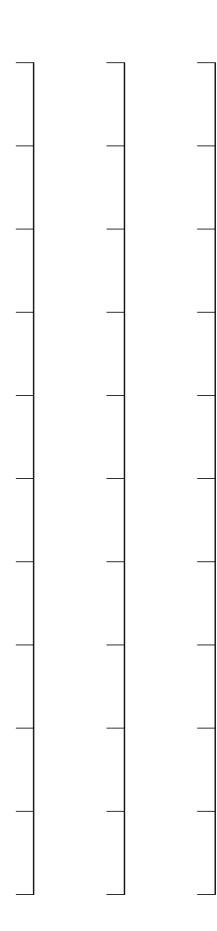
1. Double these numbers and write a number sentence for each.

20   20 × 2 = 40   **40** ....

25 ....   **11** ....

14 ....   **19** ....

2. Halve these numbers and write a number sentence for each.

20   20 ÷ 2 = 10   **100** ....

30 ....   **16** ....

24 ....   **18** ....

3. Work out the answers to these.

2 × 21 = ...   2 × 15 = ...

double 21 = ...   double 15 = ...

2 × 4 = ...   2 × 12 = ...

double 4 = ...   double 12 = ...

14 ÷ 2 = ...   80 ÷ 2 = ...

half of 14 = ...   half of 80 = ...

18 ÷ 2 = ...   50 ÷ 2 = ...

half of 18 = ...   half of 50 = ...
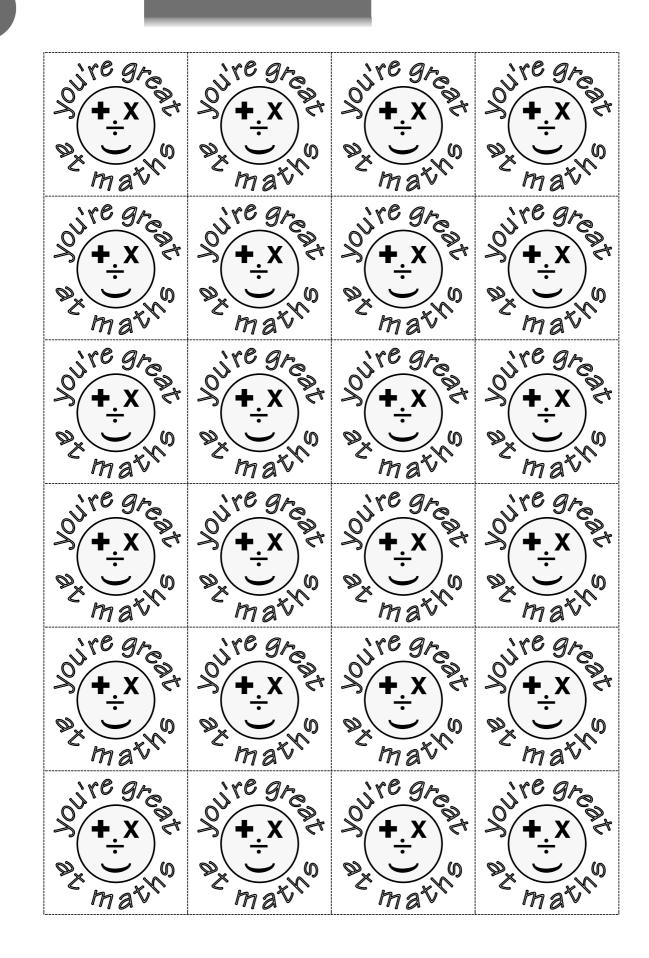
Unit 5

RESOURCE SHEET 8

Unit 5

RESOURCE SHEET 9

MAKING DECISIONS

Unit 6
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
• Choose and use appropriate operations (including multiplication and division) to solve word problems. • Explain methods and reasoning orally.	add subtract	two hoops; word problems 1 (resource sheet 10); 0–100 number lines and 1–100 number grids available in case children need them	Write questions for *Subtracting Snakes and Adding Ladders*

STARTER

5 MINUTES

Put two hoops on the table, one labelled 'add' and the other 'subtract'. Read the word problems cut out from the resource sheet. Ask the children to decide which hoop you should put each problem in.

KEY QUESTION

▪ **Which words give you clues about whether to add or subtract?**

MAIN ACTIVITY

20 MINUTES

Choose a few of the problems from resource sheet 10 and ask the children what the necessary calculation is. Start with an addition question. Ask the children the answer to this calculation, and then the answer to the question. Then ask them to read the question again and see if the answer makes sense. Repeat with one of the subtraction questions. Spell out the four steps of the process you have just gone through.

1. Work out what calculation you need to do
   (it may help to look to see if there are key words which help you).
2. Work out the calculation.
3. Answer the question.
4. Read the question to see if the answer makes sense.

Ask the children to choose a word problem to work on in pairs. After they have found the answer, they should prepare to tell the other children how they worked it out. Ask each pair to explain how they worked out the answer, including whether they did the calculation in their head or used a number line/grid to help them.

Explain Activity Sheet 6.1, which the children will have to complete before the next session.

KEY QUESTIONS

■ What calculation is necessary? Which words give you a clue? What's the answer to the calculation? What's the answer to the question? Does the answer make sense?
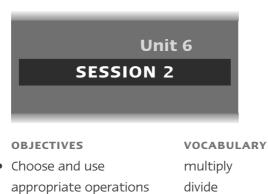
PLENARY

5 MINUTES

Talk the children through the following two-step word problem, which involves addition and subtraction. Ask them to explain how they would solve the problem.

The supermarket has a special offer on yoghurts.

If you buy two yoghurts at 21p each you get 5p off the total price. *How much will you pay for two yoghurts?*

Unit 6
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Choose and use appropriate operations (including multiplication and division) to solve word problems.
- Explain methods and reasoning orally.

VOCABULARY

multiply

divide

RESOURCES

two hoops;

word problems 2

(resource sheet 11)

STARTER

5 MINUTES

Put two hoops on the table. Label one 'multiply' and the other 'divide'. Read the word problems cut out from the resource sheet. Ask the children to decide which hoop you should put each problem in.

KEY QUESTION

> ☐ **How did you decide which hoop was the right one for each problem?**

MAIN ACTIVITY

20 MINUTES

Choose a few of the problems from resource sheet 11 and ask children what the necessary calculation is, for example:

Six tripods flew to the moon. Tripods have three legs. How many moon boots will they need? Establish that the calculation involved is 3×6. Ask the children the answer to this calculation, and then the answer to the question – 18 moon boots. Then ask them to read the question again and see if it makes sense. Repeat with one of the division questions. Spell out the four steps of the process you have just gone through.

1. Work out what calculation you need to do
   (it may help to look to see if there are key words which help you).
2. Work out the calculation.
3. Answer the question.
4. Read the question to see if the answer makes sense.

Ask the children to choose a word problem to work on in pairs. After they have found the answer, they should prepare to tell the other children how they worked it out. Ask each pair to explain how they worked out the answer.

⋙→

Explain Activity Sheet 6.2, which the children will have to complete before the next session. Write one word problem together to model this activity.

KEY QUESTIONS

What calculation is necessary? Which words give you a clue? What's the answer to the calculation? What's the answer to the question? Does the answer make sense?

PLENARY

5 MINUTES

Tell the children that five tripods (three legs each) and seven bipods (two legs each) are going to the moon. Ask them how you could find out how many moon boots they will need. Establish that this is a multi-step problem. First they must find out how many boots the tripods will need and then how many the bipods will need, then these answers should be added together to find the total number of boots.

UNIT

6

Name ....

Date ....

Dear Parents/Carers,

We are learning about solving word problems in our mathematics lessons, including deciding whether a problem needs us to add or subtract. Please help your child by helping to answer the questions below.

Thank you for your help.

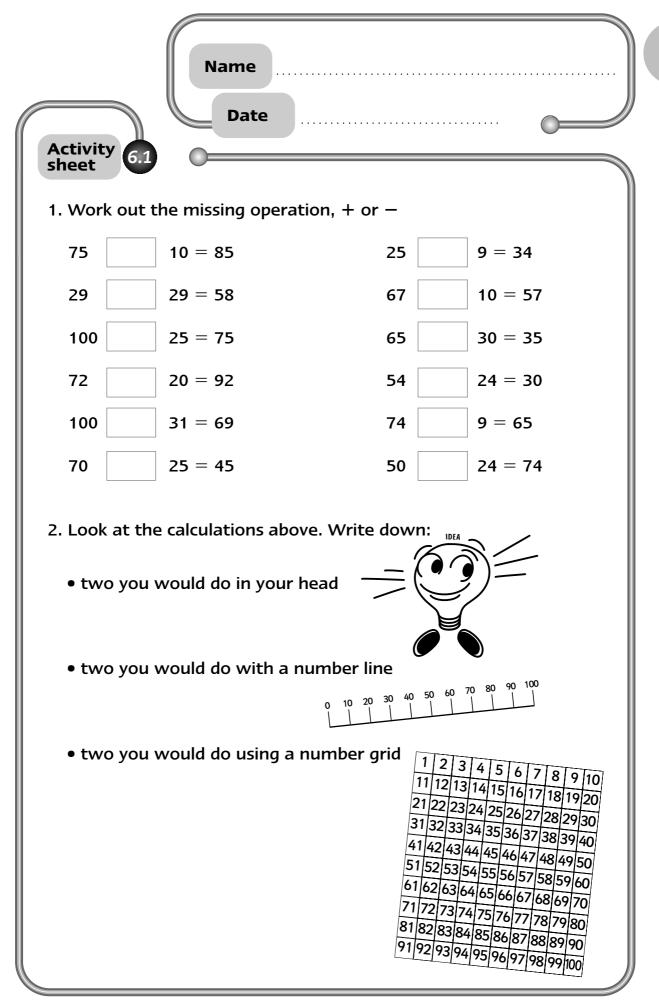Your child's teacher

Subtracting Snakes and Adding Ladders

100	99	98	97	96	95	94	93	92	91
81	82	83	84	85	86	87	88	89	90
80	79	78	77	76	75	74	73	72	71
61	62	63	64	65	66	67	68	69	70
60	59	58	57	56	55	54	53	52	51
41	42	43	44	45	46	47	48	49	50
40	39	38	37	36	35	34	33	32	31
21	22	23	24	25	26	27	28	29	30
20	19	18	17	16	15	14	13	12	11
1	2	3	4	5	6	7	8	9	10

Make up two addition questions and two subtraction questions about this board game. For example, *'You are on 35 and you roll a 5. Which number do you land on?'* or *'You land on a snake's head on 95. You have to go back 30 squares. What number will you land on?'*
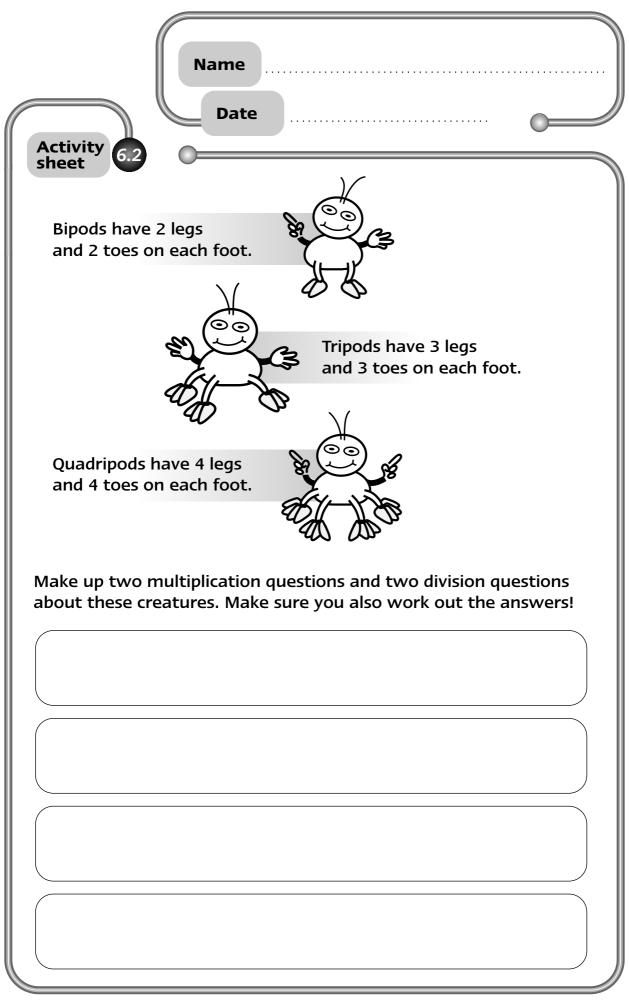
Write your questions and answers on the back of this sheet.

Name ....

Date ....

Activity sheet 6.1

1. Work out the missing operation, + or −

| 75 | | 10 = 85 | | 25 | | 9 = 34 |

| 29 | | 29 = 58 | | 67 | | 10 = 57 |

| 100 | | 25 = 75 | | 65 | | 30 = 35 |

| 72 | | 20 = 92 | | 54 | | 24 = 30 |

| 100 | | 31 = 69 | | 74 | | 9 = 65 |

| 70 | | 25 = 45 | | 50 | | 24 = 74 |

2. Look at the calculations above. Write down:

- two you would do in your head

- two you would do with a number line

- two you would do using a number grid

UNIT

6

Name ....

Date ....

Activity sheet 6.2

Bipods have 2 legs
and 2 toes on each foot.

Tripods have 3 legs
and 3 toes on each foot.

Quadripods have 4 legs
and 4 toes on each foot.

Make up two multiplication questions and two division questions
about these creatures. Make sure you also work out the answers!

Unit 6
RESOURCE SHEET 10

Sharanjit is 12 years old.

Her eldest sister is 9 years older.

How old is her sister?

Mrs Jones is 40 years old.

Her husband is 4 years younger.

How old is he?

You have saved £12 from your pocket money.

Auntie Shirley gives you £5 for your birthday.

How much money do you have altogether?

You've managed to save £20.

You decide to spend £5 on new books.
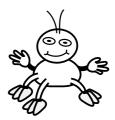
How much money will you have left?

In a board game, you have landed on the square 49.

You roll the dice again and get a 5. You move on 5 spaces.
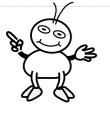
Which number do you land on?

In a board game, you land on the square 41.

It says 'Move back 10 spaces.'

What square will you land on?
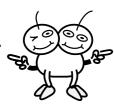
Unit 6
RESOURCE SHEET 11

Six tripods fly to the moon.
Tripods have three legs.
How many moon boots will they need?

Some bipods want to fly to the moon.
They have two legs.
There are 16 moon boots available.
How many bipods can go to the moon?
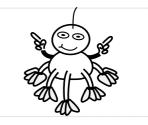
Duotops have 2 heads.
To go outside their spacecraft they need to wear space helmets.
There are 7 duotops.
How many helmets will they need altogether?

Decipods have ten legs.
They wear special space shoes when
they go outside their spacecraft.
There are 50 shoes available.
How may decipods can go outside?

Quinipods have five legs.
How many space socks will nine quinipods need?

Quinipods have five legs.
There are 20 moonboots available.
How many quinipods can fly to the moon?

PART 3

UNIT

7

FRACTIONS

Unit 7
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVE

• Recognise unit fractions such as $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{10}$ and use them to find fractions of shapes and numbers.

VOCABULARY

half

halve

quarter

equal parts

RESOURCES

fraction pictures (resource sheet 14); fraction shapes (resource sheet 15); whiteboards/pieces of paper for children to write on and hold up; number strips for 0–8, 0–12, 0–16, 0–20, 0–24, 0–28, 0–32, 0–40, 0–60, 0–80 (resource sheet 16); 0–100 number line; 1–6 paperclip spinner (resource sheet 1, Unit 1); *Spinning Money* game (resource sheet 12)

HOMEWORK

Play *Spinning Money* using the game sheet (resource sheet 12); the spinner (resource sheet 1, Unit 1) and the 10p coins (resource sheet 13)

STARTER

5 MINUTES

Hold up pictures of objects (resource sheet 14) and ask children to write on their white boards or pieces of paper what each fractional part is worth.

Show pictures of shapes (resource sheet 15), where some shapes are divided into equal parts and some are not. Ask the children to write whether each picture shows equal fractions or not, and if the parts are equal, what fraction. They should explain their reasons.

KEY QUESTION

☐ **If I cut an apple into four pieces, what must be special about each piece if we are to call each piece a quarter?**

MAIN ACTIVITY

20 MINUTES

Hold up a number line strip 0–8 as below. Fold it in half. *What is half of 8?* Fold it in half again. *What number is a quarter along the strip of paper?* You could also point out that 4 is two quarters along, that 6 is three quarters along and that 8 is four quarters along.

```
0     1     2     3     4     5     6     7     8
|     |     |     |     |     |     |     |     |
```

Record on the board: $\frac{1}{2}$ of 8 = 4 and $\frac{1}{4}$ of 8 = 2

⋙→

Repeat, this time folding the number line strip 0–40.

Spread a selection of strips (resource sheet 16) on a table and invite the children to choose strips to fold into halves and quarters, and to record the resulting statements in the same way.

Briefly explain Activity Sheet 7.1, which the children will have to complete before the next session.

Introduce the *Spinning Money* game for homework. (The pupils will also need resource sheet 1, resource sheet 12 and cut-out coins resource sheet 13).
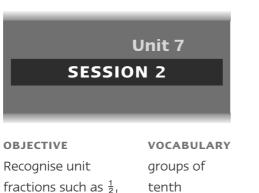
KEY QUESTION

When we halve a number we are dividing it into two equal parts. One half of the number is one of these parts. When we 'quarter' a number what are we doing?

PLENARY

5 MINUTES

Point to 100 on a 0–100 number line. Ask everyone to imagine the line being folded in half. *Where would one half be?* Now ask them to imagine that part of the line being halved again, to find one quarter of 100. *Where would the first fold be?* Record on the board: $\frac{1}{2}$ of 100 = 50 and $\frac{1}{4}$ of 100 = 25. Point out that you have divided 100 into two pieces and then into four pieces.

Unit 7
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVE

- Recognise unit fractions such as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$ and use them to find fractions of shapes and numbers.

VOCABULARY

groups of
tenth
equal parts
divide by
divide into equal groups

RESOURCES

demonstration 1–100 number grid (blank); place value cards (resource sheet 2, Unit 1)

STARTER

5 MINUTES

Write on the board the following table.

10 groups of 1 child are

10 groups of 2 children are

10 groups of 3 children are

…

10 groups of 10 children are

Ask children to answer each question quickly using their place value cards. Invite children with the correct answers to come and write the answers on the board. Try to inject some pace. Leave the table on the board to refer to in the main activity, then ask questions about it.

KEY QUESTIONS

- **If we know that 10 groups of 5 children is 50, how many will be in each group if we split 50 children into 10 groups? What is 50 divided by 10?**
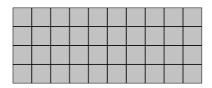- **If we split 30 children into 10 groups, how many will be in each?**

MAIN ACTIVITY

20 MINUTES

Shade in 40 squares of a 1–100 number grid, or fold the unneeded rows underneath. Say that there are forty squares here and that you want to find a tenth of 40. Ask for suggestions of how you could do this. Draw out that there are ten columns, so each column is a tenth of 40.

≫➜

One tenth of 40 is 4. Record this as $\frac{1}{10}$ of 40 = 4. Point out that we could also write this as 40 ÷ 10 = 4, because if you divide 40 into 10 equal groups you get 4 in each group. Point to the table used in the starter and ask if there are any facts there that you could have used (10 groups of 4 = 40).

Repeat for other numbers of rows on the grid, each time referring back to the number facts on the sheet used in the starter and recording the relevant fraction statement and division statement.

Briefly explain Activity Sheet 7.2, which the children will have to complete before the next session.

KEY QUESTION
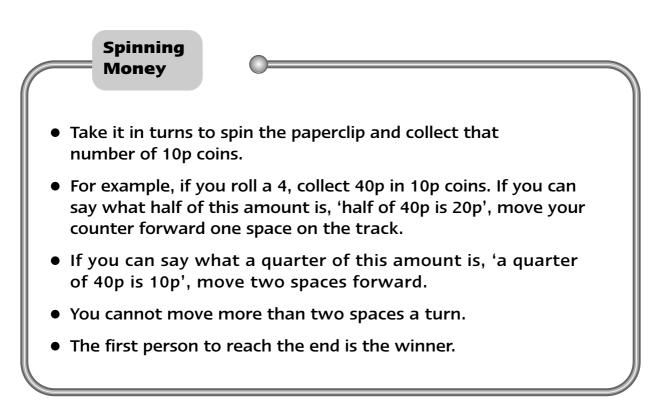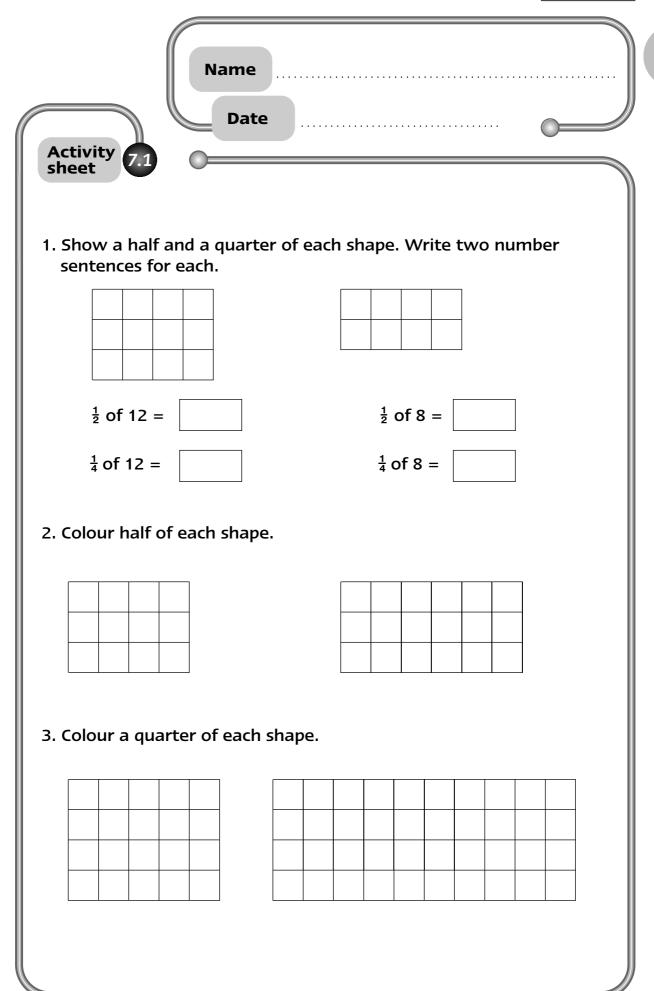
When we find a tenth of a number, what are we dividing it by?

PLENARY

5 MINUTES
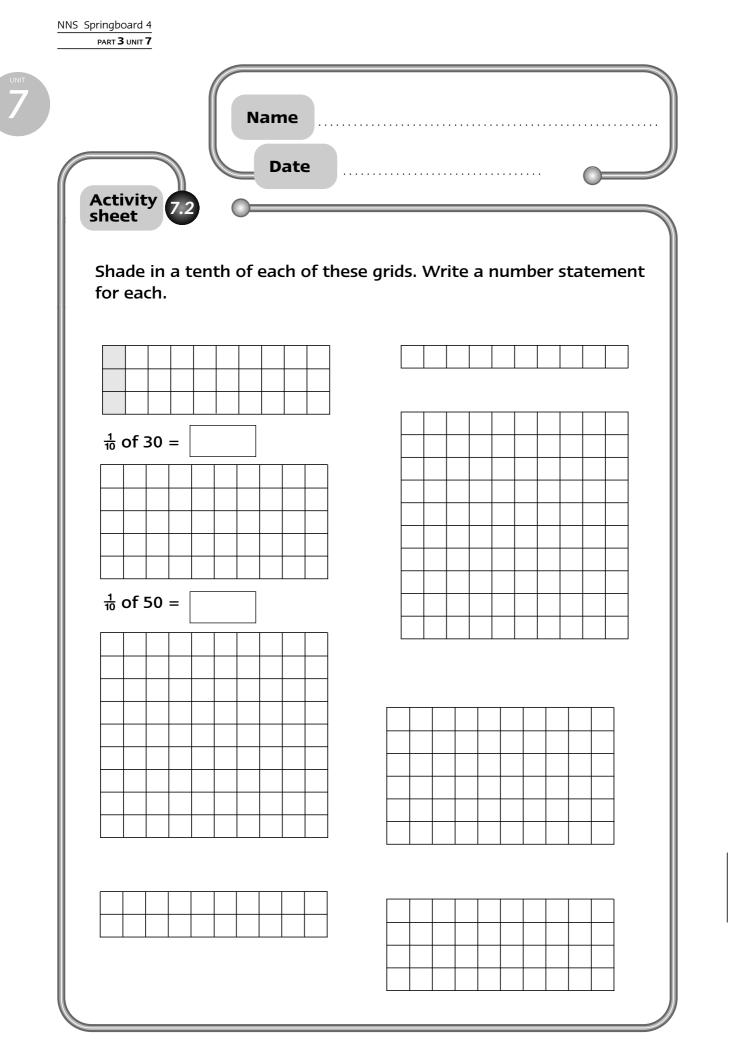
Ask the children questions such as 'What is one tenth of 30? Of 70? Of 60?' For each question, first ask them to hold up the multiple of ten in the question, and then to hold up the answer. *What do you notice?* Point out that when we divide a 'tens' number, such as 30, by 10, we get a 'ones' number.

UNIT
7

Name ....

Date ....

Dear Parents/Carers,

We have been learning how to find halves and quarters of numbers. Please help your child to practise this by playing *Spinning Money*.

Thank you for your help.

Your child's teacher

Spinning Money

- Take it in turns to spin the paperclip and collect that number of 10p coins.

- For example, if you roll a 4, collect 40p in 10p coins. If you can say what half of this amount is, 'half of 40p is 20p', move your counter forward one space on the track.

- If you can say what a quarter of this amount is, 'a quarter of 40p is 10p', move two spaces forward.

- You cannot move more than two spaces a turn.

- The first person to reach the end is the winner.

UNIT
7

Name ....

Date ....

Activity sheet **7.1**

1. Show a half and a quarter of each shape. Write two number sentences for each.

$\frac{1}{2}$ of 12 = ☐ $\frac{1}{2}$ of 8 = ☐

$\frac{1}{4}$ of 12 = ☐ $\frac{1}{4}$ of 8 = ☐

2. Colour half of each shape.

3. Colour a quarter of each shape.

UNIT
7

Activity sheet **7.2**

Name ....

Date ....

Shade in a tenth of each of these grids. Write a number statement for each.

$\frac{1}{10}$ of 30 = ☐

$\frac{1}{10}$ of 50 = ☐

Unit 7
RESOURCE SHEET 12

fraction champion

Spinning Money

start

Unit 7
RESOURCE SHEET 13

10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p
10p	10p	10p	10p	10p	10p

Unit 7

RESOURCE SHEET 14

Unit 7

RESOURCE SHEET 15

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

K.

L.

Unit 7

RESOURCE SHEET 16

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |

| 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |

| 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |

PART 3

UNIT

8

TIME

Unit 8
• SESSION 1 •

TOTAL TIME	OBJECTIVE	VOCABULARY	RESOURCES	HOMEWORK
30 MINUTES	• Read the time to 5 minutes on a 12-hour digital clock, and use the notation 9:40.	am, pm, noon minute hour analogue digital	counting stick; a 12-hour digital clock – one that you can easily change; circular number line (resource sheet 17); individual white boards or pieces of paper to hold up	Find times of favourite TV programmes in a TV Guide

STARTER

5 MINUTES

Use the counting stick to count from 7 am through 12 noon to 5 pm, and back again, using the terms am, noon and pm. Point out that 12 noon is in the middle of your stick as a reference point. Explain that times before this central point are in the morning and times after it are in the afternoon.

Now point randomly to the divisions on the stick. Ask what time it is and how the children know. Invite them to suggest what might happen at that time, for example 1 pm is when afternoon lessons start.

| 7 am | 8 am | 9 am | 10 am | 11 am | 12 noon | 1 pm | 2 pm | 3 pm | 4 pm | 5 pm |

Indicate a point halfway between 8 am and 9 am. *What time will that be?* Repeat, pointing at other half-past times.

KEY QUESTIONS

> ☐ **How do we say times that are in the morning?**
> **...in the afternoon?**

MAIN ACTIVITY

20 MINUTES

Show the children a **digital** clock and remind them that there are 60 minutes in an hour. Make the clock say 10 o'clock. Point out that the number before the two dots, or colon, tells us the hour, and that the number after the dots tells us the minutes past the hour. Say: 'the hour is ten, and there are no minutes after the hour. This means that it is 10 o'clock'. If your clock has a way of denoting whether this is 10 am or 10 pm, point this out.

⋙➤

Tell the children that you are going to make the clock show a time five minutes later. Make the clock show 10:05. Ask the children what time this is. Point out that there is a zero before the five and this means that there are no tens in a similar way to how we would write a zero in the tens place in a three- or four-digit number. Now make the time say 10:10, 10:15 and so on, all the way to 10:55. Ensure that everyone understands that you are moving the clock on by five minutes each time. Ask the children to read the time, saying, for example, 'ten fifteen' or 'ten twenty'. Reinforce that this means 15 or 20 minutes **after** 10 o'clock.

Now ask the children to predict what time it will be five minutes after 10:55. If they are unsure, remind them that there are 60 minutes in an hour.

Show the children the circular number line with minutes marked in fives to 60. Make the digital clock say a time between 10 and 11 o'clock and ask the children whether they think this time is closer to 10 o'clock or 11 o'clock, using the number line to help.

Explain Activity Sheet 8.1, which the children will have to complete before the next session.

KEY QUESTIONS

☐ **Is 10:35 closer to 10 o'clock or 11 o'clock? How do you know?**

PLENARY
5 MINUTES

Ask everyone to write on their white boards a time between 10:00 and 11:00. Then ask them to circle their time if it is nearer to 10:00 than 11:00. Check their answers and discuss why they circled particular times.

Ask them all to write down a time that is nearer to 11 o'clock than 10 o'clock. Ask them to explain why they chose particular times.

Unit 8
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVE

- Read the time to 5 minutes on an analogue clock and a 12-hour digital clock, and use the notation 9:40.

VOCABULARY

am, pm, noon

minute, hour

analogue, digital

past, to

half past

quarter past

quarter to

RESOURCES

counting stick;

an analogue clock (preferably geared);

individual analogue clocks, one for each child

STARTER

5 MINUTES

Use the counting stick to count from 7 am through 12 noon to 5 pm, and back again, using the terms am, noon and pm. Remind everyone that 12 noon is in the middle of your stick as a reference point, and that times before this central point are in the morning and times after it are in the afternoon.

7 am	8 am	9 am	10 am	11 am	12 noon	1 pm	2 pm	3 pm	4 pm	5 pm

Ask the group what time is four hours **later** than 10 am, encouraging them to count on four hours, going through 12 noon. *What time is two hours before 1 pm? How did you work this out?* Encourage counting back through 12 noon. Ask similar questions which require counting back through 12 noon.

KEY QUESTIONS

- ☐ **How can you work out what time is four hours after 10 am?**
- ☐ **How can you work out what time is two hours before 1 pm?**

MAIN ACTIVITY

20 MINUTES

Show the children an **analogue** clock and remind them that there are 60 minutes in an hour. Move the minute hand five minutes at a time. Encourage the group to count in fives until the hand reaches the top again. Point out that you stopped counting in fives because there are 60 minutes in one hour. Remind the children that when the minute hand is at the top of the clock, on the number 12, it is 'something' o'clock.

Put the hour hand on the number 9 and ask the children what time the clock says. Move the minute hand on five minutes and tell them that is now five minutes after 9 o'clock, and that another way of saying this is 'five past nine'. Move the minute hand on another five minutes. *What time is it now?* Move the hand on another five minutes. *What time is it now?*

≫→

Explain that we don't usually say '15 past 9' but **quarter past**, because the minute hand is now a quarter of the way around the clock. Continue moving the hand five minutes at a time and asking what time it is until you reach half past 9. Explain that we don't call this time 30 past 9 but **half past**, as the minute hand is half-way around the clock.

Move the hour hand to the number 10 and the minute hand to the top. Ask the children to say what time it says now. Say that you are going to move the minute hand on five minutes at a time and the group have to chant all together what time it says, for example, five past 10. End with half past 10. Repeat this, writing the time in digital form. Draw out the link between the analogue and digital forms.

Now move the hands to show 3 o'clock. Ask what time is this. Move the minute hand back five minutes. Tell them that this time is five minutes before 3 o'clock, or five to three. Explain that we could also count on in fives from 2 o'clock to say that it is 55 minutes after two, shown as 2:55 on a 12-hour digital clock, but that on an analogue clock we usually count back from the next hour when the time is after half past.

Move the hands to 10 to 3. Ask how many minutes there are to go until 3 o'clock. Say that we call this time 10 to 3, as there are 10 minutes to go before 3 o'clock. Repeat this for quarter to 3 (pointing out why it is said this way), 20 to 3 and 25 to 3. Move the hands to any of these times and ask the children to read the time and to explain how they arrive at their answers.

Explain Activity Sheet 8.2, which the children will have to complete before the next session.

KEY QUESTIONS

> **What time does the clock say now? How do you know?**
> **If you're not sure, what can you do to find out (count in fives)?**

PLENARY

5
MINUTES

Ask the children to show you a time on their individual clocks between 2 o'clock and half past, then a time between half past 2 and 3 o'clock. Ask how they decided, drawing out which side of their clock shows times that are 'past' the hour and which side shows times that are 'to' the hour.

UNIT
8

Name ....

Date ....

Dear Parents/Carers,

In our mathematics lessons, we have been learning to tell the time on a 12-hour digital clock. Please help your child to practise this by helping him or her to look in a TV guide to find the times of five favourite programmes. Ask your child to read you the times and say how many minutes past the hour each of them is.

Thank you for your help.
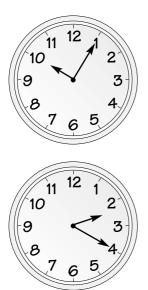
Your child's teacher

Name ....

Date ....

The times on the left are taken from a digital clock. For each
of these times, circle the time they are closest to. Use the dial
below if you get stuck.

| 2:55 | 2 o'clock | 3 o'clock |

| 2:25 | 2 o'clock | 3 o'clock |

| 6:50 | 6 o'clock | 7 o'clock |

| 4:15 | 4 o'clock | 5 o'clock |

| 11:45 | 11 o'clock | 12 o'clock |

| 12:10 | 12 o'clock | 1 o'clock |

Minutes in an hour

UNIT

8

Name ....

Date ....

Activity sheet **8.2**

1. Join each clock to the correct time.

5 past 10

Quarter to 11

5 to 3

20 past 2

2. Which time is closest to 10 o'clock? ....

3. Which time is closest to 11 o'clock? ....

4. Which time is closest to 2 o'clock? ....

5. Which time is closest to 3 o'clock? ....
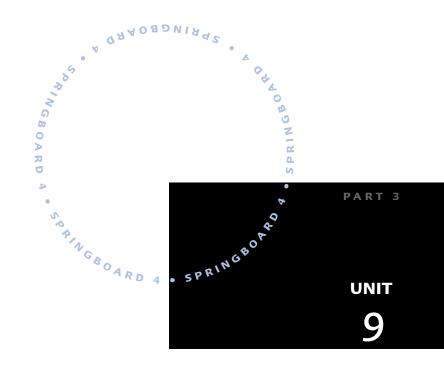
**MENTAL CALCULATION
STRATEGIES**

Unit 9
• SESSION 1 •

	OBJECTIVE	VOCABULARY	RESOURCES	HOMEWORK
TOTAL TIME 30 MINUTES	• Add and subtract a near multiple of 10 to or from a two-digit number by adding or subtracting 10, 20, 30 and adjusting.	add subtract counting on in tens counting on in ones counting back in tens counting back in ones	1–100 number grid; small 1–100 number grids (resource sheet 6, Unit 4); L-shapes for the 1–100 grids (resource sheet 18) photocopied on to acetate sheet; answer sheet for *Cross Nines* crossnumber puzzle (resource sheet 20)	Fill in the crossnumber puzzle *Cross Nines*

STARTER

5 MINUTES

Rehearse adding and subtracting 10, 20 or 30 to or from any two-digit number. Have a 1–100 number grid to help. After a while, ask children to close their eyes and imagine moving on the number grid as they add/subtract a multiple of 10. Ensure that the children are confident in counting forwards and backwards in tens to find the answers, rather than counting on and back in ones.

KEY QUESTIONS

> ☐ **What is 64 add 30? What is 64 subtract 30?**
> ☐ **How did you work it out?**

MAIN ACTIVITY

20 MINUTES

Point to 45 on the 1–100 number grid. Ask the children how they would add on 10. Then say that we only wanted to add 9 really – what should we do (take one off again)? Point to 45 and ask how they would add on 20, then say that we only wanted to add on 19 really – what should we do? Repeat several times then move on to adding on 29 and extend to 39.

You need to demonstrate the 'L' shaped movement, or use a cut-out 'L' from acetate.

Then write on the board: The answer to 45 + 19 is the same as 45 + 20 − 1.

45 + 19 = 45 + 20 − 1

Repeat the recording for the other questions that you asked.

⋙→

Ask the children to cut out quickly the L-shapes photocopied from resource sheet 18. Take one and show how this fits on the number grid 1–100, helping you to find the answer to a question, such as 48 + 19. Point out that the spot on the L shows the top.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Ask a child to explain how this works.

Repeat this with a few other shapes, and explain that this is what they will do when completing Activity Sheet 9.1 before the next session.

KEY QUESTIONS

□ **When adding on 19 by first adding on 20, do we add 1 or subtract 1? Why?**

PLENARY

5 MINUTES
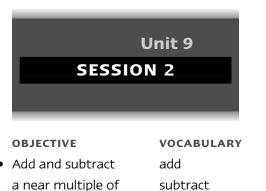
Ask the children to close their eyes and imagine adding 19 on to 45. First they add 20 and then subtract one. Ask them to draw in the air where they would move on the number grid 1–100.

Unit 9
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVE

- Add and subtract a near multiple of 10 to or from a two-digit number by adding or subtracting 10, 20, 30 and adjusting.

VOCABULARY

add

subtract

counting on in tens

counting on in ones

counting back in tens

counting back in ones

RESOURCES

place value cards (resource sheet 2, Unit 1); wipe-on, wipe-off number grid 1–100; sheet of six 1–100 grids (resource sheet 19)

STARTER

5 MINUTES

Rehearse adding and subtracting 10, 20, 30 and 40 from two-digit numbers, keeping the answers to under 100. Ask children to respond using place value cards. Have a 1–100 number grid to refer to.

KEY QUESTIONS

☐ **What is 54 add 40? What is 94 subtract 40? How do you know?**

MAIN ACTIVITY

20 MINUTES

Point to 45 on the 1–100 number grid. *How would you subtract 10?* Suppose they only wanted to subtract 9 really. *What should you do?* Draw an arrow on the number grid to show the calculation you have carried out and record the number sentence, $45 - 9 = 36$. Point to 45 and ask how they would subtract 20. Then say that they only wanted to subtract 19 really. *What should you do?* Again, draw the arrow to represent the calculation and record the number sentence. Repeat for subtracting 29 and extend to 39.

Ask for volunteers to come up to the number grid and draw the arrows for the following calculations. Record the number sentence for each.

$87 - 19$	$67 - 19$	$96 - 29$
$52 - 29$	$74 - 39$	$81 - 39$

Try mixing addition questions and subtraction questions.

$57 + 19$	$57 - 19$	$38 + 29$
$47 + 39$	$68 - 29$	$68 + 29$

Explain that this is what they will do on Activity Sheet 9.2 before the next session.

KEY QUESTION

☐ When subtracting 19 by first subtracting 20, do we add 1 or subtract 1? Why?

PLENARY

5 MINUTES

Ask the children to close their eyes and imagine subtracting 19 from 45. First they subtract 20 and then add on 1. Ask them to draw in the air where they would move on the 1–100 number grid. Repeat for other near multiples of 10.

Name ....

Date ....

Dear Parents/Carers,

We have been learning how to add 9, 19, 29 or 39 to numbers by adding 10, 20, 30 or 40 and then taking 1 away.

Please help your child to practise this by completing the cross number puzzle below. Thank you for your help.

Your child's teacher

Cross Nines

1	2					3	
	4	5			6		
			7			8	
9			10				

Clue: If your answers are right, the digits from the first row will add up to 9, the digits from the second row will add up to 19, the digits from the third row will add up to 29, and the digits from the fourth row will add up to 38.

Across
1. 14 + 9
3. 22 + 9
4. 15 + 9
6. 57 + 19
7. 39 + 19
9. 59 + 39
10. 47 + 39

Down
2. 23 + 9
3. 27 + 9
5. 29 + 19
6. 59 + 19
7. 27 + 29
8. 49 + 39

Name ....

Date ....

Activity sheet 9.1

Use the hundred square to help you complete these number sentences.
Use the 'L' shapes if it helps.

35 + 9 = ...

74 + 9 = ...

42 + 19 = ...

50 + 19 = ...

25 + 19 = ...

77 + 19 = ...

34 + 29 = ...

53 + 29 = ...

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

+ 9   + 19   + 29

Name ....

Date ....

Activity sheet **9.2**

(On the attached sheet) use arrows to draw the calculations on the grids and write the complete number sentence underneath.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$$37 + 19 = 56$$

$45 + 19 =$ ....

$57 + 29 =$ ....

$24 + 39 =$ ....

$75 - 9 =$ ....

$87 - 19 =$ ....

$64 - 29 =$ ....

Unit 9
RESOURCE SHEET 18

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Unit 9
RESOURCE SHEET 19

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Unit 9

RESOURCE SHEET 20

1		8	8
3	6		
	7	8	
		5	6
			9
	4	8	
3	2		8
2			9

PART 3

UNIT
10

MONEY

Unit 10
• SESSION 1 •

TOTAL TIME

30 MINUTES

OBJECTIVES

- Understand and use £. p notation.
- Find totals and work out which coins to use.
- Give change.

VOCABULARY

pounds

pence

amount

change

total

RESOURCES

Coins – £2, £1, 50p, 20p, 10p, 5p, 2p and 1p

HOMEWORK

Find from a catalogue or newspaper five items to buy, each under £10

STARTER

5 MINUTES

How many pence in one pound? Write £2.65 on the board. Point to the 2 in £2.65. *How many pence in £2?* Use place value cards to show £2.65 as 265.

Point to £2.65 and say the amount together. Place two £1 coins on the table. Point to the 6. Count out six 10p coins. Point to the 5. This is 5p. Count out five 1p coins.

KEY QUESTIONS

- ☐ **How many pence in one pound?**
- ☐ **Which digit in an amount shows the tens of pence?**

MAIN ACTIVITY

20 MINUTES

Write £2.65, £4.78, £5.89, £1.02, £9.10, 589p, 102p, 478p, 910p, 265p on the board. The children work in pairs to match the amounts. Take feedback.

Ring one of the amounts on the board, such as £5.89. *Which digit shows the number of pounds?* Choose a child to lay out that number of £1 coins. *Which digit shows the number of tens of pence?* Choose another child to lay out that number of 10p coins. *Which digit shows the number of ones?* Choose another child to lay out that number of 1p coins. Point to the whole amount and read it together, stressing which digit matches which set of coins.

Now focus on the pounds. *Can we use fewer coins here?* Show the children the £2 coin and tell them it is worth 2 pounds. Replace two of the £1 coins with one £2 coin. *Can we do this again?* Get the fewest pound/two pound coins possible.

≫→

Focus on the 10p coins. *Can we use fewer coins here?* Show the children the 20p and the 50p coins and explain their values. Replace as many of the 10p coins with 50p or 20p as possible, ending up with the fewest coins that represent this amount.

Focus on the 1p coins. *Can we use fewer coins here?* Show the children the 5p and the 2p coins and explain their values. Replace as many of the 1p coins with 5p or 2p coins as possible. End up with the fewest coins possible to represent this amount.

Repeat this process for another amount of money.

Explain Activity Sheet 10.1, which the children will have to complete before the next session.
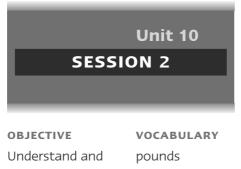
KEY QUESTIONS

☐ **Which coins can we use for the pounds? For the tens of pence? For the ones?**

PLENARY

5 MINUTES

Consider the key questions above. Write £4.78 or a similar amount on the board. Say that you are going to make this amount with the smallest number of coins. Ask a child to give you coins to represent the pounds, another to do the same for the tens of pence and a third for the ones. Ask the other children whether they could use even fewer coins. Discuss.

Unit 10
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVE

- Understand and use £.p notation.
- Find totals and work out which coins to use.
- Give change.

VOCABULARY

pounds
pence
amount
how much
change
total

RESOURCES

Coins – £2, £1, 50p, 20p, 10p, 5p, 2p and 1p;
shopping catalogue;
priced items (resource sheet 21)

STARTER

5 MINUTES

Write £2.75 on the board. Say that you want to make this amount using the smallest number of coins. The children work in pairs laying out the coins in front of them. Check each pair.

Point to the pounds digit; remind everyone that this is the number of pounds. *How many pounds?* Say that they could use two £1 coins, but one £2 coin would give them a smaller number of coins. Point to the second digit and identify it as the tens of pence digit. They could use seven 10p coins but they also have 50p and 20p coins to choose from. Encourage everyone to see that they need one 50p and one 20p. Point to the third digit and remind the children that this is the ones digit. They could use five 1p coins but one 5p coin would be better.

If time allows, repeat this process for £7.68.

KEY QUESTIONS

☐ **Which digit indicates the number of pounds?
The tens of pence? The ones?**

MAIN ACTIVITY

20 MINUTES

Choose an item in the shopping catalogue that has a price ending with 99p, say £2.99. Write this amount on the board and ask the children to read it out. Point to the 99p. *How many pence here? How many pence in one pound?* Show that this amount is 1p less than one pound.

Point to the price again. Say that if you added just 1p, you would have 100 pence or one more pound. *How much would this be?* Lay out three £1 coins. *How much extra have I paid?* Demonstrate that instead of £2.99, you have paid £3. *How much change do I want?* Repeat with another price ending in 99p.

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Repeat the process, choosing an amount that ends in 49p. Round up to the next pound when you pay. Demonstrate that you have paid 50p and 1p too much this time. Ask a child to give you change. Repeat with another amount ending in 49p.

Explain Activity Sheet 10.2, which the children will have to complete.

KEY QUESTIONS

> **How many pence in one pound? How much more is £3 than £2.99? How much more than £2.49 is £3?**

PLENARY

5 MINUTES

Consider the key questions above. *Can you give me two different ways of paying for an item that costs £2.49?* Invite the children to use coins to demonstrate. Ensure that giving three £1 coins and asking for change is included. Discuss all answers.

UNIT
10

Name ....

Date ....

Dear Parents/Carers,

In our mathematics lessons, we have been learning about pounds (£) and pence (p) notation, finding totals and working out which coins to use to pay.

Please help your child to choose five items, each under £10, from a newspaper or shopping catalogue. Your child then needs to write down the coins needed to pay for them. Encourage your child to use as few coins as possible for each item.

Thank you for your help.

Your child's teacher

Number of each type of coin needed

cost of item	£2	£1	50p	20p	10p	5p	2p	1p

UNIT
10

Name . . . .

Date . . . .

Activity sheet 10.1

1. Write the number of 1p, 10p and £1 coins you would need to make each amount.

	£1	10p	1p
£3.62			
£7.20			
£8.91			
£7.14			
£1.19			

2. Make these amounts using the fewest coins possible each time. Write down the number of each coin you will need.

	£2	£1	50p	20p	10p	5p	2p	1p
£2.55								
£6.75								
£5.86								
£8.69								
£4.31								
£3.33								

UNIT

10

Name ....

Date ....

Activity sheet 10.2

1. Write the amount that is 1p more than:

£3.99 £ ....

£7.99 £ ....

£1.99 £ ....

£10.99 £ ....

£9.99 £ ....

2. Write the change given in each shop.

Book £4.99 Paid with £5 .... p change

Football £6.99 Paid with £7 .... p change

Comic £1.99 Paid with £2 .... p change

Poster £3.99 Paid with £4 .... p change

Stickers £1.49 Paid with £2 .... p change

Watch ring £5.49 Paid with £6 .... p change

Camera £4.49 Paid with £5 .... p change

Video £12.49 Paid with £13 .... p change

CD £7.49 Paid with £8 .... p change

Singing mug £3.49 Paid with £4 .... p change

Unit 10
RESOURCE SHEET 21

NNS Springboard 4
PART **3** UNIT **10**
RESOURCE SHEET

UNIT
10

£4.99

£6.99

£1.99

£3.99

£1.49

£5.49

£4.49

£12.49

£7.49

£3.49