Maths - Year 4

Pattern and Algebra 5: Looking for growing patterns in problem solving

Key Vocabulary

|	
Sequence	An ordered list of numbers, shapes or objects, e.g. 20, 25, 30...
Increasing	Getting larger in number or size.
decreasing	Getting smaller in number or size.

Mathematical Skills

- Record growing patterns systematically using adding or multiplying.
- Record results systematically in a table.
- Use multiplying and dividing facts to calculate the values of terms in growing patterns.
- Compare the results of growing patterns in a table and notice patterns and relationships between the terms, the amount of Shapes used to make them and the position of the terms (first, second, third etc.)
- Notice patterns in the terms of doubling sequences.
- Work out rules for unfamiliar number sequences and devise rules to make up their own.

Mathematical Methods

- Making growing pictures with Numicon Shapes.
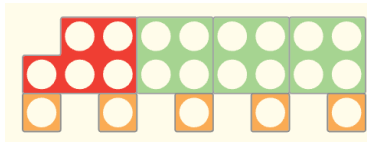
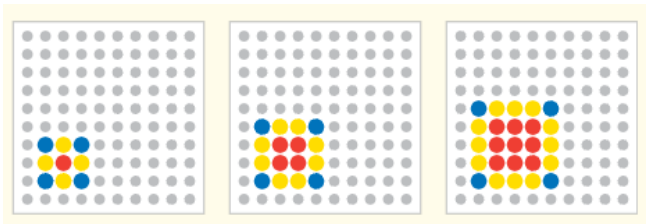| Term	Shapes used	Total
1	5 + 1 + 1	7
2	5 + 1 + 1 + 4 + 1	12
3	5 + 1 + 1 + 4 + 1 + 4 + 1	17
4	5 + 1 + 1 + 4 + 1 + 4 + 1 + 4 + 1	22
5	5 + 1 + 1 + 4 + 1 + 4 + 1 + 4 + 1 + 4 + 1	27

- Exploring growing patterns in problem solving e.g. we need to arrange some tables so that a class of 32 children can all sit together.
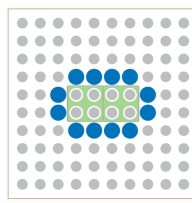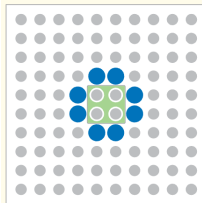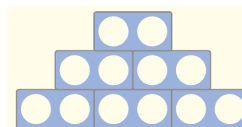

Tables	Chairs
1	8
2	12
3	16
4	20

Tables	Chairs
1	2 × 4 = 8
2	3 × 4 = 12
3	4 × 4 = 16
4	5 × 4 = 20
5	6 × 4 = 24
6	7 × 4 = 28
7	8 × 4 = 32

- Exploring growing number patterns.

- Exploring patterns with growing differences.

Term	Shapes	Total
1	1 × 2	2
2	3 × 2	6
3	6 × 2	12
4	10 × 2	20
5	15 × 2	30

Exploring doubling patterns in problems e.g. Ben is given a special money box for his eighth birthday. On his first birthday his parents had put £1 in it. They put in double this amount on his second birthday, and doubled the amount every year until his eighth birthday.
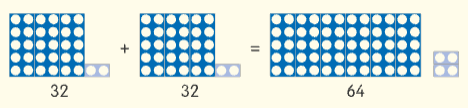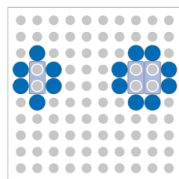
1st	2nd	3rd	4th	5th	6th	7th	8th
£1	£2	£4	£8	£16	£32	£64	£128

Birthday	Amounts added (£)	Total (£)
1st	1	1
2nd	1 + 2	3
3rd	1 + 2 + 4	7
4th	1 + 2 + 4 + 8	15
5th	1 + 2 + 4 + 8 + 16	31
6th	1 + 2 + 4 + 8 + 16 + 32	63
7th	1 + 2 + 4 + 8 + 16 + 32 + 64	127
8th	1 + 2 + 4 + 8 + 16 + 32 + 64 + 128	255

Can you..?

- Can you write a sequence for the number of chairs around these 2-shape tables? Continue it up to the 10th term.

- Complete the sequence 3, ☐ 17, 24, ☐ 38

- Work out the sequence for the growing number of yellow counters.