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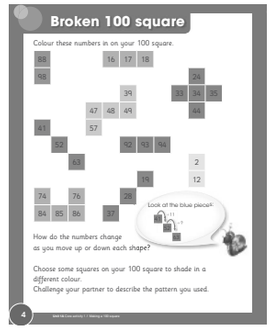
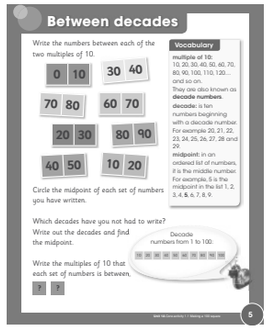
Excerpt
More information

1A 1 The 100 square

Quick reference

Core activity 1.1: Making a 100 square (Learner's Book p4–5)
Learners gain a good understanding of the 100 square by recognising and using the repeating number patterns it contains, and by writing numbers between each pair of multiples of 10.





Prior learning
Some experience of exploring numbers to 100.

Objectives* – please note that listed objectives might only be partially covered within any given chapter but are covered fully across the book when taken as a whole

		1A: Number (*Numbers and the number system*)
2Nn1	–	Count, read and write numbers to at least 100 and back again.
2Nn9	–	Say a number between any given neighbouring pairs of multiples of 10 e.g. 40 and 50.
		1A: Problem solving (*Using techniques and skills in solving mathematical problems*)
2Pt2	–	Explain methods and reasoning orally.
2Pt3	–	Explore number problems and puzzles.

*for NRICH activities mapped to the Cambridge Primary objectives, please visit www.cambridgeprimarymaths

Vocabulary
decade number • decade • multiple of 10 • midpoint

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Core activity 1.1: Making a 100 square

LB: p4

Resources: *100 square* photocopy master (p4); one per learner. *Make a 100 square* photocopy master (CD-ROM); one per learner. One sheet of A4 paper for each learner (ideally in different colours). Scissors. Glue. (Optional: *100 square jigsaw* photocopy masters (CD-ROM); coloured paper; scissors; glue and bead string/bars.)

Begin with the *100 square* photocopy master. Invite learners to talk about what they see. "*Tell me about a pattern you can see on the 100 square. How do the numbers change in each row (or column)?*" Finish by focusing on the 1 to 9 pattern in each row and column.

Tell the learners that they are going to make their own 100 square. Give each learner a copy of the *Make a 100 square* photocopy master. Ask them to count how many 1 to 9 rows they have. Ask questions such as, "*Do you need all those? How could you use the 1 to 9 strips to make a 100 square? Why have you only got one row of tens numbers? Where do they appear on the 100 square?*" If necessary, explain that they need to cut out each of the 1 to 9 strips and keep one strip as it is, turn one strip into teen numbers, another into the 20 numbers, and so on.

Once learners have a strip for each row of the 100 square, they can stick the strips in order on paper. They should then cut the decade number strip into squares and place each decade number at the right-hand end of the correct row.

Explain that the tens numbers are multiples of 10; they are the numbers we say when we are counting in tens from zero. They are also called decade numbers. 'Dec-' means 10, so a decade is the ten numbers starting with the decade number. For example, the numbers 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29 are a decade.

When everyone has completed a 100 square, call out numbers one at a time, asking learners to put a finger on that number on their 100 square. Occasionally ask a learner to describe where that number is. For example, 21 is near the top of the square on the left-hand side, below number 11 and above 31. You may need to continue this activity, and the rest of the activities, in a second session.

Ask learners to put a finger on a decade number (a multiple of 10) such as 30 and another finger on the next decade number, 40. Ask learners to tell you a number between those two numbers. Ask someone else to tell you another, and another. Ask questions such as,

Vocabulary

decade number: 10, 20, 30, 40, 50, 60, 70, 80, 90.

decade: ten numbers beginning with a decade number, for example 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29. A period of 10 years is called a decade, so the 10 years from 2010 to 2019 are a decade.

multiple of 10: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120…and so on.

midpoint: the middle number in a list of ordered numbers. For example, 5 is the midpoint of the list, 1, 2, 3, 4, **5**, 6, 7, 8, 9.

"*Which is the midpoint? How many different answers are there? What if you had your fingers on 50 and 60? Or 80 and 90? Or 20 and 30?*" Draw out that there are always nine numbers between each multiple of ten. The pattern is always something-one, something-two up to something-nine, so there will always be nine numbers between. For example, the numbers 21–29 are the numbers between the two decade numbers 20 and 30. As a class, get learners to call out the numbers between other two decade numbers.

Look out for!

Learners who want to include the multiples of 10 (or decade numbers) when giving numbers **between** two decade numbers. *Explain that the classroom floor is between the walls; the walls are not between, they mark the beginning and the end.*

Summary

Learners have a good understanding of the layout of the 100 square and can talk about the patterns they see.

Notes on the Learner's Book

Broken 100 square (p4): after learners have explored how the numbers change, as they move up or down the blue shapes, challenge them by asking if this will always happen with any set of numbers in this shape on a 100 square.

Between decades (p5): challenge learners to fill in the numbers between the decade numbers. Encourage them to see that '50–60' is missing from the set of decades. They should fill in the numbers and find the midpoint.

Check up!

- "*What is the next multiple of 10 after 30?*"
- "*Which numbers come between 40 and 50?*"
- "*Tell me about a pattern you have noticed on the 100 square.*"

More activities

100-square jigsaws (class, group or individual)

You will need the *100 square jigsaw* photocopy masters (CD-ROM).

Reproduce each of the four jigsaws onto different coloured paper. Learners write in the missing numbers and then cut out the pieces. They then swap jigsaws with a partner and complete each other's. The jigsaws become more difficult, with fewer numbers already completed on each piece. Cutting out the pieces before completing the numbers on the 100 square makes this a more difficult challenge, particularly for jigsaws three and four. Numbers could be completed on each piece or after the jigsaw has been completed.

Bead bar counting (class, group or individual)

You will need a bead bar.

Count the beads together from one. Stop occasionally and invite a learner to write that number where everyone can see it. Check that the number is written correctly and that everyone agrees it is correct before moving on. Count together from before the beads start (zero) in tens to 100 and back again, moving the beads as you say each number.

Games Book (ISBN 9781107623491)

100 Square Muddle (p1) is a game for two or three players. Learners use their understanding of the patterns in the 100 square to find the correct number.

100 square

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

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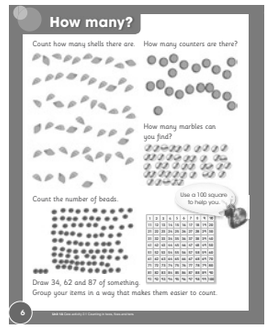
1A 2 Counting in twos, fives and tens

Quick reference

Core activity 2.1: Counting in twos, fives and tens (Learner's Book p6–7)
Learners explore the patterns made when counting in twos, fives and tens. They use counting in tens to count larger quantities. Learners count amounts of up to 100 objects accurately by arranging them in tens and ones.



Prior learning
Some experience of exploring numbers to 100.

Objectives* – please note that listed objectives might only be partially covered within any given chapter but are covered fully across the book when taken as a whole

		1A: Number (*Numbers and the number system*)
2Nn1	–	Count, read and write numbers to at least 100 and back again.
2Nn2	–	Count up to 100 objects, e.g. beads on a bead bar.
2Nn3	–	Count on in ones and tens from single and two digit numbers and back again.
2Nn4	–	Count in twos, fives and tens, and use grouping in twos, fives or tens to count larger groups of objects.
2Nn7	–	Find 1 or 10 more/less than any two-digit number.
2Nn9	–	Say a number between any given neighbouring pairs of multiples of 10, e.g. 40 and 50.
2Nn14	–	Understand odd and even numbers and recognise these up to at least 20.
		1A: Problem solving (*Using techniques and skills in solving mathematical problems*)
2Pt2	–	Explain methods and reasoning orally.

*for NRICH activities mapped to the Cambridge Primary objectives, please visit www.cambridgeprimarymaths

Vocabulary
total • count • twos • fives • tens

Core activity 2.1: Counting in twos, fives and tens

LB: p6

Resources: *100 square* photocopy master (chapter 1, p4). A beadstring/bar photocopy master (CD-ROM). *100 square patterns* photocopy master (p10). Prepare 20 bags (each with a large write-on label) each containing between 50 and 100 of a small item such as pebbles, beans, peas, feathers, dice, red counters, blue counters and so on. *Blank 10 by 10 grid* (CD-ROM). (Optional: *1–100 number cards* use cards 1 to 20; four separate cards with +1, –1, +10, –10 for each pair of learners made using *Blank cards* (CD-ROM).)

Display the *100 square* photocopy master for the whole class to see. Ask a learner to choose a number for everyone to find on the 100 square, then count on in ones or tens from that number. If you have a beadstring, carry out the same activity on the string, first finding the correct number of beads by counting in tens and ones, and then count on. Repeat with three or four different learners choosing a different number. Ask the learners to talk about the patterns they notice in the numbers they say.

"It can be hard to see the patterns when we just say the numbers, so it is better if we colour them in."

Give each learner a copy of the *100 square patterns* photocopy master and explain that they need to count in twos and colour in each number they say on the first 100 square. Challenge them to continue the pattern all the way up to 100. Explain that they need to do the same for the other two 100 squares, counting in fives on the second one and in tens on the last one.

When the learners have completed their patterns, talk about the patterns together. Ask questions such as, "*What do you notice about the fives and tens patterns? Which numbers are coloured in on every 100 square? Why is that? Which numbers are not coloured in on any of the 100 squares? Why is that? Does the pattern on the first 100 square remind you of a pattern we have looked at before?*" **(odd and even)**

Show the learners the bags of small items and explain that you do not know how many of each item is in each bag and it would be useful to know before you tidied up all the items, so you need some help.

Vocabulary

total: how many altogether.

Look out for!

- Learners who find it hard to continue one or more of the patterns at first. *Count along on the 100 square with them to support counting on the correct amount.*
- Learners who find this very straightforward. *Ask them to predict how the patterns would continue on a 101 to 200 square. Give them blank 10 by 10 grids for them to make their own number square and explore continuing the patterns.*
  Ask questions such as, "How will this be different to the 100 square? How will you need to change the decade numbers strip (or multiples of 10 strip)?"
  Once the learners are comfortable with the layout of the 101 to 200 square, challenge them to make their own jigsaws or muddle game.

Ask each pair of learners to count how many there are in a bag and write the number on the label, even if they get a different total from the learners who counted it before. Explain that you would like each bag to be counted two or three times in case anyone makes a mistake. Allow the learners to begin without any more discussion.

Look at how the learners arrange the objects to count them. If some learners are arranging the items in twos, fives or tens stop the session and explain that it seems to be taking a long time and some learners are getting in a muddle. Say that some learners seem to have got organised and are getting on faster, so you would like everyone to explain how they are counting.

If no one is counting in twos, fives or tens, stop the session after a while and explain that it seems to be taking a long time and some learners are getting in a muddle. Then ask for ideas to speed things up and count correctly. Talk through the learners' ideas. If necessary, remind the learners that they have been counting in tens, so perhaps that could help them. Draw out that it would be useful to put the items in rows of tens and then count them in tens and ones.

After the contents of the bags have been counted at least twice, ask the learners to finish off the bag they are counting and not start a new one. Choose a bag and look at the numbers on the label. If all the numbers are the same, comment that, "*That must be right because you all got the same total*".

When you find a bag with different numbers on it, comment that, "*We need to count this one together as there are two (or three) different numbers written on the label*". Carefully count out the items, putting them in rows of ten. Then count in tens and ones to find the total. Explain that what you have done is used an imaginary 100 square to help you. Put a 100 square next to the arrangement to show the children how your arrangement is the same as the 100 square. Point out the number on the 100 square and how it is made up of the same number of rows of ten as your arrangement. If there is time, count out a second bag, this time counting up in twos or fives.

Explain that you could count small items by putting one on each little square in the hundred square, but that would not work for bigger items. Tell the learners that it is very useful to keep a picture of the 100 square in their heads and arrange things in rows of 10, like on the 100 square, when counting them.

Look out for!

- Learners who are finding it difficult to get organised. *Put their items into rows of ten and encourage them to take over. Count the rows in tens each time another row is added.*
- Learners who find it hard to switch from counting in tens to counting in ones. *Model indicating along the row for tens and touching each single one as you count. If necessary, count the total together.*
- Learners who find this straightforward. *Ask them to tell you how many more of a particular item would be needed to make 100, or to find two bags which total 100 or near 100. You could also ask them how many counters altogether, if you have two bags of counters, or some other combination of two or even three bags. They could use their 101 to 200 square to help them find the total.*

Opportunity for display

Display the bags with their labels on a table or other surface. Add a large label inviting learners and adults to check if the labels are correct. Alternatively, take the labels off the bags and add a large label inviting learners and adults to find the correct label for each bag.

Summary

- Learners recognised and continued the patterns made when counting in twos, fives and tens.
- Learners are able to count amounts of up to 100 objects accurately by arranging them in tens and ones.

Notes on the Learner's Book

How many? (p6): Ask learners to count the number of each object in twos, fives or tens. Challenge the learners to draw an arrangement for a particular number that would make it easier to count the number in twos/fives/tens.

Bags (p7): ask learners to write a number of items that could be in each bag. Compare results.

Check up!

- Start counting and invite a learner, or groups of learners, to take over and continue the count. For example, 2, 4, 6, 8… or 10, 20, 30… or 5, 10, 15, 20… Ask the learners to explain how they knew what came next.
- Ask learners to picture a 100 square in their heads, then imagine a counter on 23. Ask, "*Where do you need to look to find the number that is ten more (or ten less or one more or one less)?*" Repeat with a different start number.

More activities

Counting (pairs or group)

You will need *1–100 number cards* photocopy master (CD-ROM); use cards 1 to 20, and four separate cards with +1, –1, +10, –10 made using *Blank cards* (CD-ROM).

Both sets of cards need to be shuffled and placed face down in front of the learners. A card from the 1 to 20 set is turned over to tell the learners where to start their count. A card from the set of four cards is turned over to tell the learners how to count. +1 means count on in ones, –1 means count back in ones, +10 means count on in tens and –10 means count back in tens. Each pair continues their count until they reach 100 or 0 if they can. They then turn over the next card in each pile and start a new count. Some learners will find it useful to have a 100 square in front of them for support. Learners could count together or take it in turns.

Bead bar counting (group)

You will need a beadstring/bar.

Part the beads into two groups. Ask the learners to tell you how many beads are in the first group. Support them to count in tens then ones to find out how many. Ask learners how many are in the second group. Remind them that they are 100 altogether and challenge the second group together to check.

Counting rhymes (class)

Practise counting in twos, fives and tens using counting rhymes, clapping rhythms or other actions. Here are some suggestions, but make up your own too.
Counting in twos – clap on each number. 2, 4, 6, 8, 10, "*You're doing great, let's do it again*".
Counting in fives – show alternate fists opening for each five. 5, 10, 15, 20 clap twice. 25, 30, 35, 40 clap twice. 45, 50, 55, 60, clap twice. Continue in the same way to 100.

Counting in tens – show both fists opening then closing as you say each ten. 10, 20, 30, 40, 50, "*Counting is so nifty!*" 60, 70, 80, 90, 100, "*Counting to 100 is easy!*"

Play Clap Click (class)

Each clap means ten, each click of the fingers means one. So clap, clap, clap, click is 31. After demonstrating a few times, choose a learner to Clap Click a number. The learner who says the correct number first can then make the next number. As they get better at the game, sometimes do the Clicks before the Claps to make the game more challenging.

Games Book (ISBN 9781107623491)

100 square games (p3) *Game 1* is a game for two or three players. Learners practise adding ten using the 100 square.
100 square games (p3) *Game 2* is a game for two or three players. Learners practise taking away ten using the 100 square.

100 square patterns

Count in 2s, 5s or 10s. Colour in the numbers on the 100 square as you say them.
Carry on the patterns to the end of each 100 square.
What do you notice about each pattern?

count in fives

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

count in twos

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

count in tens

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
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