

Pattern

Home/School Links Sheet 24

Pattern and sequences

Your child will be learning about pattern and sequences over the coming days. S/he needs to know the mathematical language associated with pattern and sequences: copy, extend, devise, predict, repeated pattern, element of the pattern.

Note 1: Stages of development in exploring patterns:

1. Children copy patterns.
2. Children extend patterns.
3. Children devise their own patterns.

Note 2: Your child should be able to predict what comes next in a given pattern and should give a reason for his/her prediction.

Game: What is missing?

Devise a pattern with your child using any material you have to hand at home, such as pasta shapes, coloured clothes pegs, socks, etc. Invite your child to close his/her eyes. Remove one item from the pattern and tell your child to open his/her eyes. Your child must decide what is missing and explain his/her reasoning. For example, make a pattern out of socks: red, red, blue, green, purple, purple, red, red, blue, green...

Pattern detective

Ask your child to examine patterns from his/her environment around the home or garden, such as wallpaper, gift-wrapping paper, bathroom/kitchen tiles, striped jumpers, etc. Discuss them and draw attention to the way each pattern is repeated.

Integrate patterns

Have fun copying, extending and devising the following patterns. Always invite the children to say what comes next and to explain their reasoning for their answer.

- *P.E.:* Long step, short step, long step; clap hands, touch knees, touch toes.
- *Visual Arts:* Matchbox dipped in paint: vertical, horizontal, vertical, etc. Design a necklace with three to four different coloured beads.
- *Nature:* Life cycle of animals.
- *Science:* Use rough and smooth materials to make rough, smooth, rough, smooth, etc. patterns.

- *Music:* Create a pattern with two or three percussion instruments, e.g. hit a triangle, drum, tambourine, triangle, drum, tambourine. Children take turns repeating the same sounds. Make singing patterns, e.g. doh ray me fa, doh ray me fa.

Extension: Invite your child to close his/her eyes. As with earlier patterns, remove one item from these patterns. Ask your child to open his/her eyes, decide what is missing and explain his/her reasoning.

Time patterns

Days of the week: Discuss the days of the week pattern with your child. Ask him/her what day comes after Tuesday, Friday, etc. Ask similar questions about the patterns for the months of the year and the seasons.

Your child's day: Examine the pattern for a typical day for your child and discuss it, e.g. before breakfast, after breakfast, at school, when I go home, after dinner, etc.

Money patterns

Your child can copy, extend and devise patterns with 5c, 10c, 20c and 50c coins.

Extension: Ask your child to predict what the 10th/15th, etc. coin will be in the pattern.

Skip counting in 2s, 3s, 4s...10s

Ask your child to find things in the local environment, home or garden that come in 2s, 3s, 4s...10s. S/he could also research this on the internet under your guidance.

Calculator fun

Ask your child to press $6 + = = =$ on the calculator to show counting in 6s. This can be done for all tables.

Ask your child to key in 108, then press $- 9 = = =$ on the calculator to show counting back in 9s. This can be done for all division tables.

Hundred square detective work

Using the hundred square on page 123 of the textbook, ask your child questions such as:

- How many rows are on the hundred square?
- How many numbers begin with 7? Where are they?
- What is the first number in the second row? What is the last number in the eighth row?

Activity Ideas & Information

Prior knowledge

The pupil should be able to:

- Explore, recognise and record pattern in numbers 0–999.
- Group and count in 2s, 3s, 4s... 10s on the number line and hundred square.
- Recognise number bonds through grouping.
- Explore other number patterns, including odd and even number patterns, on the hundred square.
- Explore, extend and describe (explain the rule for) sequences.
- Use pattern as an aid in the memorisation of number facts.

Home/School links



Home/School Links Sheet 24 can be sent home to parents when teaching pages 122–124. For maximum benefit, you may prefer to send it home at the start of the section, which deals with pattern in the environment as well as number sequences. It encourages parents to become actively involved in the learning process.

Warm-up activity 1

Clap and stamp

To begin, ask children to skip count forwards in unison in 2s, 3s, 4s... 10s, clapping their hands as they say each individual number. When you blow a whistle, the children must count backwards from the number they said last, stamping their feet as they count each individual number.

Extending and using patterns

Children predict what comes next in a pattern and should give a reason for their prediction.

Note: This is a revision and extension of work done on pattern in Third Class.

Stages of development in exploring patterns:

1. Children copy patterns.
2. Children extend patterns.
3. Children devise patterns.

Ask the children to close their eyes. Remove one item in the pattern while the children have their eyes closed. Tell the children to open their eyes. The children must decide what is missing and explain their reasoning.

Collaborative learning/Active learning 1

Pattern detective

Organisational setting: Children work in pairs or groups of three

Materials required: Patterns from the children's environment, e.g. wallpaper, gift-wrapping paper, clothes with defined patterns, etc.

Ask the children to examine patterns from their environment, such as wallpaper, gift-wrapping paper, socks, striped jumpers, etc. Discuss the pattern and draw attention to the way it is repeated.

Whole-class activity 1

Integrate patterns

Organisational setting: Whole class

Materials required: Matchboxes, coloured beads, rough and smooth paper or material, percussion instruments, e.g. triangle, drum, tambourine

Have fun copying, extending and devising the following patterns. Always invite the children to say what comes next and to explain the reasoning for their answer.

- **PE:** *Long step, short step, long step; clap hands, touch knees, touch toes.*
- **Visual Arts:** *Matchbox dipped in paint: vertical, horizontal, vertical, etc. Design a necklace with three to four different coloured beads.*
- **Nature:** *Life cycle of animals.*
- **Science:** *Use rough and smooth materials to make rough, smooth, rough, smooth, etc. patterns.*
- **Music:** *Create a pattern with two or three percussion instruments, e.g. hit a triangle, drum, tambourine, triangle, drum, tambourine. Children take turns repeating the same sounds. Make singing patterns, e.g. doh ray me fa, doh ray me fa.*

Collaborative learning/Active learning 2

Fun making patterns

Organisational setting: Children work in groups of three

Materials required: Pasta shapes, drinking straws, cubes, counters, multi-links, logi-blocks, buttons, toothpicks, counters, shells, etc.

Children take turns devising patterns using some of the materials mentioned above or other suitable materials. They reveal the first part of their pattern before it starts to repeat to the other members in their group. Other children examine the pattern and predict what will come next.

Extension: Children predict what the 10th, 15th, etc. element of the pattern will be.

Collaborative learning/Active learning 3

Money patterns

Organisational setting: Children work in pairs

Materials required: 5c, 10c, 20c and 50c coins

Children can copy, extend and devise patterns with the above coins.

Extension: Children predict what the 10th, 15th, etc. coin in the pattern will be.

Collaborative learning/Active learning 4

Shape patterns

Organisational setting: Children work in pairs

Materials required: 2-D shapes (circle, square, rectangle, triangle, hexagon, semi-circle, oval) and 3-D shapes (cube, cuboid, cylinder, cone, sphere, triangular prism, pyramid)

Children can copy, extend and devise patterns with the above shapes.

Extension: Children predict what the 12th, 14th, etc. shape will be.

Variation: Children make the same pattern using different materials, for example 3-D shapes instead of 2-D shapes, coins instead of shapes, etc.

Skip counting in 2s, 3s, 4s...10s

The following activities are applicable to developing the concept of skip counting in 2s/3s/4s...10s. We will use skip counting in 6s to demonstrate.

Using the environment: Detective work

Ask the children to find things that come in sixes. They can research this on the internet (under supervision) or they can bring in, draw or photograph some items from their environment that come in sixes, e.g. half a dozen eggs, legs on insects, faces on a cube, points on a Star of David, etc.

Collaborative learning/Active learning 5

ICT spreadsheet

Organisational setting: Children work in pairs

Materials required: A computer with Microsoft Excel

Start Microsoft Excel. A blank spreadsheet should open up.

Enter 6 in the cell A1 (the first rectangle). Enter = A1+6 in cell B1.

Place the cursor at the bottom of the highlighted rectangle in cell B1 and drag it across row 1. The number sequence 6, 12, 18... will appear.

Whole-class activity 2

Use body parts

Organisational setting: Whole class

Ask the children how we could show six, 12, etc. ears. Answer: three, six, etc. children line up next to each other.

Variation: Do the same activity for eyes, hands, feet, shoes, etc.

Whole-class activity 3

Money money!

Organisational setting: Whole class

Materials required: Three 2c coins x 10 or an IWB displaying three 2c coins x 10

Display the three 2c coins (they can be displayed on the IWB instead). Ask the children to count the three 2c coins in sixes.

Collaborative learning/Active learning 6

Make patterns and count

Organisational setting: Children work in pairs

Materials required: Multi-links or cubes: 12 of one colour and 12 of a different colour

Ask the children to make a pattern using multi-links, joining six of the same colour together followed by six multi-links of a different colour. They repeat this pattern until each group has approximately 24 multi-links joined together. Children count their multi-links in 6s. The pattern can be extended using more links.



Whole-class activity 4



Silver Sylvie counts in 6s

Organisational setting: Whole class

Materials required: Number/concept board (PCM 43) with different colour pegs or hundred square (PCM 36) and colours, counters or cubes for each child

Ask the children to put six red pegs on their number board, followed by six green pegs, followed by six white pegs, followed by six blue pegs, etc. The children continue this pattern until they fill in the number board.

Alternatively, ask the children to start shading in numbers in 6s using different colours for each group of six on their number line or hundred square.

Variation: Children can place counters or cubes on the even numbers.

Whole-class activity 5

Shape up

Organisational setting: Whole class

Materials required: Hexagons

Ask: *How many sides does a hexagon have? How many sides do two, three, four, etc. hexagons have?*

Whole-class activity 6

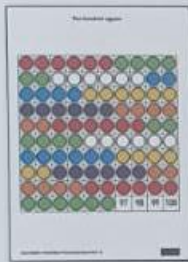
Calculator fun

Organisational setting: Whole class

Materials required: Calculator

Have the children press $6 + = = = =$ on the calculator to show counting in sixes.

Whole-class activity 7



Hundred square detective work 1

Organisational setting: Whole class

Materials required: Hundred square (PCM 36)

Activity A: Class Discussion

Sample questions for class discussion:

- How many rows are on the hundred square?
- What are the numbers in the third row?
- How many numbers begin with 7? Where are they?
- What is the first number in the second row? What is the last number in the eighth row?
- How many columns are there?
- Find all the numbers ending in 6. Where are they?
- In which column are the numbers ending with 9?
- Which number is in the third row? Which number is in the seventh column?
- Call out all the even numbers/odd numbers in the second row.

Activity B: Number bonds

- Start at 18/28/38/48...98. Count on two. What do you notice?
- Start at 13/23/33/43...93. Count on six. What do you notice?
- Start at 83/73/63...93. Count back seven. What do you notice?

Collaborative learning/Active learning 7

The hundred 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

Hundred square detective work 2

Organisational setting: Children work in pairs

Materials required: Hundred square (PCM 36)

Activity A: Children investigate all the numbers on the hundred square and write down a list of the numbers whose digits add up to 9, e.g. 9, 81, 90, 72, 63, 54, 45, 36, 27, 18.

Variation: Find all the numbers whose digits add up to 10 or 11.

Activity B: Children find all the numbers with the digit 1 or digit 2 in them.

Activity C: Ask the children to find palindromes, e.g. 22, 44, 66, 88.

Activity D: Place a red counter on all the multiples of 2, a green counter on all the multiples of 4 and a blue counter on all the multiples of 8. Ask: *Why do some numbers have more than one counter on them?*

Activity E: Colour all the odd numbers blue. Colour all the even numbers red. Ask the children to investigate the following:

- $odd + odd = even$
- $even + even = ?$
- $odd + even = ?$
- $odd \times odd = ?$
- $even \times even = ?$
- $odd \times even = ?$

Collaborative learning/Active learning 8

The hundred 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

Hide and seek

Organisational setting: Children work in pairs

Materials required: Hundred square (PCM 36), counters, cubes

Give each pair a copy of **PCM 36**. Child A covers any number s/he wishes on the hundred square with a counter as Child B looks away. Child B has to work out which number is covered. If Child B gets the number correct, s/he wins a cube. Child A swaps roles with Child B. The winner is the child who wins the most cubes after 10 turns each.

Extension 1: Child A covers a 2 x 2 square of numbers on the hundred square, e.g. 34, 35, 44, 45. Child B wins a cube if s/he works out all four numbers that are covered over.

Extension 2: Child A covers a 3 x 3 grid of numbers on the hundred square, e.g. 43, 44, 45, 53, 54, 55, 63, 64, 65. Child B wins a cube if s/he works out all nine numbers that are covered over.

The hundred 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

Concept board

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144