

1

Playing with numbers!

<p>Coverage</p> <p>This unit is about reading, writing and comparing numbers up to 100. It looks at numbers in context, place value and rounding to the nearest ten. It also covers addition and subtraction of two-digit whole numbers using a range of mental strategies.</p> <p>Multiplication of single-digit numbers is covered as repeated addition and doubling.</p> <p>The unit finishes with calculator skills.</p>	<p>Skills</p> <p>N1/E2.2 read, write, order and compare numbers to 100</p> <p>N1/E2.3 add and subtract two-digit whole numbers</p> <p>N1/E2.4 recall addition and subtraction facts to 10</p> <p>N1/E2.5 multiply using single-digit numbers</p> <p>N1/E2.6 approximate by rounding to the nearest 10</p> <p>N1/E2.7 use and interpret +, −, × and = in practical situations for solving problems</p> <p>N1/E2.8 use a calculator to check calculations using whole numbers</p>
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Resources needed for effective teaching of this unit:

Demonstration	Group	Pair	Individual
<p>Arrow/number cards 0, 1, 2, 3, 4, 5, 6, 7, 8, 9</p> <p>10, 20, 30, 40, 50, 60, 70, 80, 90</p> <p>100 grid or numbers 9–99 written on a square on the board</p> <p>Dartboard (optional)</p> <p>Till receipts</p> <p>Pairs of similar objects priced differently (optional) e.g. 2 cans of drink</p> <p>0–100 number line</p> <p>Number words</p>	<p>Packs of playing cards (1 between 2 people)</p>	<p>Dominoes, real or card</p> <p>10 cards, 5 addition facts and 5 related subtractions</p> <p>Number cards 1–20</p>	<p>Arrow/number cards 0, 1, 2, 3, 4, 5, 6, 7, 8, 9</p> <p>10, 20, 30, 40, 50, 60, 70, 80, 90</p> <p>Cubes</p> <p>Counters</p> <p>Pennies</p>

Reminder

In the Links, H means Help, E means Extension and M means Mini-project.

Remember

Throughout the unit, be aware of the reading needs of learners.

You may need to read out and/or interpret parts of the text.

Words **highlighted** in **bold** will need particular clarification.

Context

- Discuss the picture as a group.
- Be sensitive to the fact some learners may not know about the lotto or agree with its principle. Direct the questions onto favourite numbers, numbers that mean something to the learner, birthday, age, national insurance number, house number.

Stimulus questions

- Do you play any games that involve numbers?
- Do you have a favourite number? What is it?
- Do you play the Lotto?
- What numbers do you choose? Why?

Pages 2–5 Numbers everywhere!

Introduction to activity 1

- We use numbers as a common language, telling time, money, dates etc. It is important to know how to use numbers correctly. What are the single digits that make up all of our numbers? (0–9) Some learners may need large or tactile number cards.
- As a group, discuss numbers in the environment. Where do you come across numbers in everyday life?
- Ask learners to give example of numbers they have used today.

Activity 1

- Ask learners to write the single digits 0–9 in order. Explain the term **digit**.
- Look at two-digit numbers. Break down into **tens** and **units**. Explain the terms ‘tens’ and ‘units’. Use materials such as abacus, rods, cubes and arrow cards to aid understanding.

Activity 2

- Explain the digits in 73. Use arrow cards to show 7 as 70 and place the unit 3 card on top to make 73. Call out some other two-digit numbers and ask learners to make up these numbers on their arrow cards or write them down on paper. Repeat until learners are confident.
- Learners will check their answer (62) and may need help in spelling and reading the numbers. It would be useful to have a list of word numbers, ten, twenty, thirty etc. in the room.
- The number 12 is exceptional and must be learned, as must 11 (chance to discuss historical use of dozens), 13–19 form a group, and from 20 the naming of numbers obeys the same rules.

Activity 3

- Read through the story together. Perhaps discuss appropriate answers. Then either call out numbers to go in the story or ask learners to provide their own.
- Discuss the answers together, emphasising that there are many answers for each question. Assess if learners are using numbers appropriately. Are two-digit numbers being written correctly? Are telephone numbers the right length? Is the time appropriate?

Activity 4

- Look at the costs of the newspapers. Explain the terms cheapest and dearest. Explain that we order two-digit numbers by looking at the tens first.
- Explain that if two numbers have the same tens value, we look at the units digit to decide the order. Practise with pairs of numbers, e.g. 24 and 68, which comes first? 35 and 39, which comes first?

- Ask learners to order the numbers from smallest to largest.

Activity 5

- Remind learners of the Lotto balls. They appear in any order and are then re-arranged from smallest to largest to make them easier to read and remember.
- Ask learners to re-arrange the Lotto balls.

Activity 6

- Ask learners to fill in the missing numbers on the 0–99 grid. Look for patterns in columns and rows. Assess how learners are forming the numbers. Are they getting the tens and units digits correct?

LINKS: H1, H2, M1

Pages 6 and 7 An odd number

Introduction to activity 7

- Why are some numbers referred to as **odd** or **even**?
- Look at the cartoon series together and discuss what has happened? Why did the boy eat another biscuit?
- Explain, using cubes, how an even number will make two towers of the same height. An odd number will not.

Activity 7

- Use cubes or counters to help. Learners count out the number of biscuits and try to put them into two equal groups and then draw on to plates.
- Check learners' answers.

Activity 8

- Use counters, pennies or cubes. Ask learners to ring the even numbers.
- Ring the even numbers on the grid. Look at the alternate pattern. Look at the common ending digits in even numbers: 2, 4, 6, 8, 0. Look at the

digits in odd numbers: 1, 3, 5, 7, 9. Any whole number can be determined odd or even by looking at these digits.

Activity 9

- Use this game to assess learners' understanding of odd and even numbers, and ordering and comparing two-digit numbers. Encourage general questions rather than specific numbers to narrow the field.

LINKS: H3, E1

Pages 8–11 It all adds up

Introduction to activity 10

- Discuss the need for addition (i.e. adding the cost of shopping, having the correct change for a bus fare, stocktaking and ordering, in games) and explain that there are different ways to add numbers together to make it easier. Review the + symbol. Talk about related vocabulary such as sum of, more than, increase, total, plus.

Activity 10

- Play the game of '21' in pairs or groups. Encourage learners to put the larger number first when adding, then count on.
- As a group discuss the different tools and strategies used by learners to help with addition, i.e. counting on, using fingers, counters, writing it down.
- Check learners' answers to (C) and (D) and make sure they can all play the game.

Activity 11

- Use these activities to review number facts to 10 and reinforce that addition can be done in any order.
- Write some examples on the board and look for pairs that make 10. Extend by writing longer series of numbers and looking for pairs that make 10.
- Learners work individually on the examples.

Activity 12

- Remind learners about tens and units. Work on some extra activities with arrow cards if necessary, partitioning numbers into tens and units.
- Show how partitioning two-digit numbers into tens and units can help when adding (see examples in learner material). Write a few more examples on the board to reinforce this before learners attempt the activity. Provide paper, pencils, cubes and counters, and number lines to help.
- Encourage learners to move numbers about in a structured way to aid with adding.

Activity 13

- Discuss doubling in games such as dominoes and darts.
- Learners work individually, using counters or cubes to help with the adding.

Activity 14

- Play dominoes with real or card dominoes. Ask learners to double the numbers they match.
- Encourage learners to start learning some simple doubles by heart.
- Check learners' answers.

Activity 15

- Check learner's answers.
- Learners can use their knowledge of doubles to calculate near doubles. Carefully explain about adjusting by 1 (and later by 2 as confidence grows). Some learners may find that whether they add or subtract, the adjustment is confusing – encourage these learners to use one of the other methods.
- Discuss a few examples before learners attempt this activity individually.

Introduction to activity 16

- Have a selection of till receipts for learners to see. Discuss that units are underneath units and tens are under tens.
- Go through the two examples carefully. Explain the similarity to the 'chunky method' of partitioning the tens and units. Look closely at

Example 2 and crossing ten. Why does the new digit go in the tens column? Make sure learners are clear about the tens and units.

Ensure learners understand why the 1 digit is in the tens column.	2	6	26 is 20 and 6
	+	3	7
	<hr/>		37 is 30 and 7
	1	3	Add the units $6 + 7 = 13$
	5	0	Add the tens $20 + 30 = 50$
	<hr/>		
	6	3	Then add together.

- Remember that learners will certainly have been shown alternative methods for 'crossing ten' or 'carrying one' and if they are accurate in using another method they should continue to do so.

Activity 16

- Allow time for learners to work through the examples individually.
- Check learners' answer to first section.
- Learners complete the additions.
- Ask learners to write out a column addition for another person to try. Are they aligning the columns correctly? Use of squared paper will help.

LINKS: H4, E2, M2

Pages 12–15 Take it away!

Introduction to activity 17

- Go through the example showing the subtraction practically.
- Talk about when you use subtraction, i.e. is the inverse of addition and that addition is the inverse of subtraction, and related vocabulary such as take away, difference between, minus, decrease, less than. The concept of inverses is difficult so introduce it but there is no need to labour it.

Activity 17

- Check learners' answers to question 1.
- Learners work individually on the subtractions, using cubes or counters.

Introduction to activity 18

- Talk about related addition and subtraction facts. Give examples, e.g. if I know $6 + 4 = 10$ then I also know $10 - 4 = 6$. This illustrates inverse operations.

Activity 18

- Prepare a set of ten cards for each pair of learners.
 - Each set consists of five cards on which an addition fact is written (using the numbers 1–20) and five cards with a related subtraction fact for each addition fact.
 - Give a set of cards to each pair, who play a game trying to match the pairs of cards.

Extension/alternative

- Prepare sets of cards as above but for one addition fact prepare two subtraction facts and for another addition fact do no subtraction fact. Players match the cards to find the odd one out – the addition fact card with no subtraction fact card to match.

Introduction to activity 19

- Have real examples, if possible, of similar items but priced differently and compare the prices. Use a number line to count up to find the difference.

Activity 19

- Check learners' answers to question 1.
- Working individually, learners compare the prices and find the difference, using number lines to help counting up.

Activity 20

- Discuss the example. Ask learners to describe their own methods, both standard and non-standard.
- Practise counting on in tens.
- Go through some more examples
- Learners complete the activity individually or in pairs.

Activity 21

- Look at subtracting 11 and 21 by taking away 10 (20 etc.) and subtracting 1 more.
- Do several examples with the group.
- Learners do question 1, check their answer and then complete examples individually.

Activity 22

- Practise adding and subtracting 10 to numbers, e.g. find 10 more than 23. Refer to a 100 square or number line if needed. Discuss how prices often end in 9. Why might this be? Talk about adding or subtracting 9 by using 10 and adjusting by 1. $20 - 9$ can be worked out as $20 - 10 = 10$ then add 1. Some learners may be confused over adjusting. Use concrete examples and materials to aid understanding.
- Check learners' answers to the introductory example.
- Introduce the activity. Ensure learners are familiar with the coins and their value.

LINKS: H5, H7, H8, E3, M2

Pages 16 and 17 Round about

Introduction to activity 23

- As a group, discuss the need for approximating and rounding, e.g. how much money to take shopping, estimating the number of cups of tea or coffee for a crowd, setting out chairs in a hall etc.
- Explain the difference between 'exact' and 'approximate'. Talk about different vocabulary: roughly, about, almost.
- Refer to numbers on a 100 square. Remind learners of the position of the units digit in two-digit numbers. Find all the multiples of 10. Reinforce that they all end in zero. Explain about rounding to the nearest ten, down if numbers are 1, 2, 3 or 4. Up if numbers are 5, 6, 7, 8 or 9. Ask learners questions that involve rounding up or down two-digit numbers to the nearest ten. Refer to the 100 square for help.

Activity 23

- Working individually, learners round the prices to the nearest 10p. Discuss the answers as a group.

Activity 24

- Working individually, learners round the prices, add them together and work out if they have enough money.

Activity 25

- Ask learners to round the indicated measurement to the nearest 10 cm. Explain the measurements are in centimetres. Discuss where rounding measurements may be useful. (Measuring in centimetres and metres is covered in unit 4)
- Warn learners that rounding measurements requires very careful thought. Shops will cut to the nearest 10 cm but there is no use buying 90 cm of trim if the item is 93 cm long!

LINKS: M4

Pages 18 and 19 Easy times

Introduction to activity 26

- Work through the example of the cars together. Discuss the need for multiplication and grouping objects. Ask learners where they find this skill useful.
- Show multiplication as repeated addition.

Activity 26

- Talk through the method again and ask learners to work out the tyres needed for four cars.
- Check learners can work out the tyres needed for four cars.
- Working individually, learners work out how many tyres are needed for each group of cars, grouping cubes or counters to help.

Activity 27

- Use concrete examples if possible of a 4×3 baking tray. Work through the example

together. Discuss what other things might come in arrays, e.g. milk crates, egg cartons.

- Show learners that 3×4 has the same product (total) as 4×3 but does not always mean the same thing, e.g. taking 3 tablets 4 times a day is not the same as taking 4 tablets 3 times a day.

Activity 28

- Show learners that doubling is the same as multiplying by 2.
- Learners work individually on the doubling examples.

LINKS: H6, M3

Page 20 Calculate it

Activity 29

- Give calculators to learners, either individually or in pairs. Review how to turn on and clear any display before starting. Review how to enter single-digit numbers before introducing two-digit numbers.
- Show how to enter the tens first then the units.
- Learners work on entering the examples and check their answers.

Activity 30

- Ask learners to look at the symbol keys $+$, $-$, \times , $=$ and use the calculator to add single-digit numbers before adding two-digit numbers.
- Talk about the importance of estimating the answer first. An extra number added by mistake could throw the whole calculation off. Ask learners to enter the example $32 + 41$ on their calculators.
- Learners try the example $23 + 14$ and check their answers.
- Learners work individually or in pairs, estimating the answers by rounding to the nearest ten and adding/subtracting and then entering the correct values into the calculators to get an accurate answer.

LINKS: H7, M4

Pages 21 and 22 Help

H1

- Have learners play bingo as a class or group with the teacher being the caller.
- Many versions are available commercially or you could invite learners to make their own cards, with numbers being selected from a limited range.
- Pause before recording the numbers on the board to allow learners time to think. Writing the numbers up will help learners visually and aid with recording which numbers have been called and for checking purposes against learners' grids.

H2

- Ask learners to look for book pages to help with number recognition and ordering. Try to find books with fewer than 100 pages.

H3

- The tower cubes show, in a very visual way, the difference between odd and even amounts. Ask learners to compare numbers and predict if they will be odd or even. Look at the units digits to find a pattern.

H4

- Learners play this addition game in pairs. Ask learners to explain their thinking. What strategies or tools are they using to help with the additions? Give cubes and other apparatus to give more visual and tactile help.

H5

- This activity will reinforce number bonds to 10 and aid in a very concrete way the concept of subtraction as taking away.

H6

- Encourage learners to record the different ways of grouping 24 as multiplication facts, e.g. 1 group of 24 can be written as 1×24 .

H7

- Use different calculators according to the learners' needs – audible, large or tactile numbers. Try using calculators that display the sum input as well as the answers. Be aware that not all calculators work in the same way. Ensure learners understand which operation is required.

H8

- Discuss that there are four related facts for each set of numbers. Review the symbols $+$, $-$ and $=$.
- Individually, ask learners to find all four. Assess whether learners are positioning the numbers correctly. Check the use of correct symbols.

Page 23 Extension

↑ E1

- Encourage learners to look at a variety of books.

↑ E2

- Encourage learners to find all the ways of making 34. Each horizontal, vertical and diagonal row makes 34, as well as the four centre numbers, each four corner numbers and the opposite diagonal numbers shown. Discuss how learners added the numbers. What strategies did they use?

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

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

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

E3

- Learners play the game of Nim in pairs with 12 counters. This game will encourage learners to count the number remaining, look for odd and even numbers and develop subtraction strategies. (Beware, however, that the winning strategy for Nim itself is very complicated.)

How am I doing?

Learners should complete this individually, with teacher support where necessary.

Page 24 Mini-projects

M1

- Ask learners to look out for numbers where they live, and keep a record. Why are numbers being used? (measurement, price, time)

M2

- Assess which operations learners are using to make the display numbers. Can they use multiplication for some, or subtraction?

M3

- Use a real dartboard. Has anyone seen darts on TV? How does someone score 180? Point out the double and treble areas. Ask learners to work out the doubles for all the numbers on the board.
- Then do the same with the trebles. Use counters to help with the larger numbers.

M4

- Round prices to the nearest 10p when out shopping.
- Encourage learners to use a calculator during the week for shopping, and record the totals.

Pages 25 and 26 Check it

- Use these questions to assess how learners have coped with the skills in this unit. Ask learners to indicate the areas in which they would like more help.