

# Look for patterns

## Rationale

The discovery of patterns in number makes mathematical relationships more interesting and engaging for young students. It unlocks many solutions to problems. Teaching patterns lays a foundation for the teaching of algebra. The ability to manipulate numbers using pattern formations, in order to solve problems, leads to a strong understanding of mathematical thinking.

## Teaching *Look for Patterns*

The following items should be considered in the teaching of problem solving using Looking for Patterns.

- A The types of patterns possible.
- B The 4 main skills students are expected to master.

### A Types of patterns possible

Discuss and record the types of patterns we see everyday – shapes, sizes, colours, numbers, letters, positions and combinations of these.

Have students give examples.

### B Main skills

#### I Make up and record

Students must be able to generate a pattern. P1, P5, P6, P8.

On large sheets of paper make up patterns using the criteria above.

Using magnets, display several at a time on a board. Discuss – Is it a pattern? Why? Why not?

#### 2 Describe a pattern

Students learn to describe a pattern in words to convey its nature.

- a Using words, explain the pattern. eg A square is followed by a triangle, then a circle and the pattern repeats.
- b Write this down and check if others understand.
- c Use position words and ordinal numbers in descriptions of patterns.

#### 3 Complete a pattern given by someone else

Students determine the pattern and add to it.

Give the next 1 – 5 items in the pattern to demonstrate understanding of the pattern.

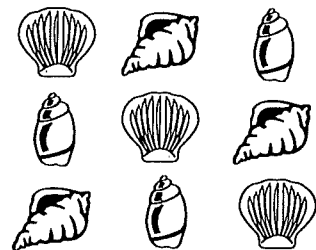
#### 4 Give the rule for the pattern

Express the description in the form of a rule.

Explain in abstract terms how the pattern is formed. eg The sequence square, triangle, circle is repeated, or  $+2 + 4$  and repeat, or subtract  $0.5$ .

A pattern may be in an arrangement or in the form of a sequence.

eg 1, 2, 4, 8, 16 or





**Worksheet 1**

**GRID PATTERNS**

Children must draw their own patterns. They should be simple so that they can be repeated easily.

**Vocabulary:** ordinal numbers, position words, names of shapes – square, circle, triangle; names for lines – wavy, oblique, diagonal, repeat

**Worksheet 3**

**BOOKS ON THE SHELF**

Students complete patterns with missing terms from the box.

Students complete patterns with missing terms which they give themselves.

Students order terms to form a pattern.

**Vocabulary:** as for Work sheets 1 and 2

**Worksheet 5**

**COLOUR WAYS**

Students colour number patterns on a grid according to directions.

**Vocabulary:** alternate, diagonal, straight, every cell

**Worksheet 7**

**LEAF PATTERNS**

Students determine which shaped/sized leaf is missing from the pattern.

**Vocabulary:** large, small, alternate, diagonally, odd, even, full-, half-, quarter-turn

**Worksheet 2**

**STAMP PATTERNS**

Students complete patterns using letters for the stamps to be placed.

**Vocabulary:** alternate, every second, under, over, next, last, middle, ordinal words

**Worksheet 4**

**NUMBER PATTERNS**

Students complete patterns and give their rules.

**Vocabulary:** Use terms such as 'add 4', 'subtract 3', 'halve' to express the rule.

Students choose which number is out of place.

**Vocabulary:** multiples, odd, even, counting by, divisible by

Students sort numbers by qualities.

**Worksheet 6**

**BEAD PATTERNS**

Students continue a given pattern of shapes and answer questions about the pattern.

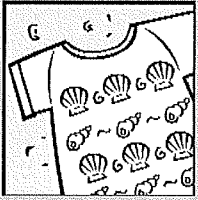
Students give a rule and determine how many repeats of a pattern can be made.

**Worksheet 8**

**TOSS THE DICE PATTERNS**

Supply counters.

The rules for the game are on the page and each child will have a copy. Review rules with class before beginning to play.

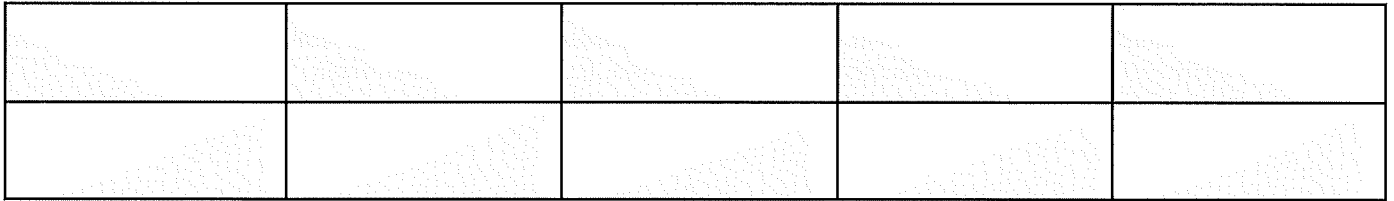


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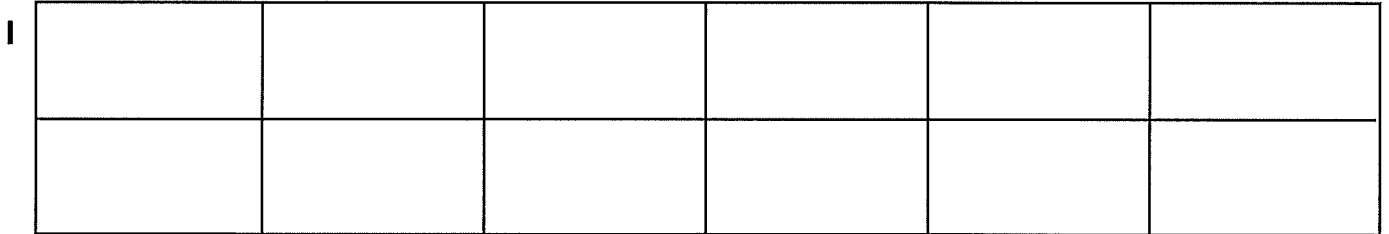
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# Grid patterns

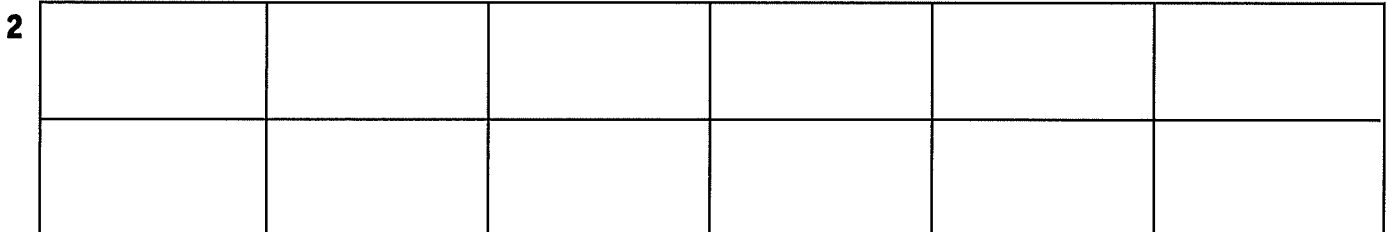
Here's a tile pattern for the floor in Toby Tornado's playroom.



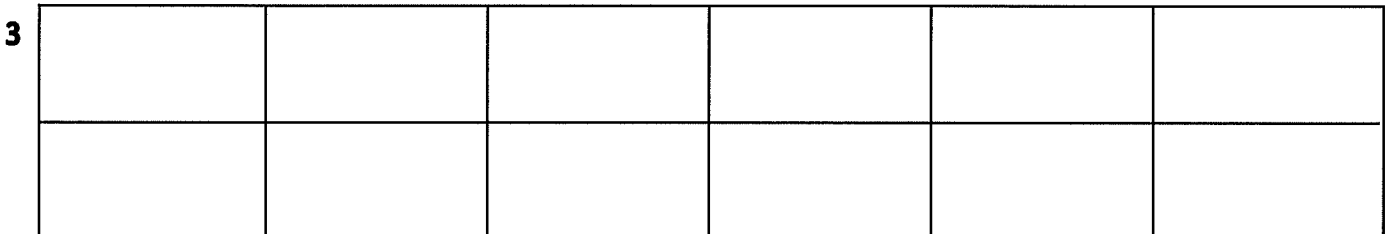
Use shapes or lines on your blank tiles to make your own patterns.  
Describe them.



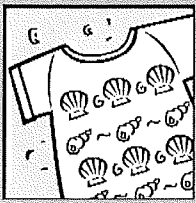
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# Stamp patterns

**Freddy Furgetting, the zoo keeper, likes rearranging his animal stamp collection. Sadly, he has forgotten how this pattern was supposed to finish. Help him by writing the letters for the missing stamps in their right places.**

**1**

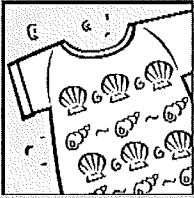
					<b>A</b>
					<b>B</b>

How is the pattern made? \_\_\_\_\_

**2**

					<b>A</b>
					<b>B</b>

How is this pattern made? \_\_\_\_\_

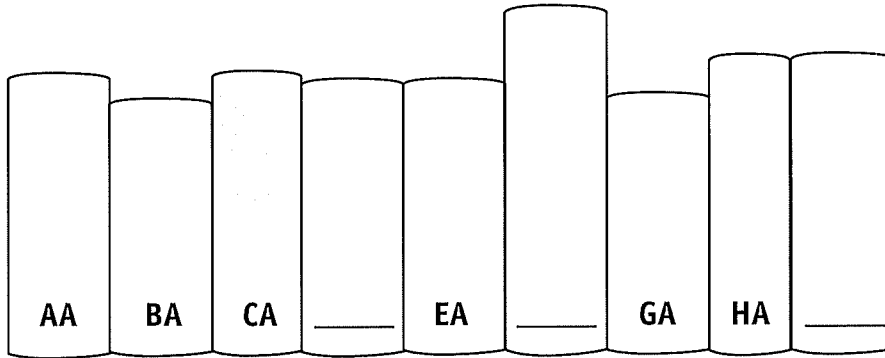


Name \_\_\_\_\_

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# Books on the shelf

1 a Some labels have disappeared! Replace the missing labels.

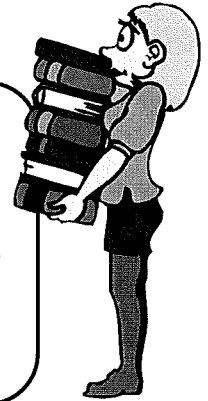


Choose the correct letters for the spaces.

AD \_\_\_\_\_ KA

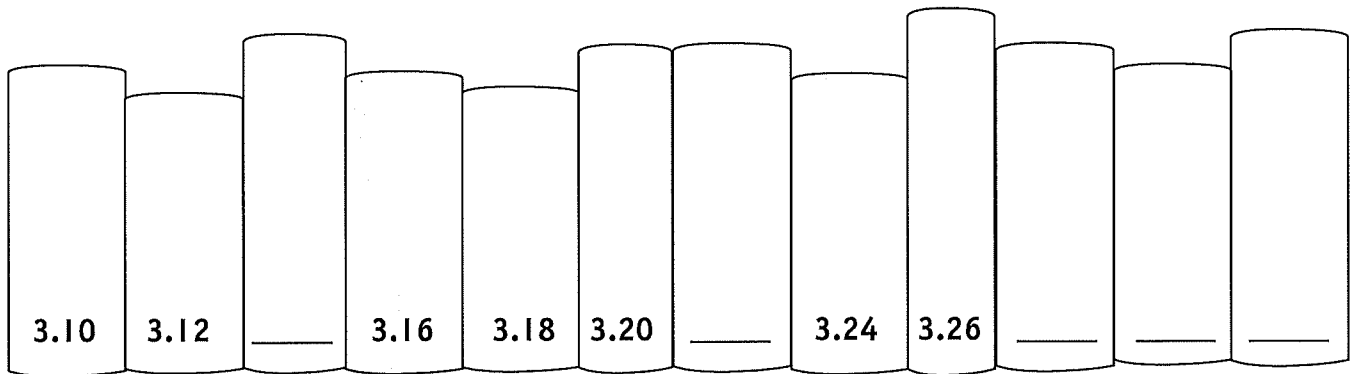
DA \_\_\_\_\_ IA

DF \_\_\_\_\_ FA



b How is the pattern made? \_\_\_\_\_

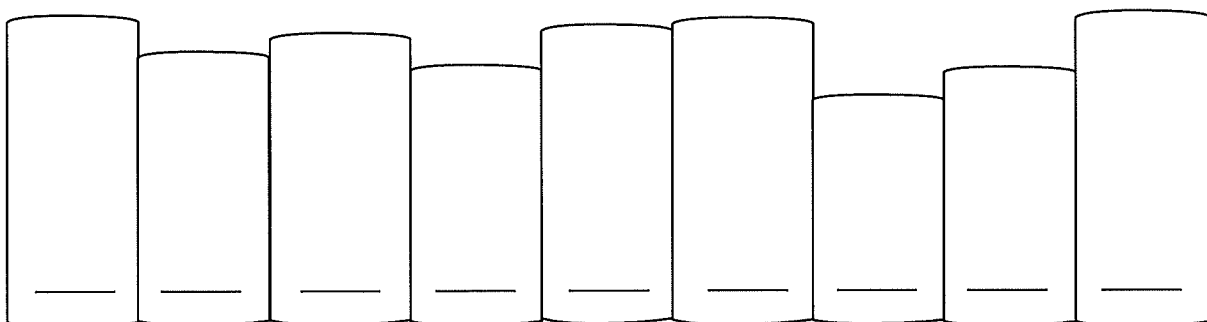
2 a Now books have disappeared! Write in their numbers to help Libby, the librarian.



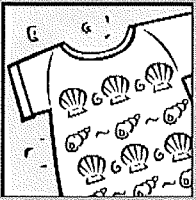
b How is the pattern made? \_\_\_\_\_

3 a Give Libby help by labelling these books in their correct order.

15N, 15L, 15P, 15O, 15T, 15S, 15Q, 15M, 15R



b How is this pattern made? \_\_\_\_\_



Name \_\_\_\_\_

Date \_\_\_\_\_

# Number patterns

**Professor Proseed can do anything with numbers. Best of all, he loves to put them into patterns, but sometimes his numbers get up to mischief and are lost.**

**1** Complete each number pattern. Give the rule for the pattern.

a 12, 14, 16, 18, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

b 25, 23, 21, 19, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

c 10, 30, 50, 70, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

**2** Circle the number that does not fit into the Professor's pattern. Give your reason.

a 15, 20, 25, 30, 35, 53, 45 \_\_\_\_\_

b 1, 3, 5, 7, 10, 11, 13 \_\_\_\_\_

c 20, 30, 40, 52, 60 \_\_\_\_\_

Whole numbers which are multiplied by 10 end in zero.  
 Whole numbers which are multiplied by 2 are even.  
 Whole numbers which are multiplied by 5 end in 5 or zero.



**3** Look at these numbers.

115, 70, 35, 20, 16, 24, 65, 30, 120, 42, 85

Sort them into the correct columns. Some belong in more than one column.

**a Multiples of 10**

**b Multiples of 2**

**c Multiples of 5**

\_\_\_\_\_

\_\_\_\_\_

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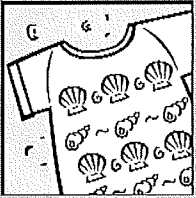
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\_\_\_\_\_

**4** What is special about 70, 30, 120 and 20? \_\_\_\_\_

\_\_\_\_\_



Name \_\_\_\_\_

Date \_\_\_\_\_

## Colour ways

- 1 a Colour the *threes pattern* in your favourite colour.  
 b Colour the *fives pattern* in a contrasting colour.  
 c Choose another pattern of your own to colour.

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

2 Describe the patterns.

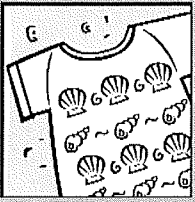
- a *the threes pattern* \_\_\_\_\_  
 b *the fives pattern* \_\_\_\_\_  
 c your own pattern \_\_\_\_\_

3 a Using yellow, colour in 1 then every third box after that.

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

- b Describe the pattern \_\_\_\_\_



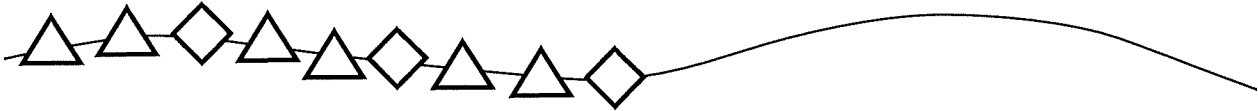


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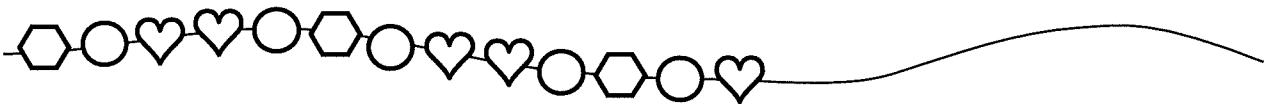
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# Bead patterns

- 1 a Beddie Beader gets hopelessly confused and loses her place making necklaces. Help her! Continue the pattern of beads until you have used 6 squares.

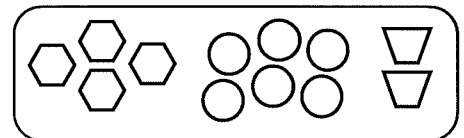


- b The pattern rule is 2 \_\_\_\_\_, 1 \_\_\_\_\_ repeated.  
 c For every square used, \_\_\_\_\_ triangles are used.  
 d If 5 squares are used, \_\_\_\_\_ triangles are used.  
 e If 12 triangles are used, \_\_\_\_\_ squares are used.
- 2 a To help Beddie again, continue this pattern of the beads until the end.

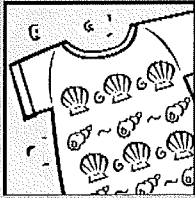


- b The rule for the pattern is \_\_\_\_\_  
 c The pattern repeats after \_\_\_\_\_ beads have been used.  
 d In each repeat of the pattern, \_\_\_\_\_ hearts are used, \_\_\_\_\_ hexagons are used and \_\_\_\_\_ circles are used.  
 e How many repeats of the pattern could Beddie make with 30 hearts? \_\_\_\_\_

- 3 a Beddie needs more ideas for her necklaces. Use all these beads to make your own pattern for her to copy.



- b The rule for my pattern is \_\_\_\_\_  
 c To add one more repeat of the pattern, you would need \_\_\_\_\_ more ○ beads?  
 d How many ○ beads are used for every ▽ ? \_\_\_\_\_  
 e How many ▽ beads are used for every 2 ○ ? \_\_\_\_\_

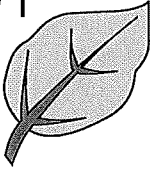



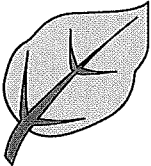

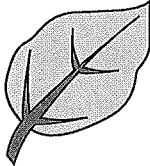
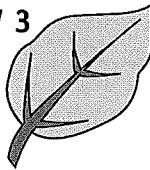

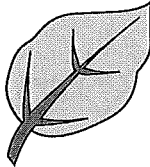


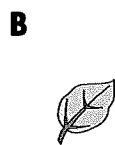
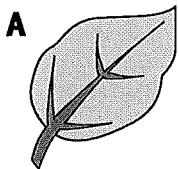
Name \_\_\_\_\_

Date \_\_\_\_\_

# Leaf patterns

1 Pitter Patter likes his leaves in perfect order. Place the letters for the missing leaves in their boxes to help him complete this pattern.

<b>ROW 1</b> 			
<b>ROW 2</b> 			
<b>ROW 3</b> 			

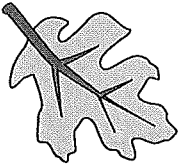


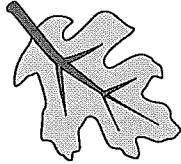


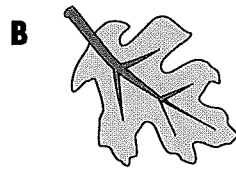
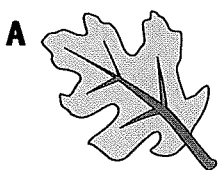
How did you work that out?

\_\_\_\_\_

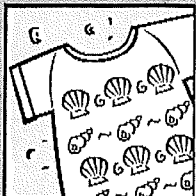
\_\_\_\_\_

2 These leaves thought they would trick Pitter Patter but with your help they haven't a chance! Place the correct letters for the missing leaves in the squares. Tell how you worked it out.

					
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\_\_\_\_\_



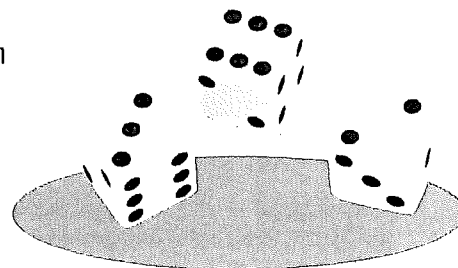
Name \_\_\_\_\_

Date \_\_\_\_\_

# Toss the dice patterns

## A game for 2 players. Each has a copy of the player card.

- Label your card with your name.
- Player 1 throws 3 dice (eg 2, 6, 3) and records the results in order from lowest to highest on their grid (2, 3, 6).
- Player 1 then makes up and records a rule for the pattern they have made. Keep the rule a secret. (eg  $2 \times 3 = 6$ )
- Player 2 must try to guess the rule and give the next 2 terms in the pattern. (eg  $3 \times 3 = 9$ ,  $4 \times 3 = 12$ ) If they can do this, they take a counter for a point. If they can't, Player 1 gets the point.
- Player 2 now throws the dice and records on their grid. The game continues until each has had 5 turns.
- If the same pattern is thrown, the player must make up a pattern different from the one that has been used in a past throw, eg  $2 + 3 + 6 = 11$ ,  $2 + 3 + 6 + 11 = 22$ .



### Player card

Name \_\_\_\_\_

Die 1	Die 2	Die 3	Rule

