Maths - Year 5

Pattern and Algebra 4: Looking for patterns and generalising

Key Vocabulary

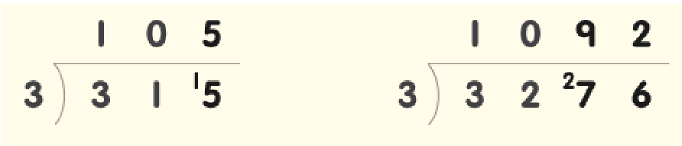
Multiple	The product of two whole numbers.
Factor	A number that divides into another number exactly.
Common factor	A whole number that divides into two or more other numbers exactly.
Sequence	An ordered list of numbers, shapes or objects.
term	One of the numbers in a sequence.
Generalise	Make a statement about a whole group of objects or situations.
Volume	How much space something takes up, often measured in cm^3 or m^3.
Square number	When a number is multiplied by itself, the product is called a square number, e.g. $3 \times 3 = 3^2 = 9$, so 9 is a square number.
Cube number	When a number is multiplied by itself twice, the product is called a cube number, e.g. $2 \times 2 \times 2 = 2^3 = 8$, so 8 is a cube number.

Mathematical Skills

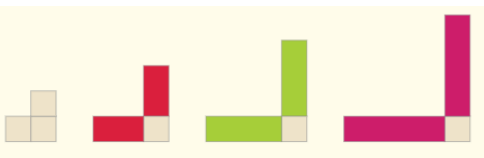
- Use knowledge of factors, multiples and divisibility flexibly and systematically to deduce general rules and explain them clearly.
- Work systematically to explore non-linear sequences to find patterns from which they deduce general rules.
- Explain that when a number is multiplied by itself the product can be called a square number.
- Use and read square number notation e.g. 5^2.
- Make connections between square numbers and area and the notation used for units of area (e.g. cm^2).
- Explain that when a number is multiplied by itself twice we call this a cube number.
- Use and read cube number notation e.g. 4^3 is 4 cubed.

Mathematical Methods

- Testing general statements about factors, multiples and divisibility e.g. a number if divisible by 3 if the sum of its digits is divisible by 3.

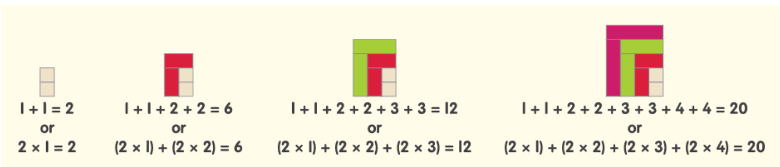


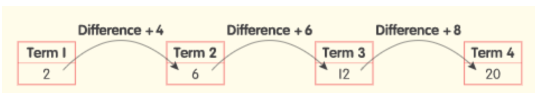
- Writing general rules for number rod designs.



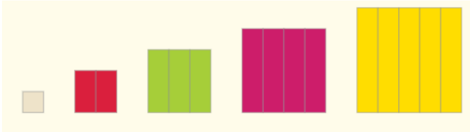
(2 x 2cm) +1cm = 5cm

- Writing general rules for growing number rod sequences e.g.



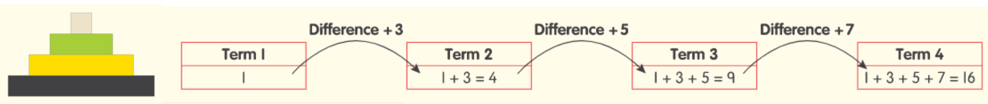


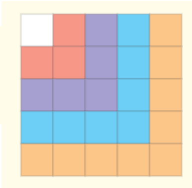
- Generalising about square numbers.



$1 \times 1 = 1$
$2 \times 2 = 4$
$3 \times 3 = 9$
$4 \times 4 = 16$
$5 \times 5 = 25$

- Exploring square numbers.



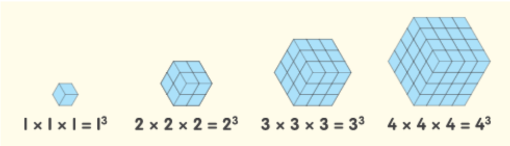


Layer 1: 1
Layer 2: $1 + (2 \times 1)$
Layer 3: $1 + (2 \times 2)$
Layer 4: $1 + (2 \times 3)$

- Generalising about the factors of square numbers.

1	4	9	16	25
1	1, 4	1, 9	1, 16	1, 25
	2	3	2, 8	5
			4	

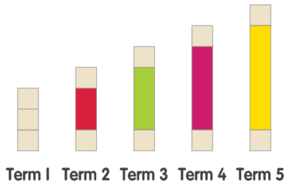
- Generalising about cube numbers.



$1 \times 1 \times 1 = 1^3 = 1$
$2 \times 2 \times 2 = 2^3 = 8$
$3 \times 3 \times 3 = 3^3 = 27$
$4 \times 4 \times 4 = 4^3 = 64$
$5 \times 5 \times 5 = 5^3 = 125$
$6 \times 6 \times 6 = 6^3 = 216$
$7 \times 7 \times 7 = 7^3 = 343$
$8 \times 8 \times 8 = 8^3 = 512$
$9 \times 9 \times 9 = 9^3 = 729$
$10 \times 10 \times 10 = 10^3 = 1000$

Can you..?

- Write a number between 2000 and 3000 that is divisible by 4.
- Look at the rod pattern. What would term 10 be?



- Find two square numbers that add up to 45 together?
- Find two cube numbers that, together, add up to 407?