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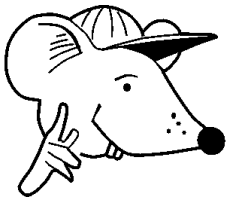
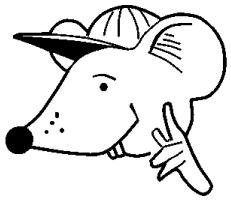


MATHEMATICS



N.S. Yr. 5 P.17

Extend number sequences by counting on and back

Equipment

Paper, pencil, ruler.
Number squares.
Calculator.

MathSphere

Children should be able to understand, read and write the following terms:

Next, consecutive, sequence, predict, continue, rule, formula, classify, property.

They should be able to count on in 6s, 7s, 8s and 9s to about one hundred and then count back. A 1 - 100 number line, or a number square, is really useful for this kind of work.

It is important that children learn to count on and back from different starting points i.e. do not always start counting from 1. It is not as easy as it sounds when the starting point is unfamiliar:

e.g. count on in 6s from 67

Constant practice out loud is very valuable!

The series of numbers should be recognised as a SEQUENCE which can be continued and further numbers in the sequence can be PREDICTED.

From this a RULE can be made for the sequence. At first this rule will be in words only. In later years these rules can be written in algebra as a FORMULA.

Many calculators can be made into an adding machine eg 'add 7 machine' by carrying out the following instructions:

Enter [7] [+] [+] [=]

Then enter the starting number eg [15] and keep pressing [=]

(Don't press anything else - no extra add signs or clear.)

The calculator can also be made into a subtraction machine eg 'subtract 7' in just the same way. It is a good idea to use the calculator and call out the next number before pressing the = sign, seeing how quickly counting on and counting back can be achieved.

(Note: this may not work for some calculators)

Fill in the missing numbers in these sequences:

1. 14, 20, 26, 32, ☐, ☐

2. 47, 54, 61, 68, ☐, ☐

3. 9, 17, ☐, 33, ☐, 49

4. 27, 34, ☐, ☐, ☐

5. 67, 58, 49, ☐, 31, ☐

6. 99, 92, ☐, 78, ☐, 64

7. ☐, 42, 36, 30, ☐, 18

8. ☐, ☐, 78, 70, 62, 54

9. Take a 9 x 9 square. Starting at 1 count on in sevens. Circle or colour the numbers you land on.

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

10. What do you notice?

If you went on, would 100 be in your sequence? How do you know?

Fill in the missing numbers in these sequences:

1. 51, 59, 67, 75, ☐, ☐

2. 3, 9, 15, 21, ☐, ☐

3. 17, 26, ☐ 44, ☐, 62

4. 18, 25, 32, ☐, ☐, ☐

5. 8, 14, 20, ☐, 32, ☐

6. 99, 91, ☐, 75, ☐, 59

7. ☐, 82, 75, 68, ☐, 54

8. ☐, ☐ 46, 40, 34, 28

9. Take a 10 x10 square. Starting at 1 count on in nines. Circle or colour the squares. What do you notice?

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

10. If you started at 5 and counted on in nines would you get a similar pattern? How is it different?

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Number sequences

Predict the next two numbers in these sequences. Then say what the rule is for the sequence.

Example: 16, 24, 32, 40, *48* *56*

Rule: ***add 8***

1. 12, 19, 26, 33, ☐ ☐

Rule…….....

2. 67, 76, 85, 94, ☐ ☐

Rule…….....

3. 9, 15, 21, 27, ☐ ☐

Rule…….....

4. 32, 39, 46, 53, ☐ ☐

Rule…….....

5. 77, 86, 95, 104, ☐ ☐

Rule…….....

6. 65, 58, 51, 44, ☐ ☐

Rule…….....

7. 42, 34, 26, 18, ☐ ☐

Rule…….....

8. 66, 57, 48, 39, ☐ ☐

Rule …….....

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Number sequences

Predict the next two numbers in these sequences. Then say what the rule is for the sequence. Take care - some might go into negative numbers!

Example: 5, 11, 17, 23, *29* *35*

Rule: ***Add 6.***

1. 10, 17, 24, 31, ☐ ☐

Rule…….....

2. 87, 93, 99, 105, ☐ ☐

Rule…….....

3. 34, 43, 52, 61, ☐ ☐

Rule…….....

4. 33, 44, 55, 66, ☐ ☐

Rule…….....

5. 103, 95, 87, 79, ☐ ☐

Rule…….....

6. 27, 21, 15, 9, ☐ ☐

Rule…….....

7. 31, 24, 17, 10, ☐ ☐

Rule…….....

8. 103, 94, 85, 76, ☐ ☐

Rule…….....

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

1. On a 1- 100 number square start at 8 and count on in eights. Circle or colour each number you land on.

2. What do you notice? Is there a pattern? Describe the pattern.

3. Practice counting forwards and backwards in eights, starting at different numbers.

4. On the same grid, starting at 4, count on in fours. Circle or colour (in a different colour) each number you land on.

5. What do you notice? Is there a pattern? Describe the pattern.

6. Write down the numbers that you have shaded twice?

7. What can you say about the pattern of numbers that you have shaded twice?

8. Take another number square and starting from a different number (eg 2), repeat the above. Practice counting on and back from this new starting position.

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

1. On a 1- 100 number square start at 9 and count on in nines. Circle or colour each number you land on, including 9. (You may have done this part before.)

2. What do you notice? Is there a pattern? Describe the pattern.

3. Practice counting forwards and backwards in nines.

4. On the same grid, starting at 3, count on in threes. Circle or colour (in a different colour) each number you land on.

5. What do you notice? Is there a pattern? Describe the pattern.

6. Write down the numbers that you have shaded twice?

7. What can you say about the pattern of numbers that you have shaded twice?

8. Take another number square and starting with a different number (eg 5), repeat the above. Practice counting on and back from this new starting position.

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For this work you will need a calculator.

Enter [6] [+] [+] [=]

12 may well come up - ignore this - do not press anything!

Then enter the starting number [8] and keep pressing [=]

(Don't press anything else - no extra add signs or clear.)

1. Write down the answers that you get, up to 44.

2. Write, in words, what is happening as the sequence goes on.

3. Predict and write down what the next three numbers in the sequence, after 44, will be. Write them down. Check on the calculator to see if you are correct.

4. Clear the calculator and repeat the above, but enter 9 instead of 6.

i.e. Enter [9] [+] [+] [=]

Then enter the starting number [10] and keep pressing [=]

5. Write down the answers that you get, up to 55.

6. Write in words what is happening as the sequence goes on.

7. Predict and write down what the next three numbers in the sequence, after 55, will be. Write them down. Check on the calculator to see if you are correct.

8. Make your calculator into an add 8 machine. Start at 0 and keep pressing [=] sign until you reach over 100. How many times did you have to press the sign?

For this work you will need a calculator.

Enter [25] [-] [-] [=]

0 may well come up - ignore this - do not press anything!

Then enter the starting number [250] and keep pressing [=]

(Don't press anything else - no extra add signs or clear.)

1. Write down the answers that you get, down to 50.

2. Write, in words, what is happening as the sequence goes on.

3. Predict and write down what the next three numbers in the sequence, after 50, will be. Write them down. Check on the calculator to see if you are correct.

4. Clear the calculator and repeat the above, but enter 11 instead of 25.

i.e. Enter [11] [-] [-] [=]

Then enter the starting number [121] and keep pressing [=]

5. Write down the answers that you get, down to 22.

6. Write in words what is happening as the sequence goes on.

7. Predict and write down what the next three numbers in the sequence, after 22, will be. Write them down. Check on the calculator to see if you are correct.

8. Make your calculator into a subtract 9 machine. Start at 45 and keep pressing [=] sign until you reach 0. How many times did you have to press the sign? Press another four times and record your answers.

9. Try counting up and down with your calculator from other starting positions. How good are you at predicting the next number?

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

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

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Answers

Page 3
1. 38, 44 **2.** 75, 82 **3.** 25, 41 **4.** 41, 48, 55 **5.** 40, 22 **6.** 85, 71
7. 48, 24 **8.** 94, 86
9. Diagonal line back two and down one
10. no (not in 7 times table or similar answer)

Page 4
1. 83, 91 **2.** 27, 33 **3.** 35, 53 **4.** 39, 46, 53 **5.** 26, 38 **6.** 83, 67
7. 89, 61 **8.** 58, 52
9. Diagonal, right to left. Digits add up to 9.
10. Yes, but in two parts.

Page 5
1. 40, 47 numbers going up in 7s
2. 103, 112 numbers going up in 9s
3. 33, 39 numbers going up in 6s
4. 60, 67 numbers going up in 7s
5. 113, 122 numbers going up in 9s
6. 37, 30 numbers going down in 7s
7. 10, 2 numbers going down in 8s
8. 30, 21 numbers going down in 9s

Page 6
1. 38, 45 numbers going up in 7s
2. 111, 117 numbers going up in 6s
3. 70, 79 numbers going up in 9s
4. 77, 88 numbers going up in 11s
5. 71, 63 numbers going down in 8s
6. 3, ¯3 numbers going down in 6s
7. 3, ¯4 numbers going down in 7s
8. 67, 58 numbers going down in 9s

Page 7
2. Several patterns might be described eg diagonal lines, across two and down etc.
5. variety of answers, diagonals, every other number down etc.
6. 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96
7. eight times table, going up in 8s etc

Page 8
2. diagonal lines, right to left digits add up to 9 etc
5. sets of diagonal lines
6. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99
7. all nine times table etc

Page 9
1. 8, 14, 20, 26, 32, 38, 44 **2.** going up in sixes - all even numbers etc
3. 50, 56, 62 **5.** 10, 19, 28, 37, 46, 55
6. Going up in 9s - alternate odd/even numbers **7.** 64, 73, 82 **8.** 13

Page 10
1. 250, 225, 200, 175, 150, 125, 100, 75, 50 **2.** Going down in 25s
3. 25, 0, ¯25 **5.** 121, 110, 99, 88, 77, 66, 55, 44, 33, 22
6. Going down in elevens
7. 11, 0, ¯11 **8.** 5 times, ¯9, ¯18, ¯27, ¯36