The National **Numeracy** *Strategy*

SPRINGBOARD 3

Mathematics catch-up programme for Year 3

ACKNOWLEDGEMENT

This initiative has been based on a catch-up programme for Year 3 originally devised by the Hamilton Trust for use in schools in the Hamilton Oxford Schools Partnership. The National Numeracy Strategy would like to thank the Hamilton Trust for permission to draw freely on the materials written for their programme.

SPRINGBOARD 3

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 3 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 3 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 3 teaching programme in the *Framework for teaching mathematics from Reception to Year 6*. It does not replace this programme, but complements it. The Springboard 3 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 3 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 3 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

PART 1

AIMS

Springboard 3 is intended for those children in Year 3 who have achieved Level 2C in the Key Stage 1 national tests in mathematics and who, with extra help, are likely to 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 3 and beyond;
- to set the expectation that these children catch up with their peers;
- to help teachers prepare a teaching programme enabling children to benefit fully from the main Year 3 teaching programme as soon as possible.

THE SPRINGBOARD 3 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 3 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, often a game to be played with a parent or carer.

Each unit covers carefully selected teaching objectives mainly from the Year 2 teaching programme, which children must meet if they are to tackle with confidence the key objectives of the Year 3 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.

Schools receiving funding for catch-up purposes may decide to use it to support the use of these materials with children in Year 3. Year 3 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 3 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. Each school funded for the Springboard programme and running it in Year 3 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 Rose Hill First School and St John Fisher Catholic First School, Oxford, and from the Hamilton Oxford Schools Partnership.

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 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 is 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 with a group of about the same size in the main part of 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, when this is appropriate and fits in with the on-going work. This is because the sessions are essentially oral.

It is important that teachers reinforce progress children have made in the sessions with the teaching assistant. A good way to do this is for the assistant to make brief entries on the feedback sheet (see page 12) after each unit, ensuring that this 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 OR 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 3 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 3

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 100 **(U1)**			
I can order whole numbers to at least 100 **(U1)**			
I know by heart my addition and subtraction facts to 10 **(U2)**			
I know all pairs of multiples of 10 with a total of 100 **(U2)**			
I can count on and back in tens to 100 **(U3)**			
I can say the number that is 10 more/less than any two-digit number **(U3)**			
I can double numbers up to 15 **(U4)**			
I can find $\frac{1}{2}$ of a small number of objects **(U4)**			
I can add two numbers by starting with the larger number first **(U5)**			
I can find a difference by counting up from a smaller number to a larger number **(U6)**			
I know by heart the multiplication facts of the two- and ten-times table **(U7)**			
I can explain to my teacher how I solved a problem **(U8)**			
I can work out a problem with money **(U9)**			
I can round numbers less than 100 to the nearest 10 **(U10)**			

I CAN PRACTISE MY TARGETS AT HOME

LINKING SPRINGBOARD 3 UNITS TO THE PLANNING GRIDS

Year 3: Autumn

Unit	Days	Topic	Associated Springboard 3 unit
1	3	• Place value, ordering, estimating, rounding • Reading numbers from scales	1
2–3	10	• Understanding + and − • Mental calculation strategies (+ and −) • Money and 'real-life' problems • Making decisions and checking results and in Term 3 • Pencil and paper procedures	2 8
4–6	13	• Measures, including problems • Shape and space • Reasoning about shapes	
7	2	**Assess and review**	
8	5	• Counting and properties of numbers • Reasoning about numbers	3
9–10	10	• Understanding × and ÷ • Mental calculation strategies (× and ÷) • Money and 'real-life' problems • Making decisions and checking results	7 9
11	5	• Fractions	
12	5	• Understanding + and − • Mental calculation strategies (+ and −) and in Term 3 • Pencil and paper procedures	5
13	5	• Handling data	
14	2	**Assess and review**	

Year 3: Spring

1	3	• Place value, ordering, estimating, rounding • Reading numbers from scales	10
2–3	10	• Understanding + and − • Mental calculation strategies (+ and −) • Money and 'real-life' problems • Making decisions and checking results and in Term 3 • Pencil and paper procedures	4 6
4–6	13	• Shape and space • Reasoning about shapes • Measures and time, including problems	
7	2	**Assess and review**	

PART 2

OBJECTIVES

UNIT OBJECTIVES AND LINKS WITH THE FRAMEWORK

UNIT OBJECTIVES UNITS 1–3

	Unit Objectives	Linked to the Y2 teaching programme	Working towards these objectives from the Y3 teaching programme
1	Read and write whole numbers to at least 100	**Read and write whole numbers to at least 100** in figures and words	**Read and write whole numbers to at least 1000** in figures and words
	Know what each digit in a two-digit number represents, including 0 as a placeholder	**Know what each digit in a two-digit number represents, including 0 as a placeholder,** and partition two-digit numbers into a multiple of tens and ones (TU)	**Know what each digit in a two-digit number represents,** and partition three-digit numbers into a multiple of tens and ones (HTU)
	Order whole numbers to at least 100	**Order whole numbers to at least 100,** and position them on a number line and 100 square	**Order whole numbers to at least 1000,** and position them on a number line
2	Know by heart all addition and subtraction facts for 10 and 20	**Know by heart: all addition and subtraction facts for each number to at least 10;** all pairs of numbers with a total of 20	**Know by heart: all addition and subtraction facts for each number to 20**
	Understand that subtraction is the inverse of addition	**Understand that subtraction is the inverse of addition**	Extend understanding that subtraction is the inverse of addition
	Know that addition can be done in any order	Recognise that addition can be done in any order, but not subtraction	Continue to recognise that addition can be done in any order
	Know all pairs of multiples of 10 with a total of 100	Know by heart: all pairs of multiples of 10 with a total of 100	Know by heart: all pairs of multiples of 100 with a total of 1000
3	Count on and back in ones and tens	Describe and extend simple number sequences: **count on or back in ones or tens, starting from any two-digit number**	Describe and extend simple number sequences: **count on or back in tens or hundreds, starting from any two- or three-digit number**
	Say the number that is 1 or 10 more/less than any given two-digit number	Say the number that is 1 or 10 more or less than any given two-digit number	Say the number that is 1, 10 or 100 more or less than any given two- or three-digit number
	Say the number 20, 30 more/less than any given number		

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 4–6

	Unit Objectives	Linked to the Y2 teaching programme	Working towards these objectives from the Y3 teaching programme
4	Know by heart doubles of numbers to 10; doubles of multiples of ten up to 50	Know by heart: doubles of all numbers to 10 and the corresponding halves **Know and use halving as the inverse of doubling**	Derive quickly: doubles of all whole numbers to at least 20, doubles of multiples of 5 to 100, doubles of multiples of 50 to 500 and all the corresponding halves
	Identify near doubles using doubles already known	Identify near doubles, using doubles already known (for example, 8 + 9, 40 + 41)	Identify near doubles, using doubles already known (for example, 80 + 81)
	Halve even numbers from 20 to 2		
	Measure and compare lengths using a standard measure	**Estimate, measure and compare lengths using standard units**	Measure and compare using standard units, including using a ruler to draw and measure lines to the nearest half centimetre
5	**Use knowledge that addition can be done in any order** Know to start with the larger number when adding Know whether to count on in ones or tens	**Use knowledge that addition can be done in any order to do mental calculations more efficiently.** For example: put the larger number first and count on in tens and ones; add three small numbers by putting the largest number first and/or finding a pair totalling 10	Use knowledge that addition can be done in any order to do mental calculations more efficiently. For example: put the larger number first and count on; add three or four small numbers by putting the largest number first and/or finding pairs totalling 9, 10 or 11
	Use known number facts and place value to add/subtract mentally	Use known number facts and place value to add/subtract mentally	Use known number facts and place value to add/subtract mentally
6	Find a small difference by counting on from the smaller to the larger number	Find a small difference by counting on from the smaller to the larger number (for example, 42 − 39)	Find a small difference by counting on from the smaller to the larger number (for example, 102 − 97)
	Measure and compare lengths using standard units	**Estimate, measure and compare lengths using standard units**	Measure and compare using standard units, including using a ruler to draw and measure lines to the nearest half centimetre

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 7–10

	Unit Objectives	Linked to the Y2 teaching programme	Working towards these objectives from the Y3 teaching programme
7	Understand the operation of multiplication as describing an array	**Understand the operation of multiplication as describing an array**	
	Know by heart the facts of the two-, five- and ten-times tables	**Know by heart: multiplication facts for the two- and ten-times tables.** Begin to know: multiplication facts for the five-times table	**Know by heart: multiplication facts for the two-, five- and ten-times tables.** Begin to know the three- and four-times tables
8	**Choose and use appropriate operations and calculation strategies to solve problems**	**Choose and use appropriate operations and efficient calculation strategies,** (for example, mental, mental with jottings) **to solve 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
	Explain how a problem was solved orally and, where appropriate, in writing	**Explain how a problem was solved orally** and, where appropriate, in writing	**Explain methods and reasoning** orally and, where appropriate, in writing
9	Solve simple word problems involving money	Use mental addition and subtraction, simple multiplication and division, to solve simple word problems involving money	Solve word problems involving money, using one or more steps, including finding totals and giving change, and working out which coins to pay
	Give change and work out which coins to pay	Recognise all coins and begin to use £.p notation for money. Find totals, give change, and work out which coins to pay	Recognise all coins and notes. **Understand and use £.p notation**
10	**Read a simple scale to the nearest labelled division**	**Read a simple scale to the nearest labelled division**	Read scales to the nearest division (labelled or unlabelled)
	Round numbers less than 100 to the nearest 10	Round numbers less than 100 to the nearest 10	Round any two-digit number to the nearest 10 and any three-digit number to the nearest 100

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

PLACE VALUE AND ORDERING OF NUMBERS TO 100

UNIT 1

Unit 1
• SESSION 1 •

TOTAL TIME

20 MINUTES

OBJECTIVES

- Read and write whole numbers to at least 100
- Know what each digit in a two-digit number represents, including 0 as a place holder
- Order whole numbers to at least 100

VOCABULARY

order, bigger, biggest, larger, largest amount, smaller, smallest amount, tens, ones, zero, place holder

RESOURCES

set of 0–9 digit cards per pupil; 0–99 number grid; sticky labels; 1p and 10p coins; number cards 0–99; 0–9 dice, or 0–9 spinner (resource sheet 1)

HOMEWORK

Play the *Tens and Ones* game using 0–9 spinner, (resource sheet 1)

STARTER

5 MINUTES

Ask different children to come to the front and place sticky labels on a large 0–99 number grid, covering the numbers you call out. Choose five or six numbers in no particular order. Try to inject pace. Ask all the children to show you the numbers covered on the grid, one at a time, by holding up their digit cards.

Which is the largest number covered? Which is the smallest? Order several other numbers in terms of size. Stress the need to look at the tens digit first when comparing numbers.

KEY QUESTIONS

- **How do you know which is the largest number? And the smallest number?**

MAIN ACTIVITY

20 MINUTES

Remove the 0–99 grid. Shuffle a pack of 0–99 number cards and give each child three cards. The children have to put their cards in order, starting with the smallest number, and hold them up for you to see. Then group the children into pairs and ask them to put their six cards in order smallest first. Check that each pair's sequence is correct. Now ask them to represent at least three of their numbers with 10p and 1p coins.

How do we know which is the biggest or smallest amount?
Have you made any amounts for which you have not used any 1p coins?
Why is this?
Stress that zero is a place holder.

Introduce the *Tens and Ones* game. Each pair needs two sets of 0–9 digit cards. Shuffle both packs and place each pile face down. Each player takes it in turn to make a two-digit number from the cards; one pile represents the tens and the other ones. Players write down the numbers. The winner is the player who, after three turns, has written the largest number. Tell the children that they will play a version of this game for homework.
Briefly explain activity sheet 1.1, which the children will have to complete before the next session.

KEY QUESTIONS

- **When you sort a set of numbers how do you know that the numbers are in the right order?**
- **How do you know which is the largest and which is the smallest number?**

PLENARY

5 MINUTES

How do you order numbers? How do you know that 42 is bigger than 24? That 27 is smaller than 29? What number is 1 more than 29? 1 less than 60?

Write the following numbers on the board: 31, 13, 3, 103, 30. Ask the children to put them in order.

UNIT 1

Unit 1
SESSION 2

TOTAL TIME
20 MINUTES

OBJECTIVES
- Read and write whole numbers to at least 100
- Know what each digit in a two-digit number represents, including 0 as a place holder
- Order whole numbers to at least 100

VOCABULARY
order, larger, largest, smaller, smallest, tens, ones, multiple of ten

RESOURCES
0–99 number grid; sticky labels; 0–9 digit cards; 1p and 10p coins; number cards 0–99; OHT or photocopies of a till receipt (resource sheet 2)

STARTER
7 MINUTES

Repeat the activity from session 1, but with different numbers. Ask different children to come to the front and place sticky labels on a large 0–99 number grid, covering the numbers you call out. Choose five or six numbers in no particular order. Try to inject pace. Ask all the children to show you the numbers covered on the grid, one at a time, by holding up their digit cards. Which is the biggest number covered? Which is the smallest? Get the children to represent these numbers with 10p and 1p coins.

They should now do the same for a multiple of ten (such as 80). Have you used any 1p coins? Why not? Remind children that when we multiply a whole number by ten the answer is known as a multiple of ten. What is another multiple of ten?

KEY QUESTIONS

- **How do you know which is the largest/smallest number?**
- **What do we write to show that there is nothing in the ones place in a number which is a multiple of ten?**

MAIN ACTIVITY
18 MINUTES

Show children the OHT of the till receipt with £.p notation (or distribute photocopies, one between two). Ask them to read out all the prices below a pound. Write these on the board.

In pairs, ask the children to order these prices, starting with the lowest, and write them down. Check that pairs are doing this correctly.

What is the smallest amount on the till receipt? What is the largest? How do we know?

If there is time, pairs of children should make up these amounts with the 10p and 1p coins.

Explain activity sheet 1.2, which children should complete before the next session.

KEY QUESTIONS

- **Is there an item that costs between 50p and 75p? Is there a price smaller than 32p? Greater than 78p?**

PLENARY

5 MINUTES

Consider the key questions.

Explain how you find the largest number and the smallest number. Count together back from 100. Ask the children to clap each time they reach a multiple of ten, starting with 100.

Name .....

Date .....

Dear Parents/Carers,

In our mathematics lessons, we have been working with numbers to 100. Here is a game you can play with your child to help them.

Thank you for your help.

Your child's teacher

Tens and Ones

- Decide who is player 1 and who is player 2. Player 1 spins the paperclip on the spinner twice to make a two-digit number.
- Write the first number in the tens space and the second number in the ones space on your side of the grid.
- Player 2 then does the same.
- Read out your numbers. Decide who has the larger number. That player scores a point.
- Repeat this until all the rows are filled.
- Play again until one of you gets an agreed number of points.
- If there is time, you can play a variation in which the player with the number closest to zero gets the point.

	Player 1		Player 2	
	Tens	Ones	Tens	Ones
1st				
2nd				
3rd				
4th				
5th				

UNIT 1

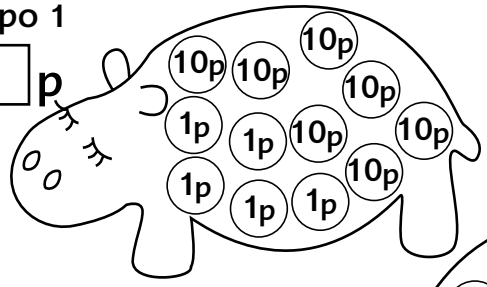
Name .....

Date .....

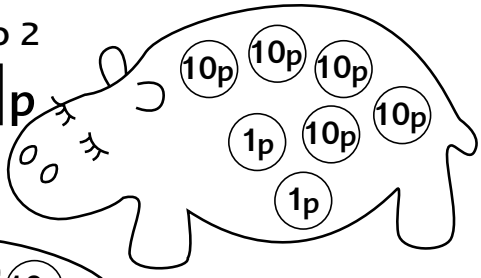
Activity sheet 1.1

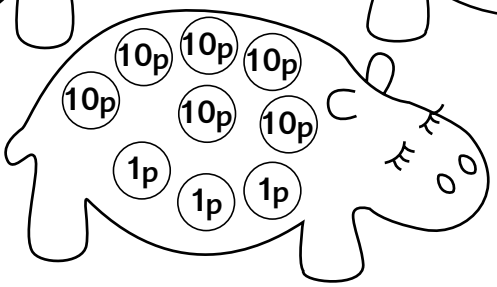
1. How much is in each hippo money box?

Hippo 1 ☐ p



Hippo 2 ☐ p





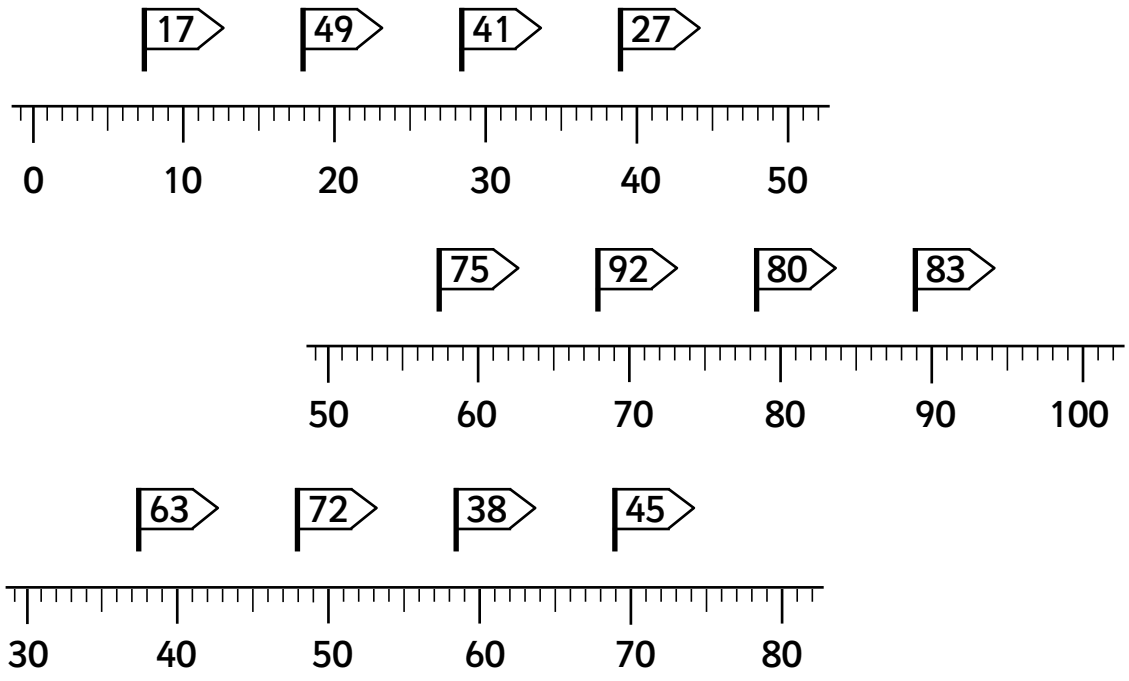
Hippo 3 ☐ p

Which Hippo has the least money? .....

Which Hippo has the most money? .....

Which Hippo has five 10p coins? .....

2. Draw a line from each flag to its place on the number line



UNIT 1

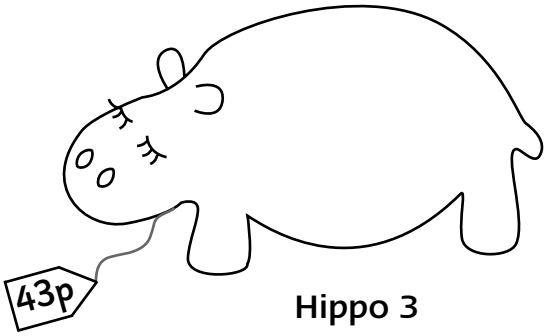
Name .....

Date .....

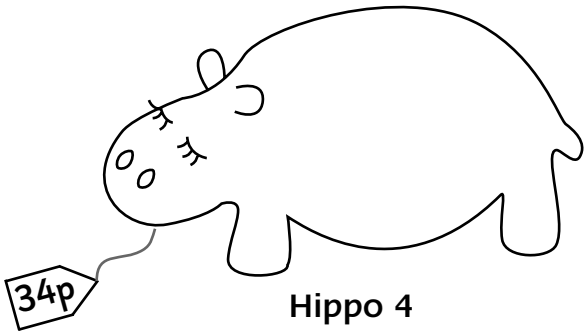
Activity sheet 1.2

1. Draw 10p and 1p coins in these hippo money boxes to make the totals on the labels.

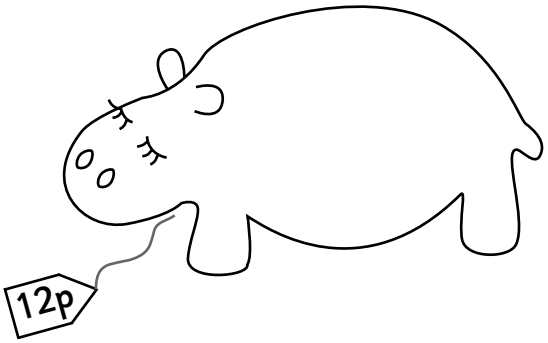
Hippo 1



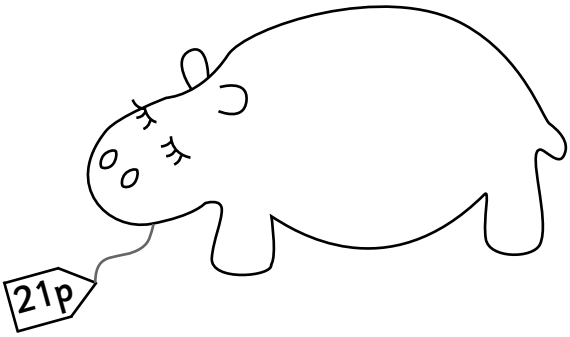
Hippo 2



Hippo 3



Hippo 4



2. Which hippo has the most money? .....

   Which hippo has the least money? .....

   Which hippo has four 1p coins? .....

   Which hippo has the most 10p coins? .....

   Which hippo has the most 1p coins? .....

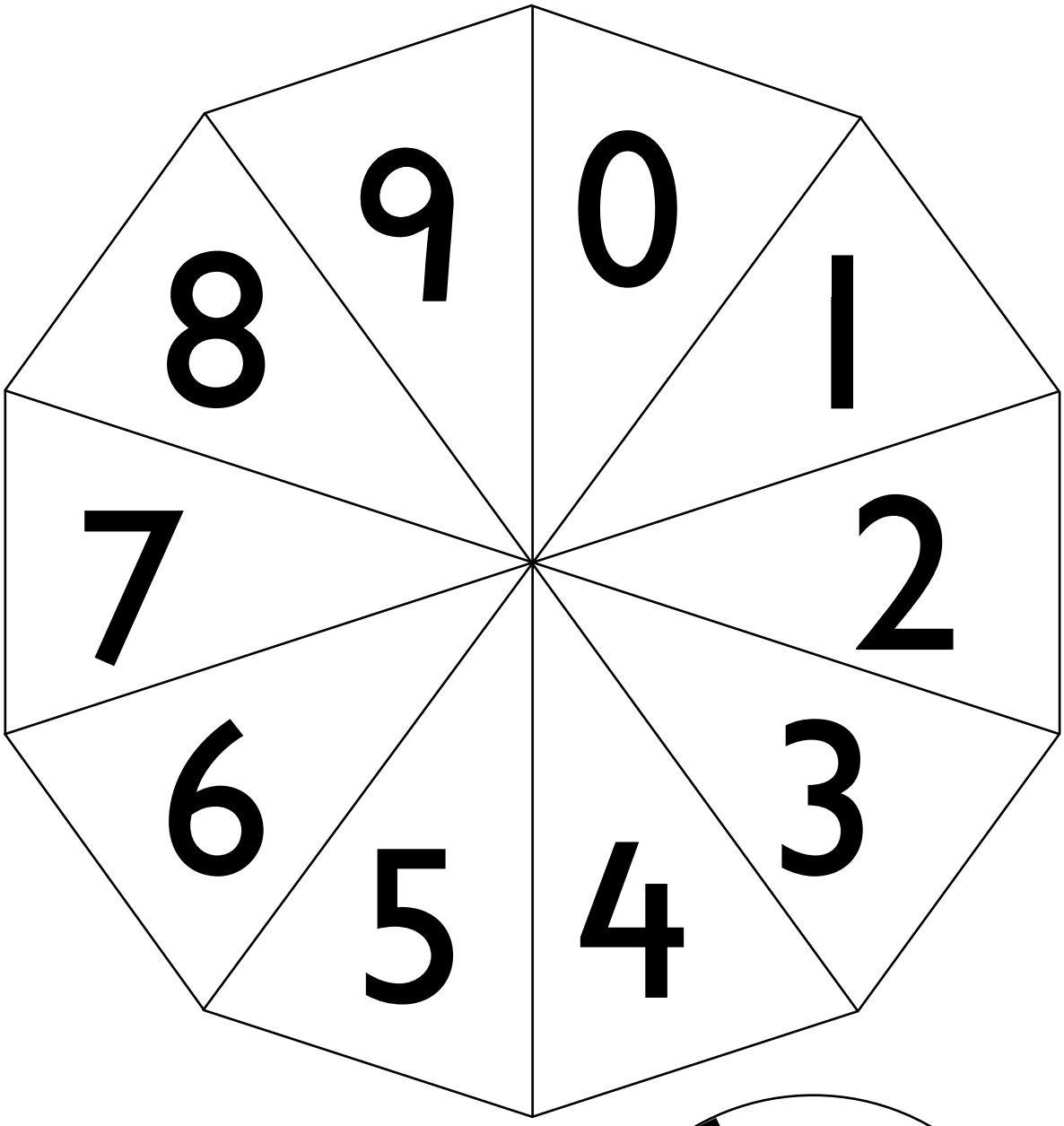
3. Write these numbers in order, from the smallest to the largest.

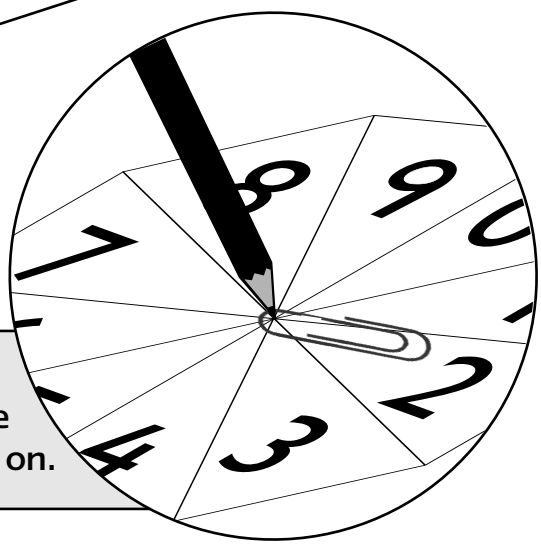
71 27 37 42 7 8 13 61

_____ _____ _____ _____ _____ _____ _____ _____

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

Sandy s Stores

	£
Crisps	0.45
Peach	0.36
Orange Juice	0.58
Tissues 150	0.99
Chocolate Bar	0.32
Lettuce	0.27
Coffee	1.10
Cucumber Half	0.31
Butter	O.95
Mushrooms 150g	0.43
Soy Sauce	1.36
Mini Cheeses	0.48
Lamps 60W	0.77
Batteries	1.66

PART 3

UNIT 2

ADDITION AND SUBTRACTION FACTS

UNIT 2

Unit 2
• SESSION 1 •

TOTAL TIME 30 MINUTES

OBJECTIVES
- Know by heart all addition and subtraction facts for 10
- Understand that subtraction is the inverse of addition
- Know all pairs of multiples of 10 with a total of 100

VOCABULARY
multiples of ten, add, subtract, take away, total, inverse

RESOURCES
ten cubes or stones in a container; individual white boards or pieces of paper to hold up; 10p coins; sets of 0–10 number cards (resource sheet 3)

HOMEWORK
Play the *Make Ten* card game, using number cards (resource sheet 3)

STARTER 5 MINUTES

Children use their fingers to demonstrate numbers that make 10. Ask the children to put up 3 fingers. How many more are needed to make 10? All chant: '3 and 7 make 10'. Ask children to suggest and demonstrate with their fingers other numbers making 10. Do not forget 10 and 0. Write on the board a few number sentences such as 4 + □ = 10 or 10 = □ + 3 for the children to complete orally.

Now do the same with three 10p coins.

How much is here? How much more do we need to make 100p or £1?
All chant: '30 pence and 70 pence make £1'.

Invite children to give you other combinations of 10p coins to make £1.

KEY QUESTIONS

2 and 8 make 10. What do 20 and 80 make? What is the pattern? Explain it. Give other examples.

MAIN ACTIVITY 20 MINUTES

Use pairs of number cards that make 10. Shuffle them and hand out a card to each child. Ask them to find the person whose card with theirs makes 10. If there is an odd number of children, the adult also takes a card. Ask each pair to think of a number sentence using their numbers. Write each on the board. Repeat with a different set of cards.

Place ten cubes or stones in a container, counting them out loud as you do so. Drop a number of the cubes or stones on the floor, one by one as the children count in their heads. Explain that there are now some cubes or stones left in the container and some on the floor. Ask the children to think of an appropriate number sentence to illustrate your action, for example, 8 + 2 = 10 (8 left in the container plus another 2 on the floor make 10 altogether), and to write it on their individual white boards or pieces of paper and hold them up for you to see. Repeat several times.

Draw attention to different number sentences the children have written. For example, some may have recorded: 10 − 8 = 2. Discuss whether they are all valid.

Hold ten 10p coins in your hand. *How much money have I got in my hand?* Remind children that 100p = £1. Ask them to count in their heads how many coins you drop into a box, then record an appropriate number sentence, for example, 30p + 70p = 100p, to describe your actions on their boards and hold them up. Repeat with other numbers.

Show the children how to play the *Make Ten* game. Lay a pack of number cards (combinations to make ten) face down and ask them to take it in turns to pick two up together. If they make ten, they keep them; if they do not, they replace them. The winner is the child who has the most sets at the end.

Explain activity sheet 2.1, which they should complete before the next session.

KEY QUESTIONS

- **How do you know that your sum makes 10?**
- **How many different number sentences can we write using the same three numbers such as 4, 6, 10?**

PLENARY

5 MINUTES

Ask a child to give you a number sentence with an answer of 10. Write it on the board.

Can anyone make another number sentence using the same numbers? And another?

Point out that there are four possible number sentences. Establish the fact that subtraction is the opposite or inverse of addition. Invite children to give examples of number sentences where the second sentence 'undoes' or 'reverses' the first sentence.

UNIT 2

Unit 2
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Know by heart all addition and subtraction facts for 10 and for 20
- Know that addition can be done in any order
- Know all pairs of multiples of 10 with a total of 100

VOCABULARY

multiples, addition, subtraction

RESOURCES

digit cards or fans; number cards 0–20 (resource sheets 3 and 4); 10p coins; individual white boards or pieces of paper to hold up

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STARTER

5 MINUTES

You hold up a digit card. Ask the children to show you, using their own sets of digit cards or digit fans, the number needed to make 10. Repeat several times. Try to inject pace. Now use 10p coins. Hold up, for example, 40p. *How much do we need to make 100p or £1?* Make the connection between 40 and 60 and 4 and 6. Repeat several times.

KEY QUESTION

What is the connection between 3 + 7 and 30 + 70?

MAIN ACTIVITY

20 MINUTES

Make up pairs of cards that total 20. Give each child or pair of children (depending on the number of children) a pair of these cards. Keep the remaining pairs yourself. The children make one addition sentence using the numbers they have been given, for example 15 + 5 = 20. Write these on the board and discuss patterns. Ask them which cards you must still be holding. *How do you know?* Reveal the cards individually and ask the children to work out the matching number to make 20. Record in order.

Now ask the children to write down three more number sentences using the pair of numbers they were originally given. Write on the board the four number sentences generated from one pair of numbers. *Which sentence reverses another?* Remind children that subtraction reverses addition and addition reverses subtraction.

Look at an addition sentence, for example 18 + 2 = 20.

Does it matter which way round we add the numbers to make 20? *Does* 2 + 18 *work?*

Ask the children, in pairs, to consider another addition sentence.

Has it worked with your example? Can we do the same with subtraction?
20 − 2 = □ is not the same as 2 − 20 = □

Explain activity sheet 2.2, which children should complete before the next session.

KEY QUESTIONS

- **Does the order we add numbers matter? Does the order matter for subtraction?**

PLENARY

5 MINUTES

Give an addition sentence where the answer is 20, such as 13 + 7 = 20. The children write down on their white boards or pieces of paper the other addition sentence containing these three numbers (such as 7 + 13 = 20) and hold them up. Now give an addition sentence with three numbers, say 10 + 7 + 3 = 20.

How many other ways could you write this? What are they?

Discuss the key questions given above, ensuring that all the children understand that the order of numbers does not matter for addition but it does for subtraction.

UNIT 2

Name .....

Date .....

Dear Parents/Carers,

We are learning by heart pairs of numbers that make 10. Please help your child by playing the game below.

Thank you for your help.

Your child's teacher

Make Ten

- Cut out the numbers on the sheet. Shuffle them.
- Lay them out face down in rows. Take it in turns to pick up two cards. If they add up to 10, you keep them. If not, you replace them where you found them.
- Keep playing until all the pairs of 10 have been found. The winner has the most pairs.
- Try playing this variation if you have time. Remove one of the 5s and the 10 from the pack, then find pairs of cards to make 9.

UNIT 2

Name .....

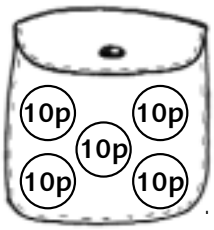
Date .....

Activity sheet 2.1

1. Draw lines to join pairs of numbers that make 10.

7	10	5	4	8	9
5	3	0	1	6	2

2. How many more 10p coins do you need in each purse to make £1?



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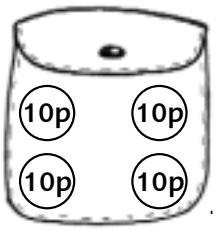

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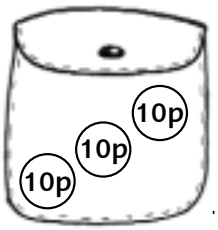

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3. Write a number sentence to make each number up to 10.

6 + 4 = 10

1 + ☐ = ☐

5 + ☐ = ☐

7 + ☐ = ☐

8 + ☐ = ☐

2 + ☐ = ☐

4. Finish these number sentences.

10 − 6 = ☐ 10 − ☐ = 7 10 − 5 = ☐ 10 − ☐ = 6

5. Use the numbers 2 and 8.
Write three more different number sentences.

2 + 8 = 10

UNIT 2

Name .....

Date .....

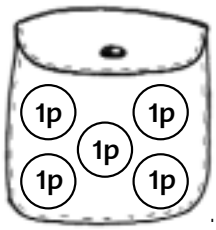
Activity sheet 2.2

1. Fill in the gaps in these number sentences.

1 + ☐ = 10 20 = 15 + ☐ 10 = 0 + ☐

7 + ☐ = 10 ☐ + 18 = 20 12 + ☐ = 20

2. How many more 1p coins do we need in each purse to make 10p?



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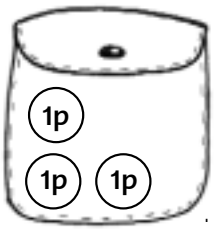

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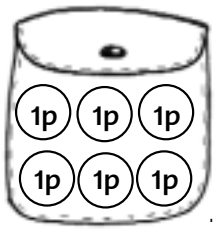

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3. Fill in the gaps in these number sentences.

☐ + 80 = 100 ☐ = 70 + 30 100 = ☐ + 40

100 = ☐ + 20 ☐ + 50 = 100 ☐ + 90 = 100

4. Think of two more different ways of making 100.

☐ + ☐ = 100 ☐ + ☐ = 100

5. Make as many number sentences as you can to total 20.
Write them on the back of this sheet.

Unit 2

RESOURCE SHEET 3

0	1	2
3	4	5
6	7	8
9	10	5

Unit 2

RESOURCE SHEET 4

10	11	12
13	14	15
16	17	18
19	20	

COUNTING AND ORDERING

UNIT 3

Unit 3
• SESSION 1 •

TOTAL TIME 30 MINUTES

OBJECTIVES
- Count on and back in ones and tens
- Say the number that is 1 or 10 more/less than any given two-digit number

VOCABULARY
tens, ones, digits, two-digit number, count on, count back, add, subtract

RESOURCES
large 0–99 grid; small 0–99 grids (resource sheet 5); dice marked with 10 and 1 only or 1, 10, 1, 10, 1, 10 paperclip spinner (resource sheet 7)

HOMEWORK
Play *Towards the 90s*, using a number grid (resource sheet 5)

STARTER 5 MINUTES

Children count on and back together in tens from zero. Refer back those who are not sure of the order to the 0–99 grid. They now count on and back in tens from other numbers, for example, 2, 12, 22, 32; 92, 82, 72. Try doing these without the aid of the number grid, for example 79, 89, 99, 109. Write a few questions such as 68 + 10 = ☐ and ☐ + 10 = 47 on the board, for the children to complete orally.

Remind the children that when they count on in tens, they are adding on ten each time. Demonstrate on the number grid, adding on ten first by counting in ones, and then by moving down one space. Discuss with the children which is the more efficient method.

KEY QUESTIONS

What is happening to the tens digit? To the ones digit?
Is it quicker to add ten by counting on in ones or in tens?

MAIN ACTIVITY 15 MINUTES

Invite one of the children to come to the front to model how to play *Towards the 90s* with you, using a class 0–99 grid. You both write your initial at zero, using different coloured chalks. Take turns to toss a dice featuring the numbers 10 and 1 only. Add this number to the number you are on, find the square with that number and draw your path to it. A path might go, for instance 0, 1, 11, 21, 22, 32. The first person to reach 90 or more is the winner. Set the children in pairs to play the game on their own grids.

Use the key questions below.

Explain activity sheet 3.1, which children should complete before the next session. They should only use a number grid to help them if they are stuck.

KEY QUESTIONS

- **What happens when you add 10? And add 1?**
- **What happens when you subtract 10? And 1? Can you predict where your answer will be on the grid? What would happen if you added 11?**

PLENARY

10 MINUTES

What have you learned today about adding and subtracting? How would you add or subtract other numbers quickly, such as 11, 20, 21, or 31?

Give the children a pathway which they are to trace on their grids. For example: start at 12, add 10, add 1, add another 1, add 10, add another 10, and ask which number they finish on.

UNIT 3

Unit 3
SESSION 2

TOTAL TIME

30 MINUTES

OBJECTIVES

- Count on and back in ones and tens
- Say the number that is 1 or 10 more/less than any given two-digit number
- Say the number 20, 30 more/less than any given number

VOCABULARY

tens, digit, ones, multiples, two-digit number, count on, count back, add, subtract, more, less

RESOURCES

large 0–99 grid; small 99–0 grids (resource sheet 6); large, blank 10 × 10 grid; dice marked 1, 10, 1, 10, 20, 30 or paperclip spinner (resource sheet 8)

STARTER

7 MINUTES

Practise counting on and back in tens from any number. If necessary, allow the children to use a large 0–99 grid to help them, but encourage them to have a go without one. Remind them that, when they are adding or taking away 10, only the tens digit changes. Put the grid away and ask them to imagine that they are looking at 47.

What number is 10 more? 10 less? What number is 20 more? 20 less? What number is 30 more? 30 less?

Ask individual children to write number sentences on the board for some of these.

KEY QUESTIONS

- **How much is 20 less than 57? Can you write the number sentence that shows this? What does it say?**

MAIN ACTIVITY

18 MINUTES

Give each pair of children nine 10p coins, nine 1p coins, a dice marked 1, 10, 1, 10, 20, 30 and a 99–0 grid (resource sheet 6). Each child takes turns to throw the dice and remove the equivalent coin(s). The winner is the first to run out of coins. The children should track the operation on their 99–0 grid each time. Model the game with a child at the front before the pairs begin.

Stick the large, blank grid on the board. Ask the children to imagine it shows the numbers 0–99. They are to write in specific numbers, for example, 52.

Who can write on the grid the number which is 10 less? 1 more? 1 less? 20 more? 20 less?

Explain activity sheet 3.2, which they should complete before the next session. They should only use a number grid to help them if they are stuck.

KEY QUESTIONS

- **What helps you to find a given number on the blank grid?**
- **Which was the hardest/easiest number to find?**
- **How do you find a number which is 20 more? 20 less?**

PLENARY

5 MINUTES

What have we learned today about adding and subtracting? What was easy to do? Why? What was difficult to do? Why?

How do you find the number that is 11 more? What about 21 more?
Discuss strategies for working this out.

How do you find the number that is 11 less? What about 21 less?

Name .....

Date .....

Dear Parents/Carers,

We have been practising counting on and back in ones and tens. Please help your child by playing the game below.

Thank you for your help.

Your child's teacher

Towards the 90s

- You will need a coin, two different coloured crayons and the 0–99 number grid. Both players start at 0 (zero) on the number grid.
- Take it in turns to toss the coin. If it lands tails, move ten places and colour the square. If it lands heads, move one place and colour the square. The first one to reach the end of the grid is the winner; you do not have to reach 99 exactly.
- If you find this easy, why not play again, this time beginning at 99 and counting backwards?

UNIT 3

Name .....

Date .....

Activity sheet 3.1

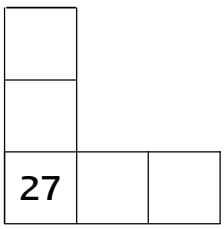
1. Make number patterns by adding or subtracting as in the example.

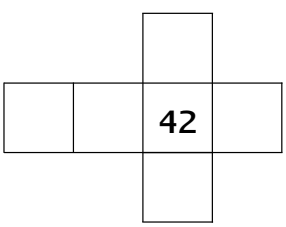
+10	2	12	22	32	42
+10	0	10			
+10	17				
−10	90				
−10	95				
+10	54				

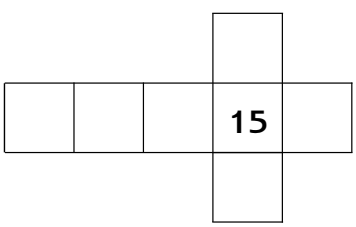
2. Write the number that is 10 less and 10 more than each number in the middle row.

10 less	16							
	26	42	51	88	37	63	19	74
10 more	36							

3. These are parts of the 0–99 number grid.
Write in the missing numbers.







UNIT 3

Name .....

Date .....

Activity sheet *3.2*

1. Make number patterns by adding or subtracting.

11	+ 2		+ 10		+ 2		+ 10		+ 2	
6	− 1		+ 10		− 1		+ 10		− 1	
92	+ 1		+ 10		+ 1		+ 10		+ 1	

2. Keep adding 20.

14	34					
37						

3. Keep subtracting 20.

125						
152						

4. Write the number that is 1 less and 1 more than each number in the middle row.

1 less	105							
	106	79	110	251	360	199	220	400
1 more	107							

Unit 3

RESOURCE SHEET 5

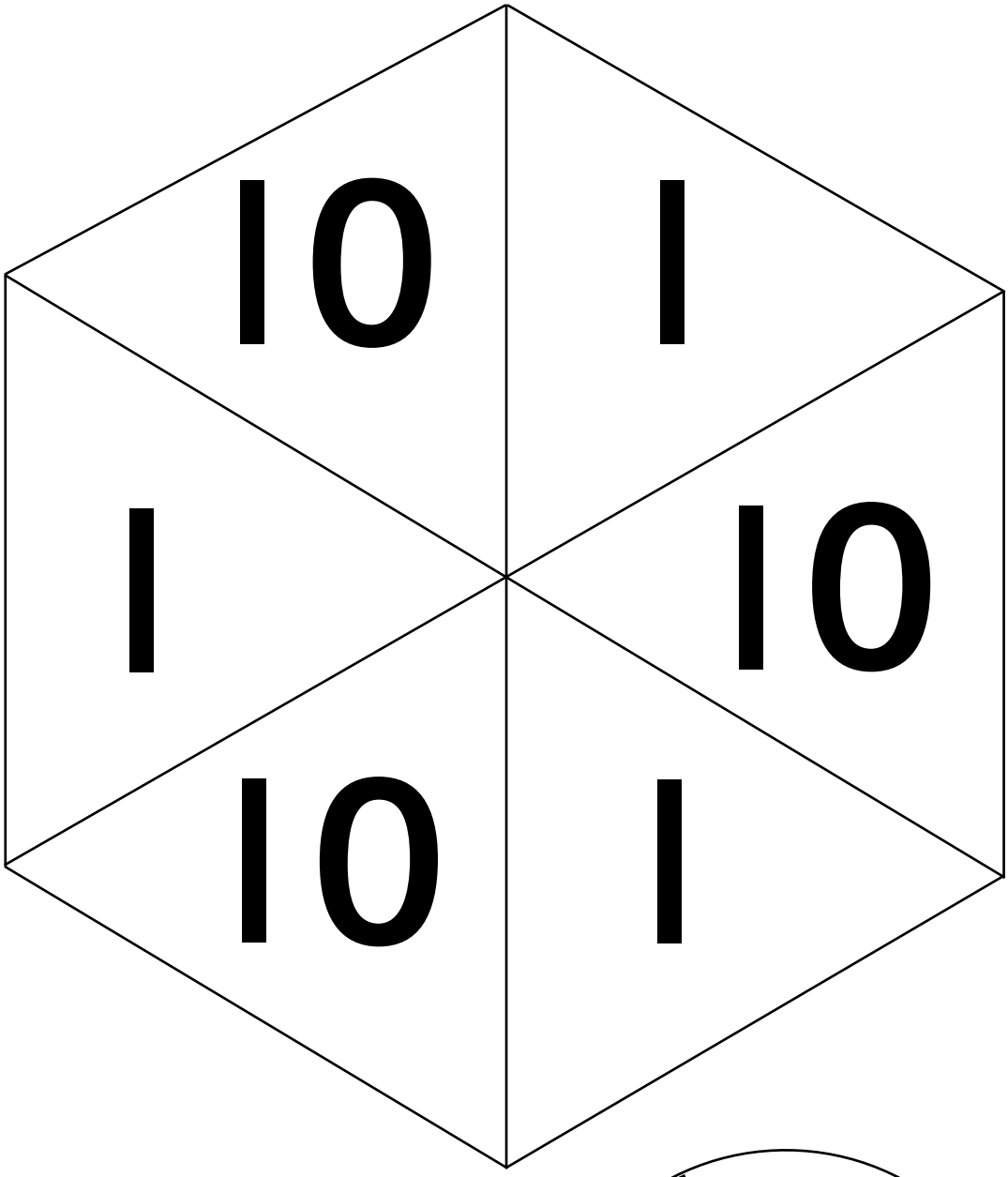
0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

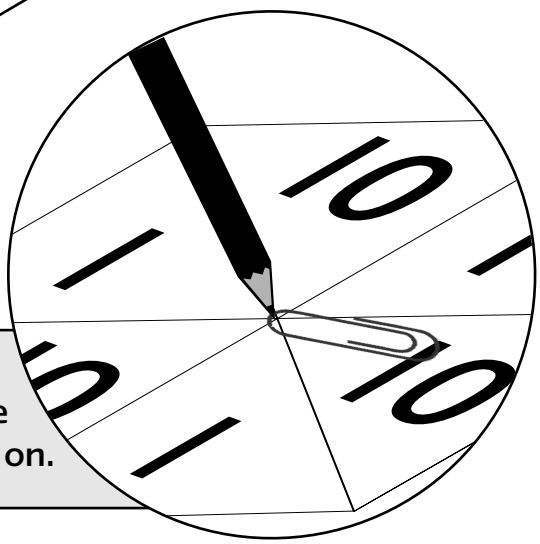
Unit 3
RESOURCE SHEET 6

99	98	97	96	95	94	93	92	91	90
89	88	87	86	85	84	83	82	81	80
79	78	77	76	75	74	73	72	71	70
69	68	67	66	65	64	63	62	61	60
59	58	57	56	55	54	53	52	51	50
49	48	47	46	45	44	43	42	41	40
39	38	37	36	35	34	33	32	31	30
29	28	27	26	25	24	23	22	21	20
19	18	17	16	15	14	13	12	11	10
9	8	7	6	5	4	3	2	1	0

Unit 3

RESOURCE SHEET 7



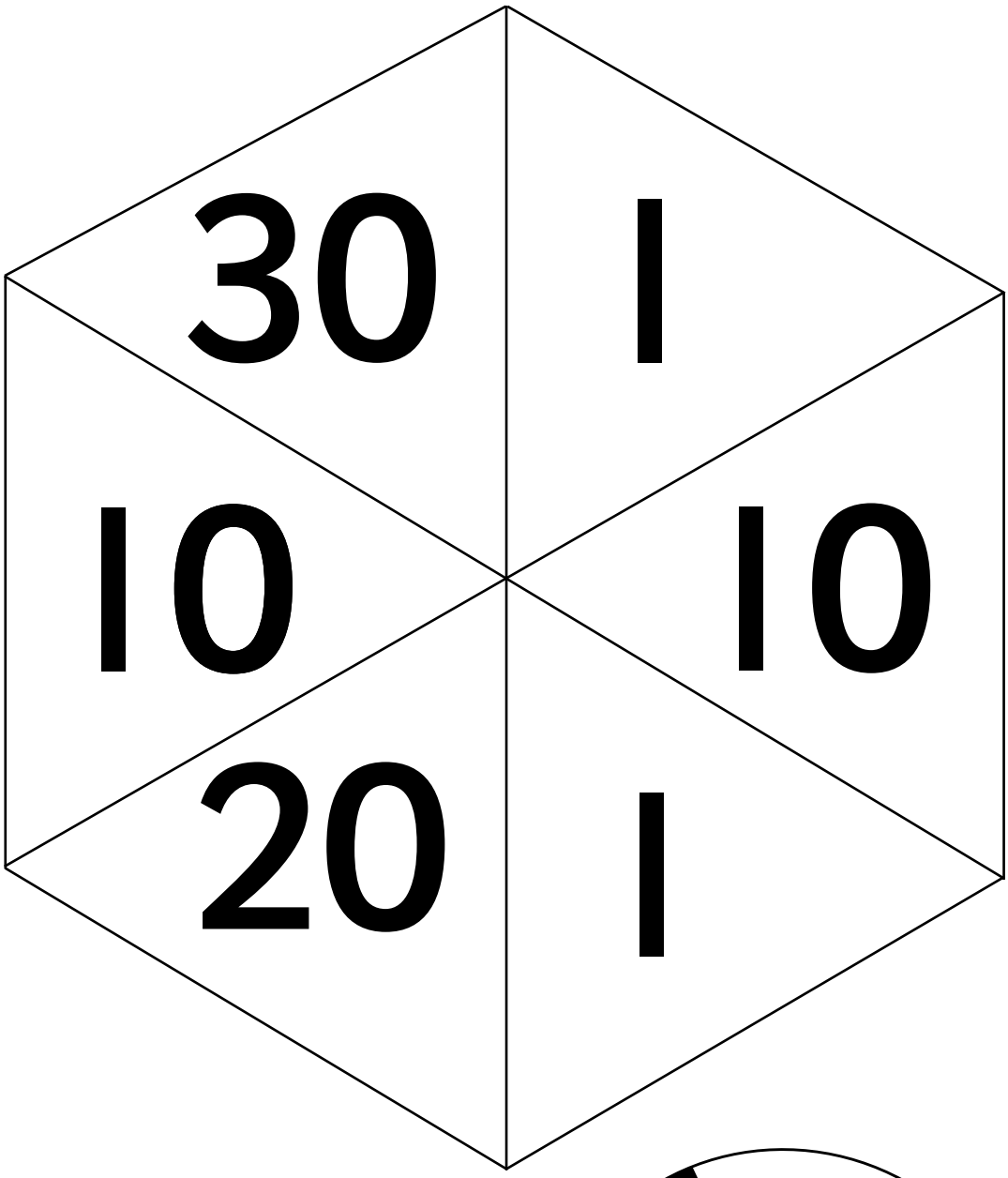


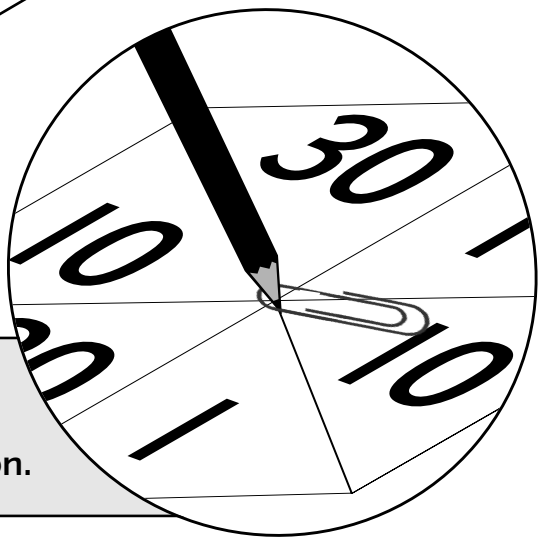
Hold the pencil fixed and flick the paper clip around. Read the number that the paper clip stops on.

UNIT 3

Unit 3

RESOURCE SHEET 8





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

PART 3

UNIT 4

DOUBLING AND HALVING NUMBERS

UNIT 4

Unit 4
• SESSION 1 •

TOTAL TIME
30 MINUTES

OBJECTIVES
- Know by heart doubles of numbers to 10 doubles of multiples of ten up to 50
- Halve even numbers from 20 to 2

VOCABULARY
half, halve, double, twice as much as, multiply by 2, divide by 2

RESOURCES
sets of 1–20 number cards;
1p, 2p, 5p and 10p coins;
10-sided dice;
1–10 paperclip spinner (resource sheet 9)

HOMEWORK
Play the *Doubling Game* using a paperclip spinner (resource sheet 9)

STARTER
5 MINUTES

Double numbers to 5, encouraging children if necessary to use fingers on both hands; for example, for double 2, hold up 2 fingers on each hand and count. Now do the same for halving even numbers from 10 to 2. Stress that 'multiply by 2' means the same as doubling and that 'divide by 2' means the same as halving. Use this vocabulary to ask more questions.

Write on the board a few questions such as $4 \times 2 = \square$ and half of 10 for children to complete orally.

Talk about $5 \times \square = 10$.

KEY QUESTIONS

- **What is double 5?**
- **What is double 3?**
- **Can you tell me half of 8? Multiply 4 by 2.**
- **What is 3 multiplied by 2?**
- **What is 8 divided by 2? Divide 6 by 2.**

MAIN ACTIVITY
20 MINUTES

Demonstrate doubling and halving even numbers from 6 to 10 by using 5p, 2p and 1p coins. Double 6, for example, by taking one 5p and one 1p and doubling both. Ask the children to predict the answer by holding up the appropriate number card. Make sure they see that two 5p coins and two 1p coins make 12p. Record on the board as 6p + 6p = 12p. Repeat the process for other even numbers.

Demonstrate how to halve 12 using coins. Remind children that double 6 is 12. Point out that halving reverses the doubling. Get children to halve 14, 16, 18 and 20. These are all numbers they made by doubling.

Divide the class into pairs and ask them to remove the number cards for 1 to 5 from their sets. Ask them to match numbers such as 6 and 12, where the higher is double the lower or the lower half the higher. Encourage the pairs to work quickly.

Tell the children to use this double 3 to help them work out double 30. Demonstrate the answer by taking three 10p coins and establishing that this is 30p. Take another three 10p coins and show that there is 60p altogether.

What is double 40? What is half of 80p? What is double 20? What is half of 20? What is twice as much as 50?

Explain that 'twice as much as' can be used instead of 'double'.

Briefly explain activity sheet 4.1, which the children should complete before the next session. Introduce them to the *Doubling Game* for homework. Each player takes it in turns to throw a ten-sided dice or use the 1–10 spinner. They double the number and write it down. The player with the largest number after five throws is the winner.

KEY QUESTIONS

- **What happens if we halve a number we have just got through doubling?**
- **If you know the double of 4, how can you find the double of 40?**

PLENARY

5 MINUTES

What happens when we double a number? What other ways are there of saying this (multiply by 2, twice the number)? What happens when we halve a number? What other way is there of saying this (divide by 2)? If we know how to double 10 and how to double 5, what is double 15? What is double 12?

Finish by throwing a ten-sided dice (numbers 1–10) or use the spinner several times and ask the children to double the result each time as quickly as possible.

UNIT 4

Unit 4
SESSION 2

TOTAL TIME
30 MINUTES

OBJECTIVES
- Identify near doubles using doubles already known (for example, 8 + 9, 40 + 41)
- Measure and compare lengths using a standard measure

VOCABULARY
half, halve, double, twice, multiply by 2, divide by 2, measure, centimetres (cm), consecutive

RESOURCES
strips of paper prepared in advance (resource sheet 10), rulers

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STARTER
5 MINUTES

Revise doubles up to 10 and doubles of multiples of 10, up to 50 + 50 = 100. Try to inject pace and use the full range of terms: double, multiply by 2, twice. Now revise halves of even numbers below 11.

KEY QUESTIONS

- **What is half of 12?**
- **What is double 8?**
- **What is 60 divided by 2?**
- **What is twice 15?**
- **What is 13 multiplied by 2?**
- **What is half of 10?**

MAIN ACTIVITY
20 MINUTES

Demonstrate that if we know double 5, then we can easily work out 5 + 6. Establish that 6 = 5 + 1. Write on the board 5 + 5 + 1. Repeat with 7 + 8 as 7 + 7 + 1 (or 7 × 2 + 1). Ask a child to do the same with 6 + 7 and another with 8 + 9. Tell the group that numbers which are next to each other, like 6 and 7, or 8 and 9, are called consecutive numbers.

Distribute two strips to each pair of children, with one strip in each pair 1 cm longer than the other. The strips can range from 4 cm and 5 cm up to 11 cm and 12 cm. Demonstrate how to measure carefully using a ruler. In pairs, children measure the pair of strips they have been given. They work out how to add the two lengths together by using near doubles, for example, strips measuring 6 cm and 7 cm respectively can be calculated as 6 + 6 + 1 = 13, and the total length is 13 cm. When they have finished, they record the number statement. If there is time, they swap strips with another pair and carry out the same procedure.

Explain activity sheet 4.2, which the children should complete before the next session.

KEY QUESTION

How do you add 7 and 8?

PLENARY

5 MINUTES

Rehearse the doubles of multiples of ten up to 50 + 50.
Ask the children to add two numbers next to each other (consecutive numbers), one of which is a multiple of ten, for example 40 + 41 = 81.

UNIT 4

Name .....

Date .....

Dear Parents/Carers,

We have been looking at doubling numbers. Please help your child by playing the game below.

Thank you for your help.

Your child's teacher

Doubling Game

- Take turns to use the paperclip spinner.
- Write down the number you get.
- Double it and write down the answer.
- Take five turns each.
- The person with the biggest number wins; if there is a tie, the person with the smallest number wins.

UNIT 4

Name .....

Date .....

Activity sheet 4.1

1.

Double 5 = ☐ Double 6 = ☐ 7 × 2 = ☐

8 × 2 = ☐ Double 9 = ☐ Double ☐ = 20

20 × ☐ = 40 ☐ × 2 = 50 ☐ × 4 = 8

2. Double each number and write the new number below.

10	8	30	7	20	6	40	4	50
.....	.....	.....	.....	.....	.....	.....	.....	.....

3. Halve each number and write the new number below.

100	10	40	8	80	6	20	2	60	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

4. Mina makes 12 cakes.
Mel makes double the amount.
How many does Mel make?

.....

5. Sarah spent half her 60p pocket money.
How much did she spend?

.....

6. John had 50p. Joe had twice as much as John.
How much did Joe have?

.....

UNIT 4

Name .....

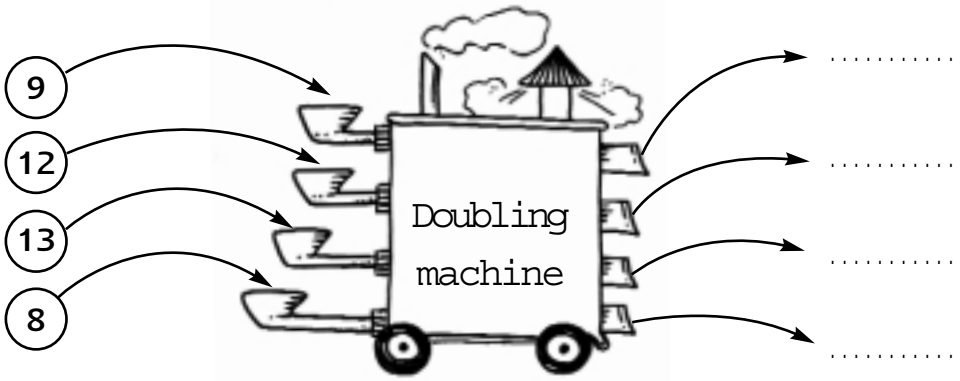
Date .....

Activity sheet 4.2

1. At the fairground, children ride for half the adult price.
Fill in the price list.

Fairground Rides	Children	Adults
Helter Skelter		70p
Bumper Cars		80p
Ghost Train	50p	
Rocket Ride	25p	

2. This machine doubles numbers fed into it.
Double the numbers.



3. 8, 20, 9, 31, 6, 30, 21, 4, 5, 7

Pick four pairs of near doubles from the list.

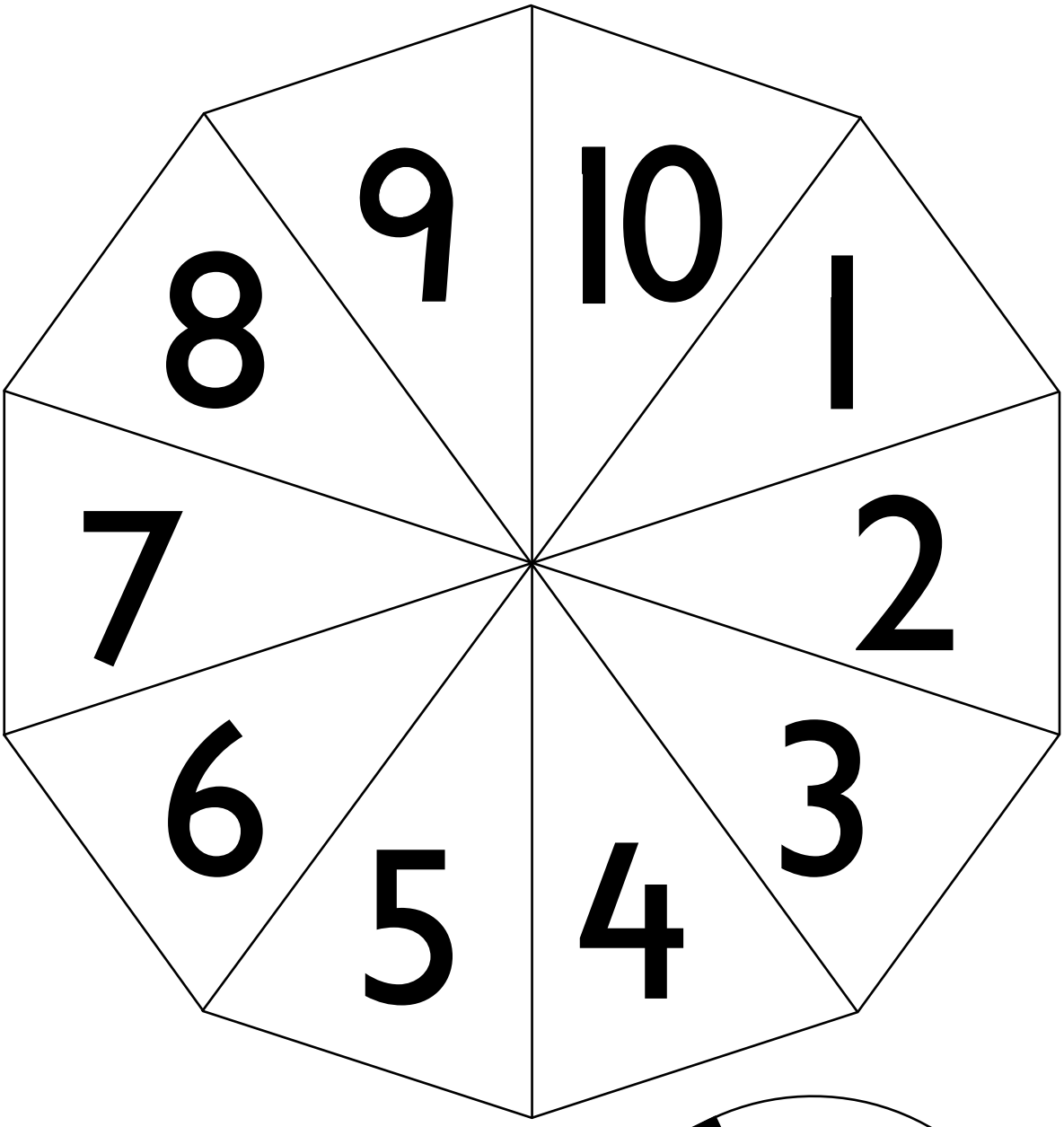
For each pair write down number sentences.
For example:

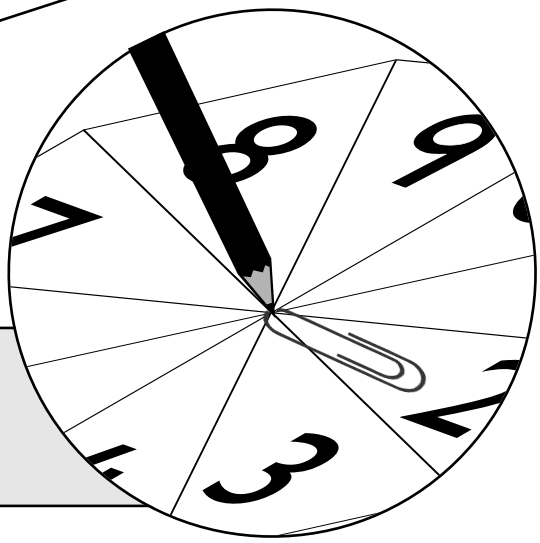
4 + 5 = 9

UNIT 4

Unit 4

RESOURCE SHEET 9





Hold the pencil fixed and flick the paperclip around. Read the number that it stops on.

UNIT 4

Unit 4

RESOURCE SHEET 10

4 cm

5 cm

6 cm

7 cm

8 cm

7 cm

8 cm

9 cm

6 cm

10 cm

5 cm

11 cm

4 cm

12 cm

PART 3

UNIT 5

MENTAL CALCULATION STRATEGIES

UNIT 5

Unit 5
• SESSION 1 •

TOTAL TIME
30 MINUTES

OBJECTIVES
- Use the knowledge that addition can be done in any order
- Use known number facts and place value to add/subtract mentally

VOCABULARY
add, subtract, counting on in tens, counting on in ones, larger/smaller number

RESOURCES
individual white boards or number cards; number grid 0–99 (resource sheet 5, unit 3); place value cards (resource sheet 11); digit cards; 1–9 paperclip spinners for homework (resource sheet 12)

HOMEWORK
Play the *Plus 11* game using a paperclip spinner (resource sheet 12)

STARTER
5 MINUTES

Practise adding and subtracting 10, 20 or 30 from any number on the 0–99 grid. Practise adding and subtracting 1 from any number on the grid. Use individual white boards (or number cards) for answers and tell children to hold them up.

KEY QUESTIONS

- **What is 64 add 30?**
- **What is 64 subtract 30?**
- **How can you use the grid to find a number 10 more or 10 less? 1 more or 1 less?**

MAIN ACTIVITY
20 MINUTES

Write 35 + 4 on the board. Ask the children how they will do this. They should know that 5 and 4 make 9 without counting on in ones. Now make 35 with place value cards and show how only the ones card changes when we add 4.

Write 35 + 40 on the board. Encourage everyone to count on in tens this time.

Using both place value cards and the 0–99 grid, demonstrate counting on from 35 to 75.

Write 53 + 30 on the board. *Do we count on in ones or tens?* Demonstrate on the grid and with place value cards. Write 53 + 3. Do this.

Repeat for other examples including 46 + 4 (next 10) and 46 + 40. Encourage the children to recognise when it is appropriate to deal with ones and when with tens.

Write 5 + 62 on the board. *Which number do we start with to do the addition?* Demonstrate that we start with 62 because it's larger. *Do we count on in ones or tens?*

Now write 20 + 74. *Which number do we start with?* Repeat this process for 47 − 3 and 47 − 30, encouraging the children to decide whether to count back in tens or ones. Repeat this a number of times with a range of numbers.

Play the *Plus 11* game in pairs. Each pair needs two sets of digit cards; one represents the tens and the other the ones. Shuffle both packs. Place each pile face down. The players take it in turns to make a two-digit number from the cards. Write it down and add 11 to it. Make sure that everyone knows that to add on 11, they add 10 then 1. After three turns each, the player in each pair who scores closer to 50 (above or below) is the winner.

Explain activity sheet 5.1, which the children should complete before the next session.

KEY QUESTIONS

- **Which number do we start with when adding? (the larger)**
- **How do we know whether to count on in ones or tens?**

PLENARY

5 MINUTES

Practise adding and subtracting multiples of ten below 100, then practise adding or subtracting single-digit numbers. Make sure the children recognise the difference.

UNIT 5

Unit 5
SESSION 2

TOTAL TIME
30 MINUTES

OBJECTIVES
- When adding know to start with the larger number
- Know whether to count on in ones or tens

VOCABULARY
add, plus, subtract, minus, double, near double, halve

RESOURCES
individual white boards or pieces of paper to hold up; number cards 20–90; dice with 10, 20, 30, 1, 2, 3 or paperclip spinner (resource sheet 13); 1–9 paperclip spinner (resource sheet 12)

STARTER
5 MINUTES

Check that children are familiar with the words 'plus' and 'minus'. Rehearse adding and subtracting 10 from any number on the 0–99 grid. Rehearse adding and subtracting 1 from any number on the grid. Ask the children to hold up individual white boards or pieces of paper with the answers.

Write on the board a few questions such as 36 + 20 = □, 36 + □ = 56 and □ + 20 = 56. Ask the children to complete these orally.

KEY QUESTIONS

- **What is 44 plus 30?**
- **What is 44 plus 3?**
- **What is 44 minus 30?**
- **What is 44 minus 3?**

MAIN ACTIVITY
20 MINUTES

Children work in pairs. They take a card from a pile of 20–90 number cards. This gives them their first number. They get their second number by throwing a dice, or using the paperclip spinner, with 10, 20, 30, 1, 2, 3 on it. They must add these numbers together and write the process down as a number sentence, for example 24 + 30 = 54. Each pair should aim to complete at least four examples. Work with the children to make sure they are carrying out the task correctly.

Write the following number sentences on the board:

4 + 75 = ☐

30 + 49 = ☐

5 + 10 + 54 = ☐

6 + 10 + 63 = ☐

20 + 2 + 57 = ☐

Tell the children they all have the same answer except for one. Ask them to say which one that is. They should work in pairs to find out. Go through each number sentence on the board, stressing that they should start with the larger or largest number.

Follow up the work on number sentences with examples that go above 100, for example:

80 + 30 = ☐

86 + 30 = ☐

98 + 5 = ☐

Explain activity sheet 5.2, which the children should complete before the next session.

KEY QUESTIONS

- **Were some calculations easier than others?**
- **Which ones?**
- **Why is it easier to start with the larger number?**

PLENARY

5 MINUTES

What easy ways are there for adding your numbers? Consider with the children the key questions above.

UNIT 5

Name .....

Date .....

Dear Parents/Carers,

In our mathematics lessons, we have been adding and subtracting mentally. Please help your child by playing the game below.

Thank you for your help.

Your child's teacher

Plus 11

Each player takes it in turn to use the 1–9 paperclip spinner. Spin it twice to make a two-digit number; the first spin gives the tens, and the second the ones. Write down the number you get, then add 11. Write down the answer.

Each player has five turns. The person who has scored closest to 50 (above or below) in any turn is the winner.

Example: Your spins give you a 4 and a 2. This means that your number is 42. Add 11 to score 53 for the round.

UNIT 5

Name .....

Date .....

Activity sheet 5.1

1. Add 10 to each number.

10	26	52	86	14	31	69
20						

2. Subtract 10 from each number.

30	57	96	13	72	81	64
20						

3. John's ride costs 35p.

Avtar's ride costs 10p more.

How much is Avtar's ride? .....

4. Mel's goldfish cost 88p.

Jim's goldfish cost 10p less.

How much is Jim's goldfish? .....

5. Fill in the gaps.

$\square - 10 = 56$ $\square + 10 = 23$

$87 = \square + 10$ $52 = \square - 10$

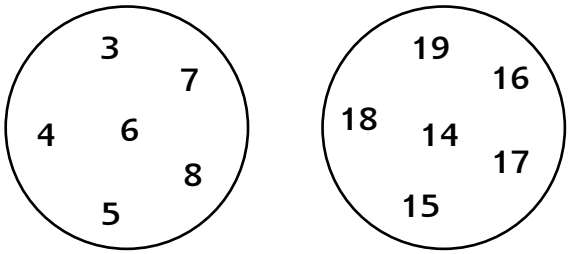
UNIT 5

Name .....

Date .....

Activity sheet 5.2

1. Choose one number from each circle.
   Add them together and write the number sentence.
   Do this five more times.



3 + 14 = 17

.....

.....

.....

.....

.....

2. I had 15p in my pocket.
   I put in another 6p.
   How much is in my pocket now?

.....

3. Ruby buys a comic.
   She gives the shopkeeper 5p, then another 22p.
   How much does the comic cost?

.....

4. Sam has 57 pence in his wallet.
   He buys sweets for 40p.
   How much does he have left?

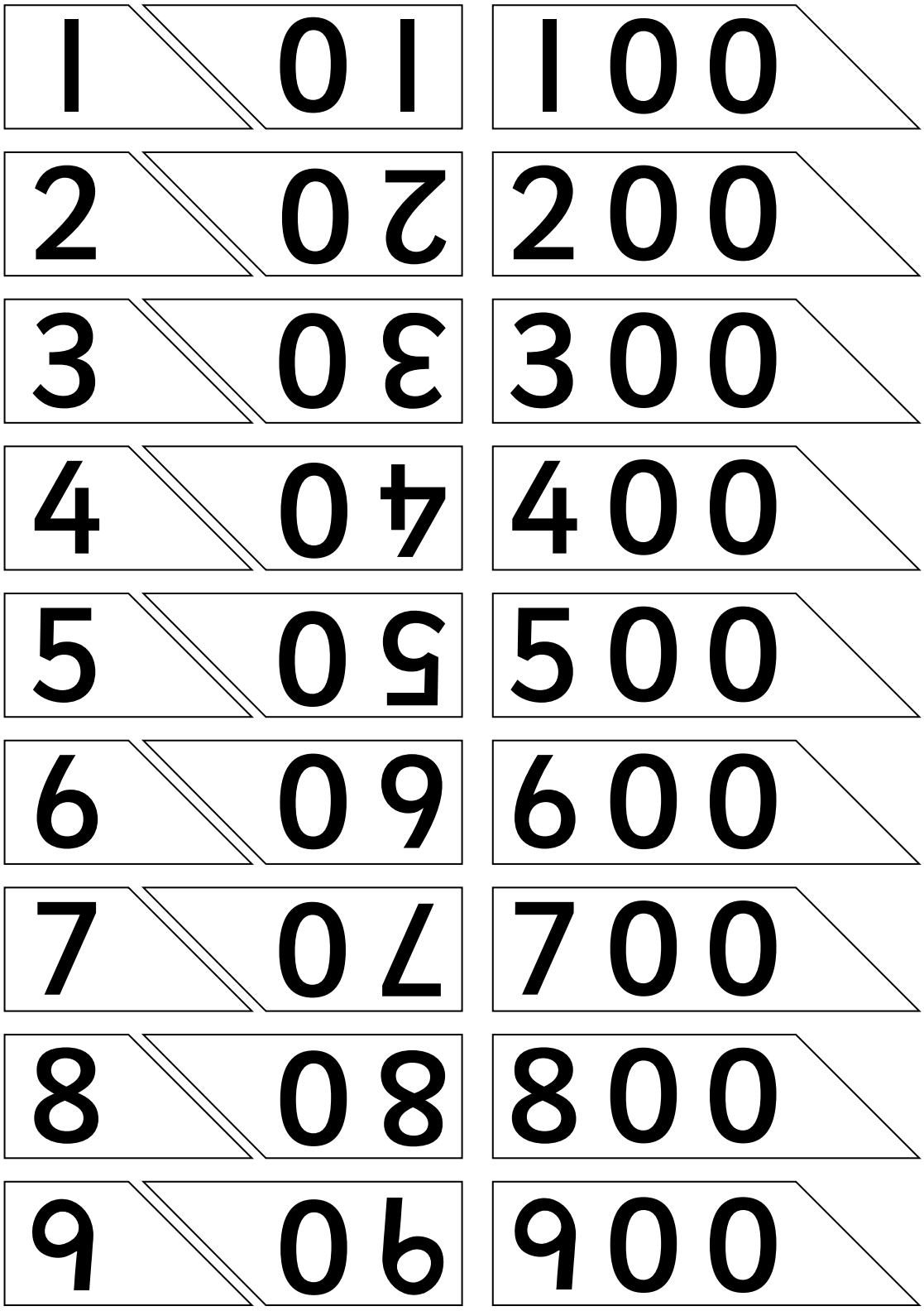
.....

5. Make up some number calculations with the number 20 in them:
   20 + 1 = 21

UNIT 5

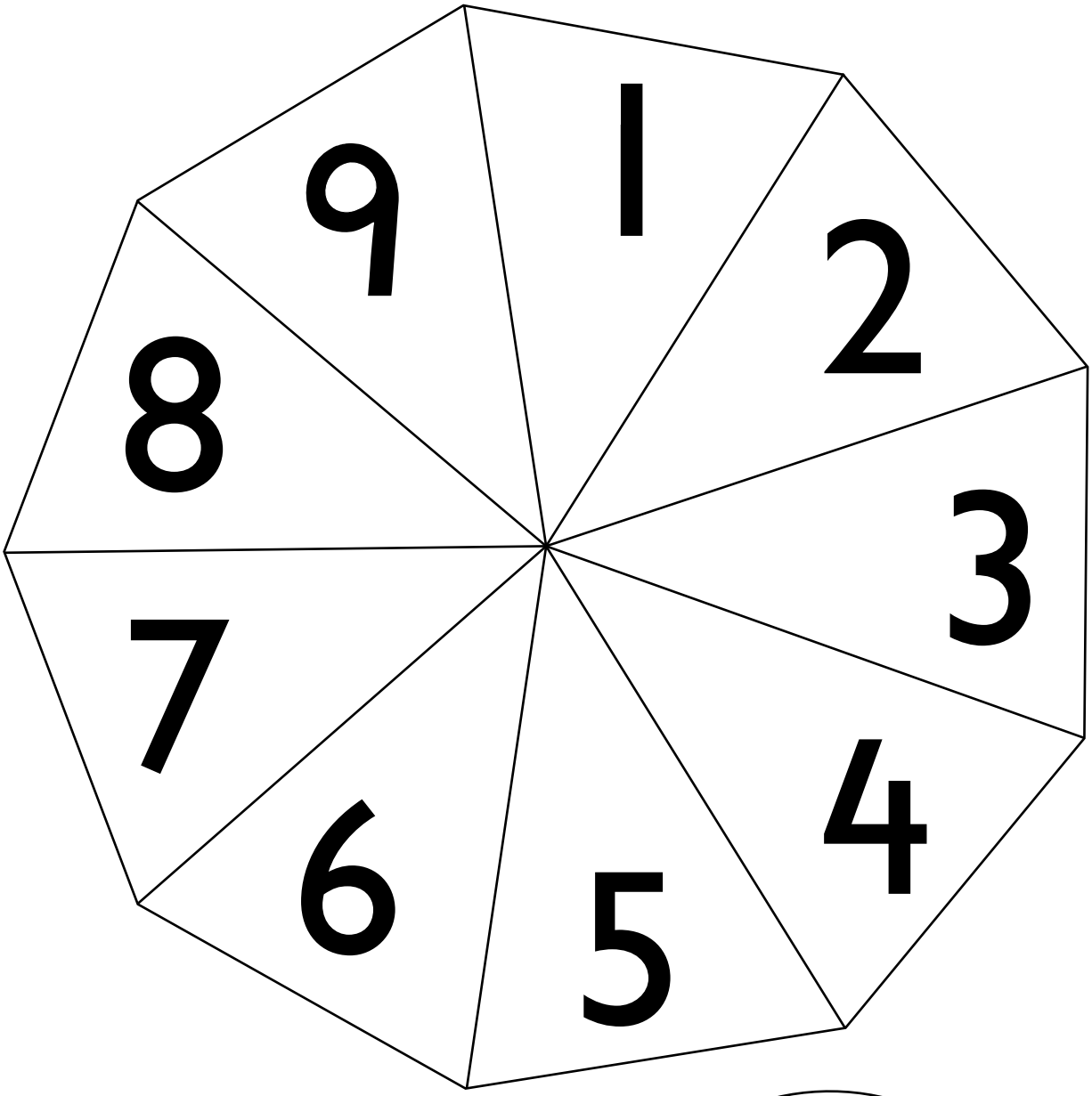
Unit 5

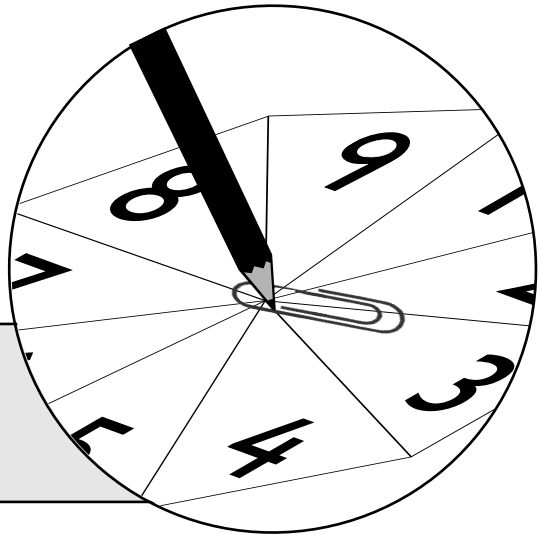
RESOURCE SHEET 11



Unit 5

RESOURCE SHEET 12

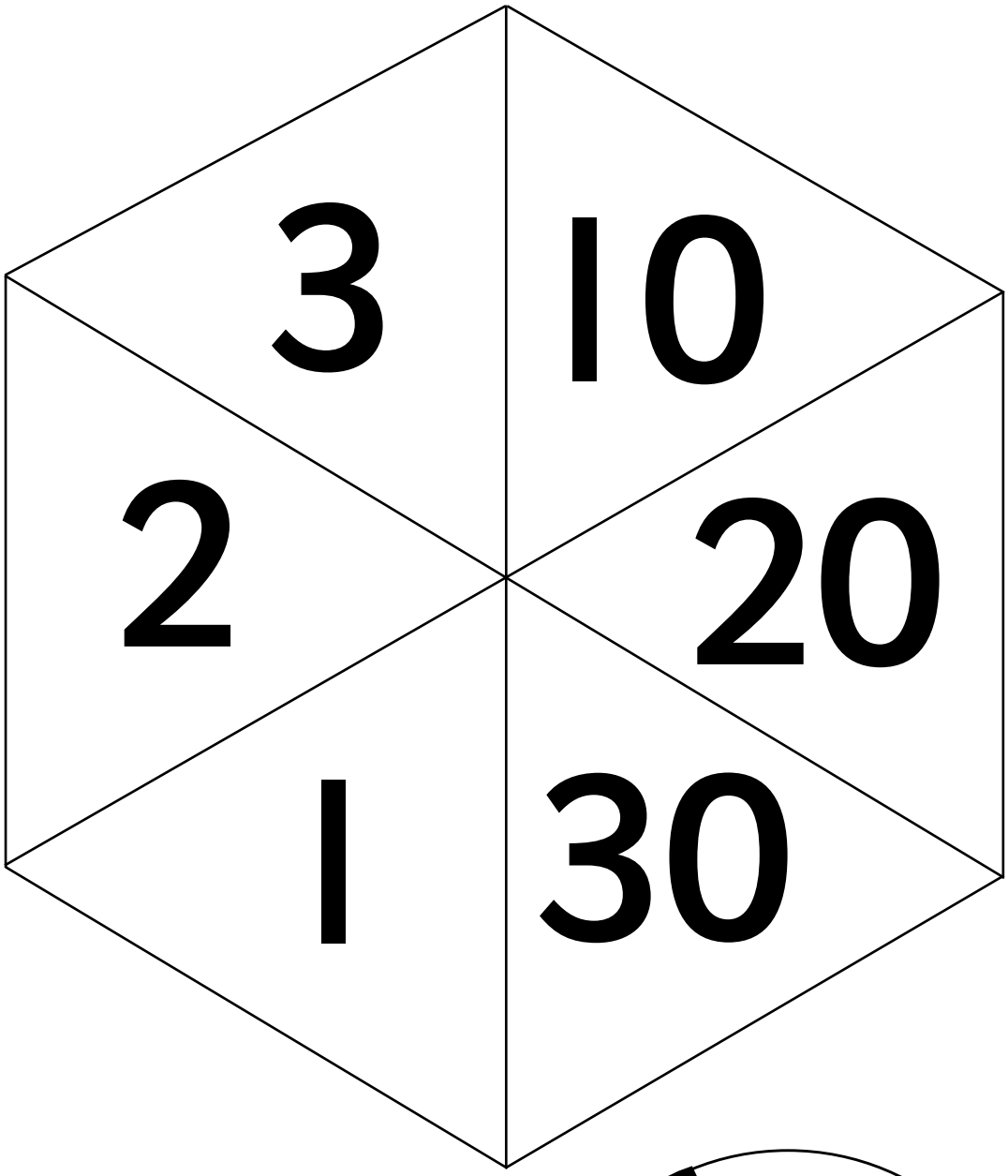


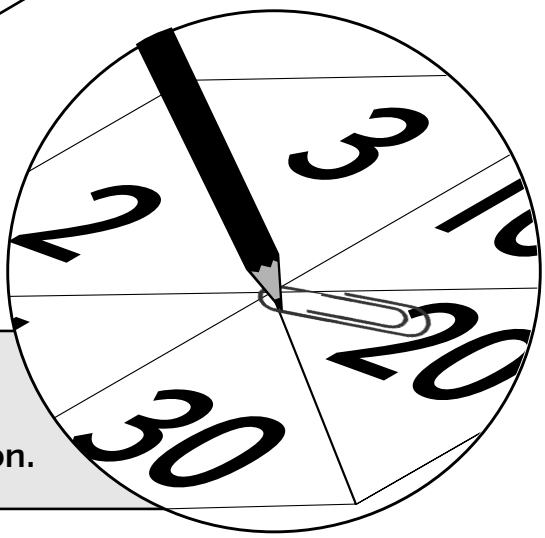


Hold the pencil fixed and flick the paperclip around. Read the number that the paper clip stops on.

Unit 5

RESOURCE SHEET 13





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

PART 3

UNIT 6

SUBTRACTION BY COUNTING ON FROM THE SMALLER NUMBER

UNIT 6

Unit 6
• SESSION 1 •

TOTAL TIME
30 MINUTES

OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
• Find a small difference by counting on from the smaller to the larger number • Measure and compare lengths using standard units	measure, centimetres (cm), double, near double, multiple, difference, taller, tallest, shorter, shortest	interlocking cubes; 0–99 grid; rulers	Make up three subtraction sentences, all of which have the answer 3. Make up another three for which the answer is 5.

STARTER
5 MINUTES

Revise addition facts for 10. Revise counting on and back in tens to and from 100. Revise subtraction facts for 10 such as 10 − 8 = 2 and 10 − 2 = 8, and for multiples of 10 to 100, such as 100 − 80 = 20 and 100 − 20 = 80.

KEY QUESTIONS

- **What do multiples of 10 always end in?**
- **How can you check that your number facts for 100 are correct?**

MAIN ACTIVITY
20 MINUTES

Using linked cubes, children build towers in different colours. Make sure that this is done quickly with a manageable number of cubes.

How tall is the red, blue, orange tower?
Which is the tallest?
Which is the shortest?
How much taller is the tallest than the shortest? (Measure the heights in centimetres.)

In pairs, children quickly build two new towers, not the same height but close to each other.

How tall is the taller tower in centimetres?
How tall is the other tower in centimetres?
What is the difference between the two heights?
How do you know?

Write the matching number sentence on the board, for example, 21 − 18 = 3. Repeat this with the children building two new towers.

What is the difference between these two heights?

Demonstrate the difference by counting on using the number line or the number grid. Write the matching number sentence on the board, for example, 23 − 17 = 6.

Repeat this process with different numbers which are less than 8 apart.

In pairs ask the children to write as many subtraction sentences as they can where the answer is 4. Explain that they will do a similar task for homework.

Explain activity sheet 6.1, which the children should complete before the next session.

KEY QUESTIONS

- **How can we find the difference between two numbers (demonstrate counting on from the smaller to the larger number)?**
- **What answer do you get if you count back from the larger to the smaller number (it should be the same)?**
- **How do we write these calculations (as subtraction sentences)?**

PLENARY

5 MINUTES

How did you find the difference between the heights of the towers? How did you check to see if you had the right answer?

UNIT 6

Unit 6
SESSION 2

TOTAL TIME 30 MINUTES

OBJECTIVE
- Find a small difference by counting on from the smaller to the larger number

VOCABULARY
estimate, count on, difference, more, multiple of ten, zero

RESOURCES
demonstration 1–50 number line; large counter

STARTER 5 MINUTES

Revise ordering and comparing numbers up to 100. Give the group three numbers. *Which is the biggest? Which is the smallest?* Repeat twice with other numbers.

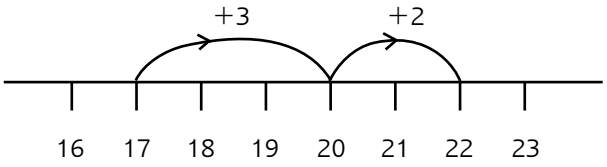
Revise multiples of 10 and counting in tens. Revise subtraction facts for 10, such as 10 − 7 = 3 and 10 − 3 = 7, and for multiples of ten to 100, such as 100 − 70 = 30 and 100 − 30 = 70.

KEY QUESTIONS

- **What do you add to 3 to make 10?**
- **What do you add to 30 to make 100?**

MAIN ACTIVITY 20 MINUTES

Write 22 − 17 on the board. Point to the sum and say it as 'What is 22 minus 17? What is the difference between 17 and 22?' Choose a child to put a counter on the number line at 17. Point to the counter and say 'This has to move from 17 to 22, but, for its first hop, it must land on a number ending in zero. How many to the next number ending in zero?' Demonstrate that this is a hop of three, up to 20. Now move the counter two more to 22. Point at the two hops. Say 'Three and two make five'.



Repeat this process for 33 − 26 and 24 − 17.

Explain activity sheet 6.2, which the children should complete before the next session.

KEY QUESTIONS

- **What others ways can we say 54 take away 47?**
- **If you count on to do this calculation, where would your first hop take you?**

PLENARY

5 MINUTES

Draw two paint brushes on the board. Label the lengths 27 cm and 34 cm.

What is the difference in the lengths of these two brushes?

Work this out by counting on. Tell the children to imagine the number line in their minds. Ask them to explain how to set about this calculation. Encourage pupils to visualise a few more calculations.

UNIT 6

Name .....

Date .....

Dear Parents/Carers,

In our mathematics lessons, we have been finding the difference between numbers by counting up from the smaller number to the larger. It would be very helpful if you could help your child with the examples below.

Thank you for your help.

Your child's teacher

Complete these number sentences.
Use different numbers for each example.

51 − 48 = 3	☐ − ☐ = 5
☐ − ☐ = 3	☐ − ☐ = 5
☐ − ☐ = 3	☐ − ☐ = 5

Try making more number sentences with answers 4, 2 and 6. Write them on the back of this sheet. How many different ones can you make for each answer?

UNIT 6

Name .....

Date .....

Activity sheet 6.1

1. Measure the lengths of each of these pencils as accurately as possible.

A  ..... cm

B  ..... cm

C  ..... cm

D  ..... cm

E  ..... cm

Which pencil is the shortest? .....

Which pencil is the longest? .....

The difference between the longest and the shortest is ..... cm.

Pencil A is ..... cm shorter than pencil C.

2. I have a pencil that is as long as the longest and shortest joined together. It is ..... cm long.

3. The length of the two shortest pencils added together is ..... cm.

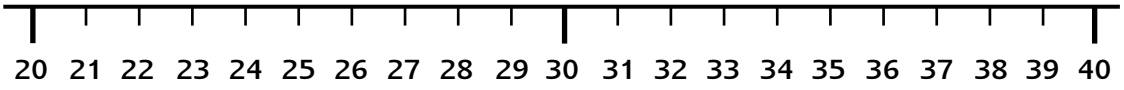
4. Write two subtraction sentences with the answer 10.

UNIT 6

Name .....

Date .....

Activity sheet 6.2



1. What is the difference between 26 and 32?

   32 − 26 = ☐

2. What is the difference between 23 and 36?

   36 − 23 = ☐

3. What is the difference between 29 and 38?

   38 − 29 = ☐

4. What is the difference between 24 and 33?

   33 − 24 = ☐

5.

42 − 38 = ☐	53 − 47 = ☐
61 − 57 = ☐	24 − 13 = ☐
59 − 48 = ☐	29 − 12 = ☐
40 − 31 = ☐	45 − 39 = ☐

PART 3

UNIT 7

UNDERSTANDING MULTIPLICATION

UNIT 7

Unit 7
• SESSION 1 •

TOTAL TIME
30 MINUTES

OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
• Understand the operation of multiplication as describing an array • Know by heart the facts of the two- and ten-times tables	multiplication, multiply, times table, array	10p coins; 1–10 spinner (resource sheet 9, unit 4)	Play the *Three in a Row* game using the 1–10 paperclip spinner (resource sheet 9, unit 4)

STARTER
5 MINUTES

Double numbers up to 20 and halve even numbers up to 20. Revise counting on in tens from zero then back again.

KEY QUESTIONS

- **What is double 3? double 6? double 12?**
- **What is half of 12? of 6?**
- **What are five tens? Count: 10, 20, 30, 40, 50.**

MAIN ACTIVITY
20 MINUTES

Put the children in pairs. Give one child in each pair a supply of 10p coins. *As we count slowly in tens, the partner with the coins gives them to the other partner.* Stop at 40. *How many coins do you have?* Continue counting in tens and passing over a 10p coin each time. Stop at 80. *How many coins now?* Continue counting to 100.

Make sure everyone understands that they have been counting in ten or adding 10 each time.

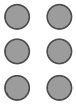
Draw 2 buns in a line on the board:

'One set of two is two'. Ask the children to repeat this.

Draw 2 more buns below the first:

'Two sets of two equal four'. Encourage the children to join in.

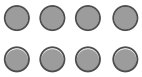
Draw another two buns.



'Three sets of two equal six'.

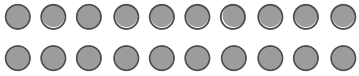
Continue drawing the buns in line to illustrate as far as:
'Ten sets of two equal twenty'.

Now draw this array on the board:



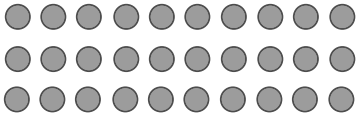
Ask children what it represents. Stress that it shows both 2 lots of 4 and 4 lots of 2. Write on the board: $2 \times 4 = 4 \times 2$. The answer is the same: 8.

Do the same with the following array.



Write on the board: $10 \times 2 = 2 \times 10 = 20$, and say 'Two tens are 20'.

Now extend the array as follows.



Write on the board: $10 \times 3 = 3 \times 10 = 30$. Say: 'Three tens are 30'.

Go through the rest of the ten-times table to 'Ten tens are 100'. Encourage the children to join in.

Go through the rules of the *Three in a Row* game the children will play at home. Explain activity sheet 7.1, which the children should complete before the next session.

KEY QUESTIONS

- **How do we write three lots of 10 as a number sentence?**
- **If five lots of 2 make 10, what do two lots of 5 make?**

PLENARY

5 MINUTES

Recite the two-times table as a group. Discuss the best way for working out the answer to any fact that they have forgotten. Methods might include counting on or back in twos. Stress the importance of knowing the key facts from which others can be worked out, namely 2×1, 2×2, 2×5 and 2×10.

Ask the children to shut their eyes and remember this fact: nine twos are 18. Chant it aloud as a class three times. Do the same with seven twos are 14. Tell them that you will check next time if they can remember these facts.

UNIT 7

Unit 7
SESSION 2

TOTAL TIME
30 MINUTES

OBJECTIVES
- Understand the operation of multiplication as describing an array
- Know by heart facts for the two-, five- and ten-times tables

VOCABULARY
multiply, times table, how many □ in □?, division fact

RESOURCES
1–100 demonstration number line; 2p, 5p and 10p coins; a set of 1–10 cards for each pair of children

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STARTER
5 MINUTES

Check whether the children have remembered the two facts from the previous session: nine twos are 18, seven twos are 14. Now recite the two-times table.

Practise counting in tens and then in twos. Stop during the count to ask 'How many tens?' or 'How many twos?'

Write on the board a few questions such as $10 \times \square = 60$ and $2 \times \square = 14$ for the children to complete orally. *How many twos make 60? How many twos make 14?*

KEY QUESTIONS

- **How many tens are there in 30?...40?...70?...80?**
- **How many twos are there in 14?...16?...18?**

MAIN ACTIVITY
20 MINUTES

Count in fives, starting at zero, pointing to the appropriate numbers on a number line. Put children in pairs and supply one child in each pair with at least ten 5p coins. Tell the children that, as the class counts slowly in fives, the partner with the coins has to give them one at a time to the other partner. Stop at 20. *How many coins do you have?* Continue counting in fives and passing over a 5p coin each time. Stop at 40. *How many coins now?* Continue counting to 50.

Write the five-times table on the board. Ask the group to chant the table, saying 'One times five is five, Two times five is ten', and so on to 'Ten times five is fifty'. Point to any fact and ask a child to read it out loud. Do this several times. Now rub a fact out and ask the children to say it. Gradually remove lines and get the group to chant the whole table.

Ask the children to use 2p coins and to write the two-times table, building it up in the same way as for the five-times table. Again, point randomly to lines for the children to read aloud.

Give out one set of 1–10 number cards to each pair and tell the children to lay out the cards with a matching number of 5p coins. They then calculate how much money matches each number of coins, and write a multiplication sentence to go with each card. For example, if there are four 5p coins on the number card for 4, the children write: $4 \times 5 = 20$, and then $5 \times 4 = 20$.

Explain activity sheet 7.2 which the children should complete before the next session. Finish by considering the key questions below.

KEY QUESTIONS

- **How many twos are there in twenty?**
- **How many fives are there in twenty?**
- **How many tens are there in twenty?**

PLENARY

5 MINUTES

Practise the five-times table. Discuss ways in which children can remember it. For example, refer to the 5, 0, 5, 0 pattern of the ones digit. Stress the importance of knowing the key facts from which they can build up the others: one five, two fives, five fives, ten fives. Ask children to shut their eyes and remember these two facts: seven fives are 35, nine fives are 45. Chant each aloud as a class three times.

Ask questions that prompt the related division facts.

What multiplied by five is thirty five? 5 times what number is 40?

Name .....

Date .....

Dear Parents/Carers,

We have been learning the ten- and two-times tables at school. Please help your child by playing the game *Three in a Row* below.

Thank you for your help.

Your child's teacher

Three in a row

1. You need a paperclip spinner and some counters or buttons.
2. Take turns to spin the spinner. Multiply the number on the spinner by 2 or by 10.
3. Put a counter on that number. For example, if you spin 3, you can make either 6 or 30.
4. The first person to get three counters in a line is the winner. A line can be horizontal →, vertical ↓, or diagonal ↘ ↙ .
5. Use the times tables to help if you need.

80	4	20	6	18	100
16	8	40	14	60	40
70	16	12	100	4	90
50	14	90	30	8	50
8	6	10	12	20	2
30	18	80	70	10	60

$1 \times 10 = 10$	$1 \times 2 = 2$
$2 \times 10 = 20$	$2 \times 2 = 4$
$3 \times 10 = 30$	$3 \times 2 = 6$
$4 \times 10 = 40$	$4 \times 2 = 8$
$5 \times 10 = 50$	$5 \times 2 = 10$
$6 \times 10 = 60$	$6 \times 2 = 12$
$7 \times 10 = 70$	$7 \times 2 = 14$
$8 \times 10 = 80$	$8 \times 2 = 16$
$9 \times 10 = 90$	$9 \times 2 = 18$
$10 \times 10 = 100$	$10 \times 2 = 20$

UNIT 7

Name .....

Date .....

Activity sheet 7.1

1. Draw lines to join pairs of calculations that have the same answer.

10 × 3	4 × 2	5 × 2	4 × 10	2 × 9
2 × 5	10 × 4	9 × 2	3 × 10	2 × 4

2. Write down as many multiplication sentences as you can using only the numbers in the box.

2	4	5	6	8	10	12	20	50

3. Fill in the missing numbers.

10, 20, ..., ..., 50, ..., ..., 80, ..., ..., 110, ...

2, 4, ..., ..., 10, 12, ..., ..., ..., 20, ...

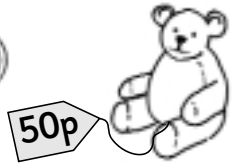
UNIT 7

Name .....

Date .....

Activity sheet 7.2

1. How many 5p coins will I need to buy each of these toys?



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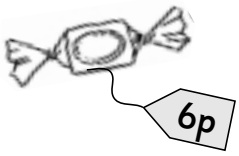
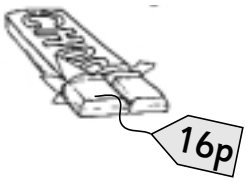
2. How many 2p coins will I need to buy each of these sweets?





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3.

 gobstoppers 2p each  lollies 10p each  laces 5p each

How much do three gobstoppers cost? .....

How much do four lollies cost? .....

How much do ten laces cost? .....

How many lollies can you get for 20p? .....

How many laces can you get for 80p? .....

How many gobstoppers can you get for 12p? .....

PART 3

UNIT 8

SELECTING THE APPROPRIATE OPERATION TO SOLVE A PROBLEM

UNIT 8

Unit 8
• SESSION 1 •

TOTAL TIME	OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
30 MINUTES	• Choose and use appropriate operations and calculation strategies to solve problems • Explain how a problem was solved, orally and, where appropriate, in writing	multiple, operation, add, subtract, multiply, divide	individual white boards or digit cards; 1–10 number cards	Write word problems that use addition, subtraction, multiplication and division calculations. Write a number sentence for each.

STARTER 5 MINUTES

Revise number facts for 10, such as 7 + 3 = 10 and 10 − 7 = 3 and the related number facts for 100, such as 70 + 30 = 100 and 100 − 70 = 30. Ask the children to display their answers using digit cards or on individual white boards.

Revise the ten- and five-times tables.

KEY QUESTIONS

- **What is 44 and 40? 44 and 4?**
- **What is 44 subtract 4?**

MAIN ACTIVITY 20 MINUTES

Write on the board: 8 ☐ 2 = 16, 8 ☐ 2 = 4, 8 ☐ 2 = 6, 8 ☐ 2 = 10. *What operation do we need to carry out? Which sign has to go in the box in each number sentence?* Ask the children to explain and justify their answers. Make sure they understand that dividing by 2 (the second example) is the same as halving.

Write this simple word problem on the board:

Three children get on a bus. There are already 27 children on the bus. How many children are there on the bus now? *Discuss how to solve it.*

Encourage the children to write down the numbers 3 and 27 and to think about the operation they need to use to solve the problem. Repeat for other word problems such as:

I give 2 sweets to each of my 3 friends. How many sweets do I give away?

Ricky needs 5 more stickers to reach 30. How many stickers has he now?

Abida has 17 CDs. Mandy has 11 CDs. How many CDs altogether?

Give out two cards from a pack of 1–10 number cards to each pair, and ask them to make up and write down three number sentences, using different operations to get different answers, for example, 5 and 2.

$5 - 2 = 3$
$5 + 2 = 7$
$5 \times 2 = 10$

Check the answers as you circulate. Ask each pair to make up and write down a word problem using one of their number sentences.

Explain activity sheet 8.1, which the children should complete before the next session.

KEY QUESTION

How do we know which operation to choose (adding when putting together two things, subtraction when taking away or finding a difference)?

PLENARY

5 MINUTES

Choose two of the children's word problems to solve. Encourage the children to explain how they know which operation to use.

Use the numbers 5 and 10.

Which operation will give the largest answer? What is the number sentence? Which operation will give the smallest whole number? What is the number sentence?

UNIT 8

Unit 8
SESSION 2

TOTAL TIME
30 MINUTES

OBJECTIVES
- Choose and use appropriate operations and calculation strategies to solve problems
- Explain how a problem was solved, orally and, where appropriate, in writing

VOCABULARY
operation, addition, add, subtraction, subtract, multiplication, multiply, division, divide

RESOURCES
individual white boards or digit cards

STARTER
5 MINUTES

Play *Ping Pong*. You say a number from 0 to 10, and the children call out the number needed to make 10. If you say 'three', for example, they reply 'seven'. Aim to keep the pace going.

Rehearse number facts for 10, using the vocabulary add, plus, subtract, minus; for example, 7 + 3 = 10, 10 − 7 = 3. The children should display their answers with digit cards or on their individual white boards.

Try *Ping Pong* with numbers to 100, such as 'sixty' – 'forty', 'eighty' – 'twenty'. Rehearse number facts for 100 with multiples of ten, for example, 70 + 30 = 100 and 100 − 70 = 30. The children should display their answers with digit cards or on their individual white boards.

KEY QUESTIONS

How do we do these calculations
24 + 10 =
46 + 3 =
30 + 70 =
6 + 7 = ?

MAIN ACTIVITY
20 MINUTES

Write 20 on the board. Ask the children to work in pairs and think about the different number sentences they could write that give this answer. Encourage them to think of as many as possible. Write the different responses on the board.

Write these number sentences on the board: □ + 7 = 15, □ × □ = 16, □ ÷ □ = □, □ − □ = □. Underneath write 2, 4, 8, 10.

The children work in pairs to find out which numbers go in which boxes. They can use a number more than once. Encourage them to test out numbers. After a few minutes, go through the number sentences, encouraging the children to explain how they got their answers.

Now write 100 on the board. Tell the children to write down a way of making 100 which uses addition, a way which uses subtraction and a way which uses multiplication. Look at some of the possibilities the children suggest.

Can anybody think of a way of making 100 using division? Will the number we start with be bigger or smaller than 100?

Remind them to think of the division sentence they made above. Ask them to think how that could help them.

Explain activity sheet 8.2, which the children should complete before the next session.

KEY QUESTION

How can number facts for 10 help us when we are calculating with multiples of 10? For example, if we know 5 + 2 what is 50 + 20?

PLENARY

5 MINUTES

Write the following number sentences on the board: □ + 7 = 20, □ × □ = 12, □ − 8 = □, □ ÷ 2 = □. Tell the children that you don't want the answers straight away. First, they have to explain to you how to set about finding each answer.

What do you have to do first to work out the addition sentence?

Name .....

Date .....

Dear Parents/Carers,

In our mathematics lessons, we have been looking at word problems and whether we have to add, subtract, multiply or divide. Please help your child to write a word problem for each of the four operations, as in the example below.

Thank you for your help.

Your child's teacher

Example:	
For multiplication	I gave 7 sweets to each of my 5 friends. How many sweets did I give away?
$7 \times 5 = 35$	Answer: 35 sweets
Addition +	
Subtraction −	
Multiplication ×	
Division ÷	

If there is time, ask your child some short word problems of this kind. Keep the arithmetic simple but vary the examples you use.

UNIT 8

Name .....

Date .....

Activity sheet 8.1

1. Which operation (+ or −) should go in the box to make the number sentence right?

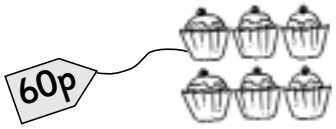
20 ☐ 5 = 15 20 ☐ 5 = 25 50 ☐ 20 = 30 50 ☐ 20 = 70

2. Which operation (+, −, × or ÷) should go in the box to make the number sentence right?

6 ☐ 2 = 8 6 ☐ 2 = 12 6 ☐ 2 = 4 6 ☐ 2 = 3

3. Pencils cost 6p.
How much will 6 pencils cost?

4. Cakes cost 60p for 6.
How much is one cake?



5. Carlo has 22 stickers.
He gives Kim 7 stickers.
How many stickers does Carlo have left?

UNIT 8

Name .....

Date .....

Activity sheet 8.2

1. Complete these number sentences:

5 × ☐ = 45	45 ÷ 5 = ☐
2 × ☐ = 28	28 ÷ ☐ = ☐
☐ × ☐ = 40	40 ÷ ☐ = ☐

2. Make up these number sentences.
   Use the numbers 3, 4, 9 and 12 only.

☐ × ☐ = ☐	☐ + ☐ = ☐
☐ ÷ ☐ = ☐	☐ − ☐ = ☐

3. Fill in the signs in these number sentences:

3 ☐ 5 = 15	15 ☐ 3 = 12
15 ☐ 3 = 5	15 ☐ 5 = 3
3 ☐ 12 = 15	5 ☐ 3 = 15

4. Make as many number sentences as you can using the numbers 20, 15, 10, 5 and 2 only.


SPRINGBOARD 3
SPRINGBOARD 3
SPRINGBOARD 3
SPRINGBOARD 3
SPRINGBOARD 3
PART 3
UNIT
9

USING MONEY

UNIT 9

Unit 9
• SESSION 1 •

TOTAL TIME	OBJECTIVE	VOCABULARY	RESOURCES	HOMEWORK
30 MINUTES	• Solve simple word problems involving money	coins, money, amount, price, increase/going up, decrease/going down, exactly, how much?	Sets of coins from 1p, 2p, 5p and 10p (resource sheets 14 and 15); Set of coins 20p, 50p, £1, £2; a purse; two hoops; 0–9 dice; 0–9 paperclip spinner (resource sheet 1, Unit 1)	Play the *Coins Game* using a paper clip spinner (resource sheet 1, unit 1) and paper coins (resource sheets 14 and 15).

STARTER

5 MINUTES

Write on the board: 14 ☐ 2 = 28, 14 ☐ 2 = 7, 14 ☐ 2 = 16, 14 ☐ 2 = 12. Ask the children to fill in the operation in each case, explaining how they worked it out.

Play *Ping Pong* (see Unit 8, session 2), but this time with numbers that make 20. Aim to keep the pace going.

KEY QUESTIONS

- **Does 3 + 7 = 10 help you to know 13 + 7 = 20?**
- **If you know 13 + 7 = 20, do you know the answer to 20 − 13?**

MAIN ACTIVITY

20 MINUTES

Show the children a full set of coins. Lay out two hoops, one labelled 'more than 10p' and one 'less than 10p'. Is there any coin they cannot place (10p)? Discuss why not.

Before the lesson, place three coins, such as 5p, 2p and 1p, in a purse. Write the total amount (in this case 8p) on the board. Ask the children which three coins you have in the purse.

Repeat the exercise with another combination of coins, say 10p, 5p and 2p. Tell the children you have 17p in the purse. Which three coins do you have?

Split the class into pairs and give each pair a set of coins, one of each denomination to £2. Tell them to make different amounts using four coins. Ask the children to write down the coins used every time as a number sentence, such as 1p + 2p + 5p + 10p = 18p. After a few minutes, ask: *Which four coins make the largest amount? Which make the smallest amount?*

Draw a toy on the board, and label it 25p. *How much do two of these toys cost?*

The price (25p) increases or goes up by 10p. How much is the toy now?

The original price (25p) goes down by 5p. How much does it cost now?

Draw another toy, this time costing 72p, and repeat the process with the same questions.

Go through the rules of the *Coins Game* shopping game the children will play at home. Explain activity sheet 9.1, which the children should complete before the next session.

KEY QUESTIONS

- **Which coin is worth the most?**
- **What is the least number of coins you need to have 25p exactly?**
- **What are they?**

PLENARY

5 MINUTES

Consider with the children the key questions above.

Now draw a bag of sweets on the board and put on a 47p price label.

How do you know which coins to give?
How do you work out the least number of coins to use to make a particular amount?

Encourage children to explain strategies, such as starting with the coin of largest value below the amount you want to make.

UNIT 9

Unit 9
SESSION 2

TOTAL TIME 30 MINUTES

OBJECTIVES
- Solve simple word problems involving money
- Give change and work out which coins to pay

VOCABULARY
coins, money, amount, price, increase/going up, decrease/going down, how much?

RESOURCES
sets of 1p – £2 coins;
a purse;
a small toy with 16p and 65p price labels

STARTER 5 MINUTES

Show two coins, 20p and 2p. Ask: *'How much have I got?'* Repeat this with two other coins.

Write 28p on the board. *What is the least number of coins I need to make 28p exactly? What are they?*

Repeat with 74p.

KEY QUESTIONS

- **What is the greatest amount you could have if you had three coins?**
- **What if each coin is different?**
- **How do you work out which coins to use if you want to pay an exact amount?**

MAIN ACTIVITY 20 MINUTES

Show the children a purse with three 10p and three 5p coins in it. Tell them you are going to buy a 20p stamp. Ask them how much you will have left. Do not remove any coins. Ask the children how they are going to work out the answer. Will there be more or less in the purse?

Practise giving change. Appoint one child the shopkeeper and another the shopper. Show the toy with the 16p label on it. Tell the children that the shopper has a 20p coin in her purse. How much change will the shopkeeper give her? Stress that 20p is more than 16p. Count on to find out how much change she should have. Establish that it is 4p change.

Relabel the toy as costing 65p.

What coins could you use to pay for this? What is the smallest number of coins? Which coins are they?

Tell the children you have one 50p and one 20p coin in your purse.

How much is this?

How much change do you get when you use these coins to pay for the 65p toy?

Encourage the children to count on. Now tell them you have one £1 coin to pay for the toy.

How much change will you have this time?

Encourage the children to count on, first in ones to 70 and then in tens to 100.

How much change do you have altogether?

Explain activity sheet 9.2, which the children should complete before the next session.

KEY QUESTION

If we pay more than we need to, how do we work out the change?

PLENARY

5 MINUTES

Show a 20p coin and tell the class you want to buy crisps for 14p.
How do you find out how much change you need?

Some children will be able to use their knowledge of number facts but others will need to count on in ones. Now show a £1 coin and tell them you are going to buy a pen for 78p.

How much change? How do you work it out?

Encourage children to go to the nearest multiple of 10 first (in this case 80) and then count on in tens to 100.

UNIT 9

Name .....

Date .....

Dear Parents/Carers,

We have been looking at the coins we need to make up different amounts of money. Please help your child by playing the game below.

Thank you for your help.

Your child's teacher

Coins Game

- You need ten 1p, ten 2p, ten 5p and ten 10p coins. This is your bank. Use coins or the cut-outs from resource sheets 14 and 15.
- Take it in turns to spin the spinner twice. Add the scores together; for example 7 and 6 will give you 13. Take that amount from the bank, provided you can make it up exactly with the coins available. Giving change is not allowed.
- Continue taking turns until neither player has been able to withdraw anything from the bank for three turns. The player who has the most money at this point is the winner.

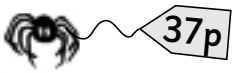
UNIT 9

Name .....

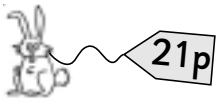
Date .....

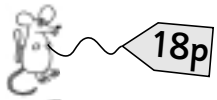
Activity sheet 9.1

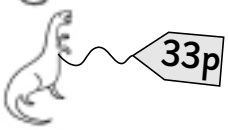
1. Work out the coins you need to pay for each toy.
Use the smallest number of coins.

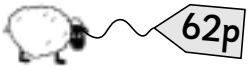


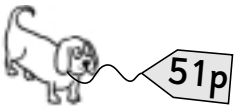
20p + 10p + 5p + 2p = 37p











2. Now increase the price of each toy by 10p.

37p + 10p = 47p	

3. Work out how much you pay for:

Two spiders .....

Two sheep .....

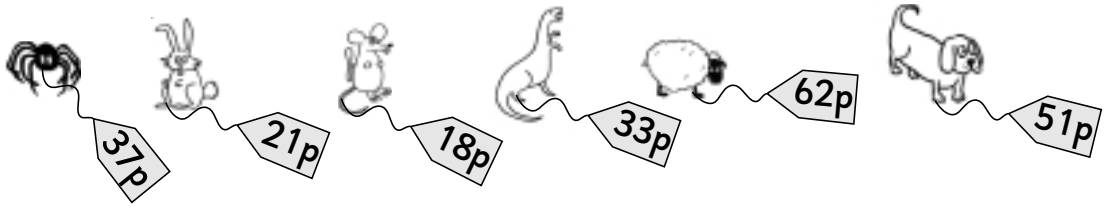
One mouse and two rabbits .....

UNIT 9

Name .....

Date .....

Activity sheet 9.2



1. Work out the change when you buy:

One mouse with	10p 5p 5p	.....
One dinosaur with	20p 20p	.....
One dog with	50p 20p	.....
One sheep with	50p 5p 5p 5p	.....
One spider with	50p	.....
Two rabbits with	50p	.....

2. Write a number sentence to show what to add to these amounts to make 50p.

27p + 23p = 50p

46p .....

25p .....

38p .....

33p .....

19p .....

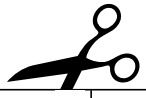
Unit 9
RESOURCE SHEET 14

1p	1p	1p	1p	1p
1p	1p	1p	1p	1p
2p	2p	2p	2p	2p
2p	2p	2p	2p	2p
5p	5p	5p	5p	5p
5p	5p	5p	5p	5p

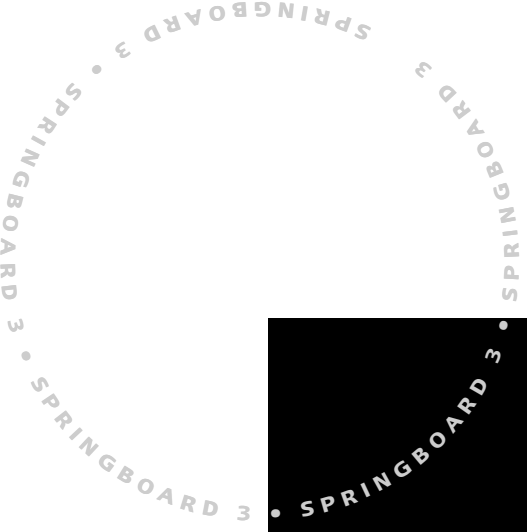
UNIT 9

Unit 9

RESOURCE SHEET 15



10p	10p	10p	10p	10p
10p	10p	10p	10p	10p
20p	20p	20p	20p	20p
20p	20p	20p	20p	20p
50p	50p	50p	50p	50p
50p	50p	50p	50p	50p



PART 3

UNIT
10

READING SCALES

UNIT 10

Unit 10
• SESSION 1 •

TOTAL TIME
30 MINUTES

OBJECTIVES	VOCABULARY	RESOURCES	HOMEWORK
• Read a simple scale to the nearest labelled division • Round numbers less than 100 to the nearest 10	multiples of ten, scale, divisions (on a scale), round up, round down, vertical, horizontal	individual white boards or number cards; number line or grid 0–99; paper copies of the 10-division line (see resource sheet 16); OHT of measuring beaker	Choose six numbers under 100, that are not multiples of 10. Round these up or down to the nearest 10.

STARTER
5 MINUTES

Ask children to give the answers to the following on their individual white boards or with number cards: 10 − 4 = □, 20 − 4 = □, 30 − 4 = □, 40 − 4 = □ , 50 − 4 = □ . Ask a child to describe the pattern.

Extend these to numbers beyond 100, (110, 120, 130 and so on).

Revise multiplication and division facts based on the two-, five- and ten-times tables.

KEY QUESTION

If you know 10 − 4 = 6, how does this help you to work out 70 − 4?

MAIN ACTIVITY
20 MINUTES

Give out copies of resource sheet 16 and draw a 10-division line on the board. Label one end of the line on the board 20 and the other end 30. Point at the marker in the middle. *What number is this?* If necessary, demonstrate on the number line or 0–99 grid. Point to other markers. *What number is this?* Ask children to point to the answers on their lines.

Change the labels on the line to 0 and 100. Ask the children to show you where 50 is and then ask them to show you 30. It may help to hold the strips vertically to match the multiples of ten on the 0–99 grid.

Now label one end of the line 40 and the other 50. Point to the third marker. *What number is this? Which end is this nearer to?*

Demonstrate that 43 is nearer to 40 than it is to 50. We round it down to the nearest multiple of 10. Write 43 ➔40 on the board, say that 43 is nearer to 40. Point to 48. *Which end is this nearer to?*

Demonstrate that it is nearer to 50. We round it up to the nearest multiple of 10. Write 48 ➔ 50 on the board.

Change to a 10–20 line. Demonstrate that 15 is in the middle. Explain that it is usual to round up when the digit is 5. Point to some other markers and ask what numbers they stand for. Now tell the children to turn their paper round, so that the line is vertical rather than horizontal. Make sure that all the children understand these terms. Ask some more questions.

Does it matter if the scale is vertical rather than horizontal?

Tell the children to round each of the numbers up or down to the nearest 10.

If there is time, point to some numbers on the 0–99 grid and ask the children to round them to the nearest 10.

Explain activity sheet 10.1, which the children should complete before the next session.

KEY QUESTIONS

- **Why aren't all the numbers written on the scale?**
- **What helps you to work out numbers not marked on the scale?**

PLENARY

5 MINUTES

Consider with the children the two questions above. Ask the children to point to the middle division on their 10-division line.

What number will go here when the line begins with 50 and ends with 60? Begins with 100 and ends with 110? Begins with zero and ends with 10? Begins with zero and ends with 20?

Finish by asking: *How many numbers can you round up or down to 50? What are they (45 to 49 and 51 to 54)?*

UNIT 10

Unit 10
SESSION 2

TOTAL TIME 30 MINUTES

OBJECTIVES
- Read a simple scale to the nearest labelled division
- Round numbers less than 100 to the nearest 10

VOCABULARY
scale, divisions (on a scale)

RESOURCES
OHT of till receipt (resource sheet 17); OHT of beaker (resource sheet 18); counting stick

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STARTER 5 MINUTES

Look at the OHT of a till receipt. Ask the children to identify prices under £1, then take turns to round the numbers up or down to the nearest 10p. Write the answers on the board and put them in order.

Tell the children that when a number ends in a 5 we round the number up to the next multiple of 10.

25 rounds to 30
55 rounds to 60 and so on.

KEY QUESTIONS

- **How do we round numbers ending in the digit 5?**
- **What is 55 rounded to the nearest 10?**
- **What are 54 and 56 rounded to the nearest 10?**

MAIN ACTIVITY 20 MINUTES

Count along a counting stick and back in tens. Tell the children that one end of the counting stick is zero and the other is 100. Repeat, but this time hold the stick in a vertical position. Point to different positions and ask children what number they represent. At first, focus on multiples of ten, then include 25, 55 and 95 in the middle of a section.

Tell the children that one end is zero and the other is 100. What is halfway? Point to this division. Tell them that one end is zero and the other is now 20. What is halfway? Repeat with one end as 10 and the other 20, then one end as zero and the other as 50.

Show the OHT of the measuring beaker. Explain that the scale shows cupfuls. The top of the scale is 100 cupfuls. Ask children where they think the level of 40 cupfuls of water would be. How do they know? Do the same for 95 and 10 cupfuls.

Tell them that the top of the scale is now 50 cupfuls.

Where would the level be for 25 cupfuls? 5 cupfuls? 10 cupfuls?

Explain activity sheet 10.2.

KEY QUESTION

What do we need to know in order to mark a particular number of cupfuls on a scale?

PLENARY

5 MINUTES

Refer again to the OHT of the beaker.

How do you work out a position on the scale?

Emphasise that you must think about the size of each division. You need to find the nearest labelled point and count on.

UNIT 10

Name .....

Date .....

Dear Parents/Carers,

We have been learning to round numbers up or down to the nearest multiple of 10. Please help your child with the task below.

Thank you for your help.

Your child's teacher

Rounding up or down

Numbers ending with the digits 1 to 4 are rounded down and those ending with the digits 5 to 9 are rounded up. This means, for example, that we round 62 down to 60, while we round 68 up to 70. We always round numbers ending in 5 up to the next multiple of 10.

Choose any five numbers below 100, that are not multiples of 10, and write them in the column on the left. Round them to the nearest multiple of 10 in the right-hand column.

Chosen number	Rounded to the nearest multiple of 10

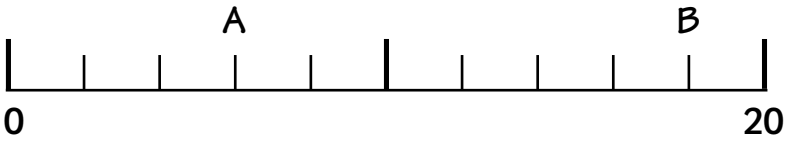
UNIT 10

Name .....

Date .....

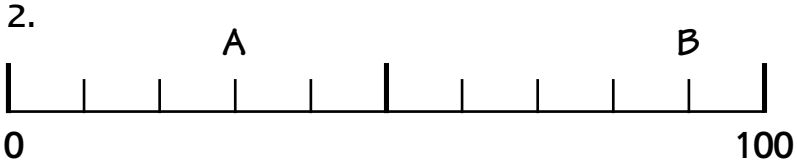
Activity sheet 10.1

1.



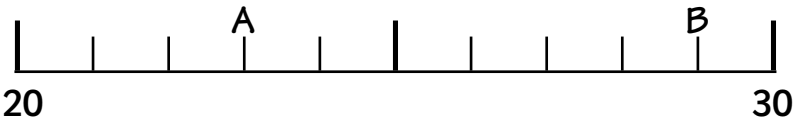
The halfway point is ..... A is ..... B is .....

2.



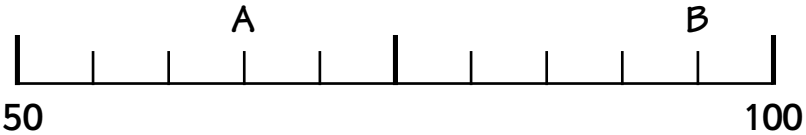
The halfway point is ..... A is ..... B is .....

3.



The halfway point is ..... A is ..... B is .....

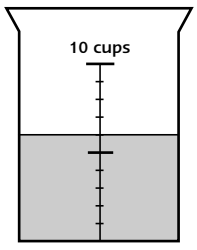
4.



The halfway point is ..... A is ..... B is .....

5. How much water is in the container? ..... cups

How many more cups do you need to fill the container to the 10 cups mark? ..... cups



UNIT 10

Name .....

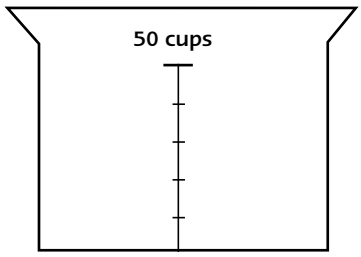
Date .....

Activity sheet 10.2

1. Draw the level of water on each container.

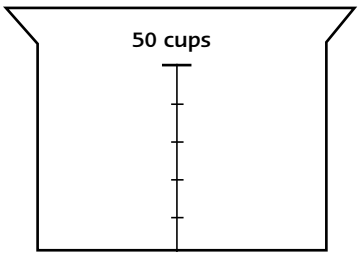
A

20 cups



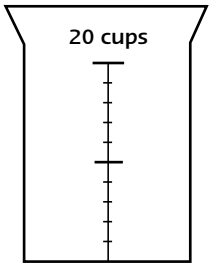
B

15 cups



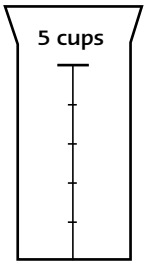
C

6 cups



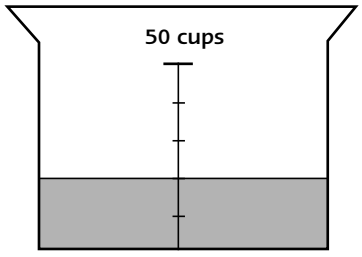
D

4 cups



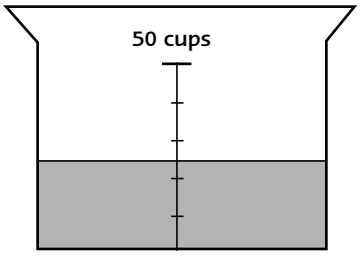
2. Work out how much water to add to each container to fill it to the top mark.

A



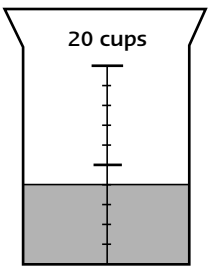
Add ..... cups

B



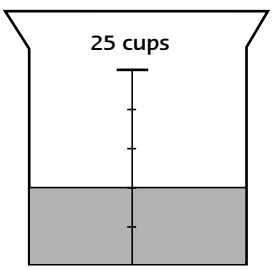
Add ..... cups

C



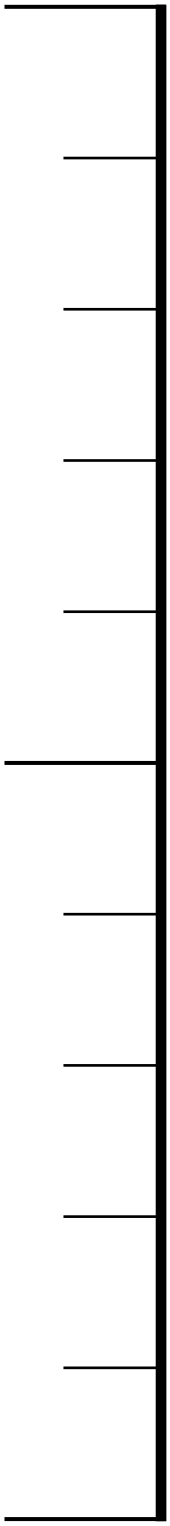
Add ..... cups

D



Add ..... cups

RESOURCE SHEET 16



Unit 10

RESOURCE SHEET 17

JOE S SUPERMARKET

	£
Eggs Medium 6	1.25
Apples Cox 1kg	0.48
Tomatoes 500g	0.78
Potatoes Bag	1.66
Onions 500g	0.52
Milk Semi-Skim	0.26
Yoghurt x4	1.40
Cheddar 250g	0.96
Chicken FR	5.85
Wholemeal Loaf	0.69
Bread Rolls x6	0.96
Crispbread	0.51
Teabags 40-Pack	0.99
Lemons x2	0.86
Bananas x5	0.75
Cornflakes 500g	1.62

Unit 10

RESOURCE SHEET 18

OHT