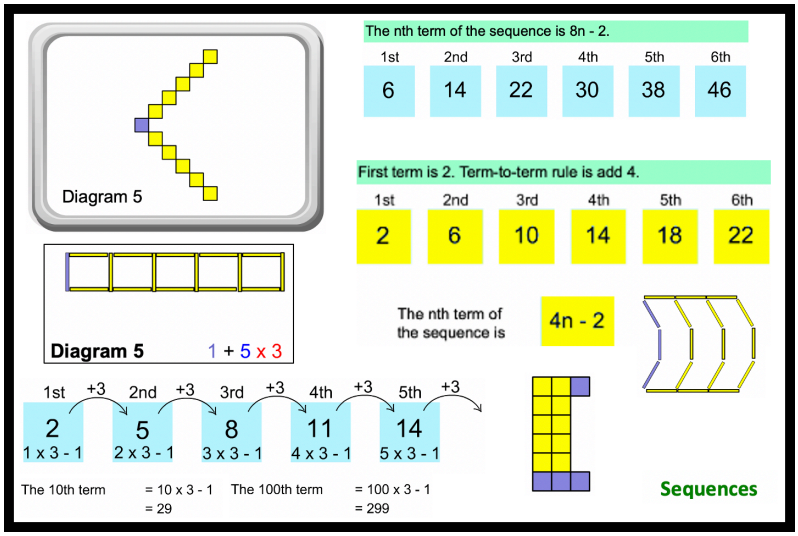
SPIRE MATHS

Stimulating, Practical, Interesting, Relevant, Enjoyable Maths For All

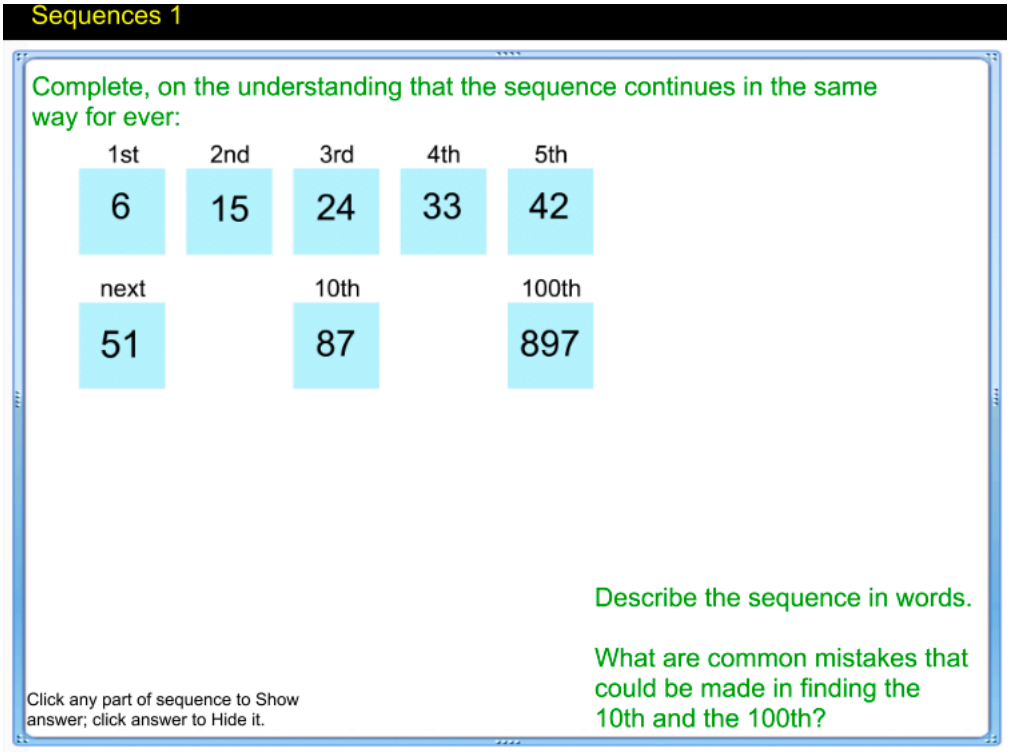
Sequences

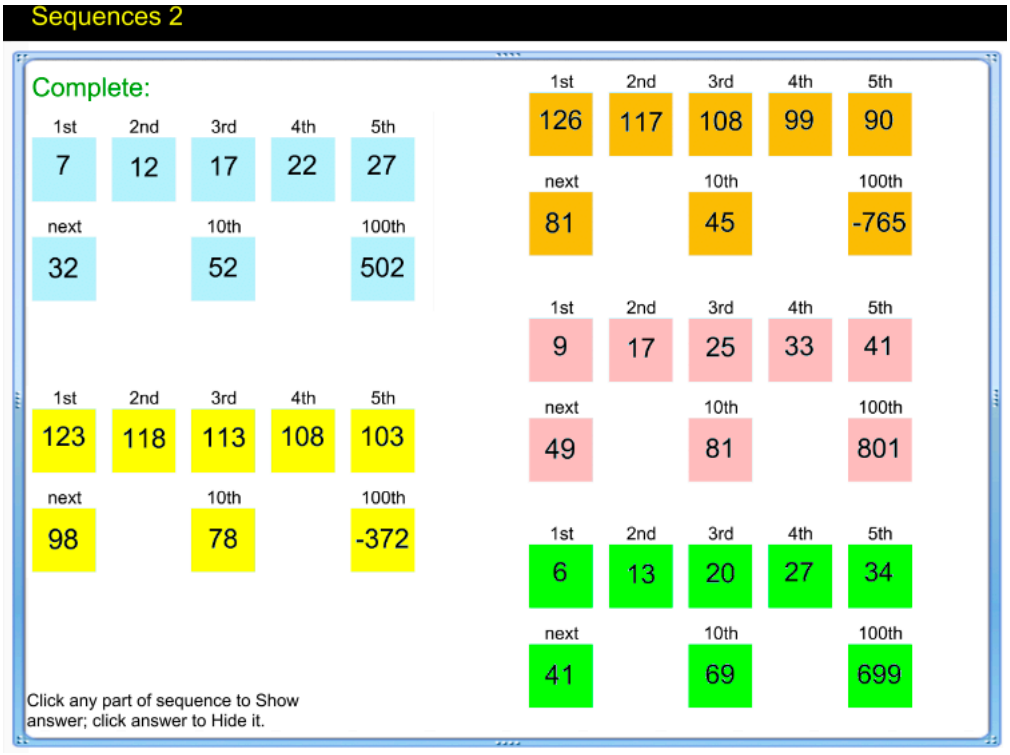


Download ActivInspire, PowerPoint and Teacher Notes from:
https://spiremaths.co.uk/sequences/

OBJECTIVE(S):	Generate and describe simple integer linear sequences including from practical contexts. Describe the general term in simple cases. Generate terms of a simple sequence, given a rule (e.g. finding a term from the previous term, finding a term given its position in the sequence).
DESCRIPTION and OVERVIEW:	1. Given first 5 terms of a sequence evaluate the next, the 10th and the 100th; then describe the sequence in words. What are common mistakes in finding these terms? Emphasise common difference and 100th ≠ 10th x 10. 2. Five examples, including descending. Photocopiable master available. Finding the 100th term in descending is difficult (it is negative). 3. The animation shows the term-to-term change of adding three before showing the next, 10th and 100th terms as the 3 times table less 1. You may wish to work through this yourself first 'live' with your pupils before showing the animation. Once it has been seen, you could hide it and have pupils talk it through – with explanations and reasons. 4. Real examples on desk first could be helpful. The animation builds up the first 5 terms of a sequence (sticks or squares). Evaluate the next, the 10th, the 100th and the nth terms. Importance of the common difference (as predictor). Colouring of sticks and squares is important. 5. Nine animated gif sequences can be seen (all at once or individually). 6. Gif shows first five terms of the 'stick' sequence 3n + 1. Repeated to show how nth term is built up. Question "What do you see?" 7. Important to link nth term with a physical stick/square sequence. 8. Create sequence given term-to-term rule. Find nth term. Link to later work on graphs, gradients and the difference method. Seek reasons. 9. Gif animation for finding nth term where first term is 5 and reule is add 4; nth term is 4n + 1. 10. Five examples of term to term sequences. Answers given. 11. Given nth term of 4n – 2 find the first term and the rule to geneate the next term (position-to-term). 12. Five examples of position-to-term questions with answers.
EQUIPMENT:	Three photocopiable masters.

IWB/PowerPoint Screens (most build up to finish like this)





Sequences 2

Complete:

	1st	2nd	3rd	4th	5th
	7	12	17	22	27
next	32		10th		100th
			52		502

	1st	2nd	3rd	4th	5th
	123	118	113	108	103
next	98		10th		100th
			78		-372

	1st	2nd	3rd	4th	5th
	126	117	108	99	90
next	81		10th		100th
			45		-765

	1st	2nd	3rd	4th	5th
	9	17	25	33	41
next	49		10th		100th
			81		801

	1st	2nd	3rd	4th	5th
	6	13	20	27	34
next	41		10th		100th
			69		699

Click any part of sequence to Show answer; click answer to Hide it.

Sequences 3

How do you find the next, the 10th and the 100th term in a sequence? Explain.

1st	2nd	3rd	4th	5th
2	5	8	11	14

Here is one way to do it

1st	+3	2nd	+3	3rd	+3	4th	+3	5th	+3
2		5		8		11		14	
1 x 3 - 1		2 x 3 - 1		3 x 3 - 1		4 x 3 - 1		5 x 3 - 1	

The next term = 6 x 3 - 1
= 17

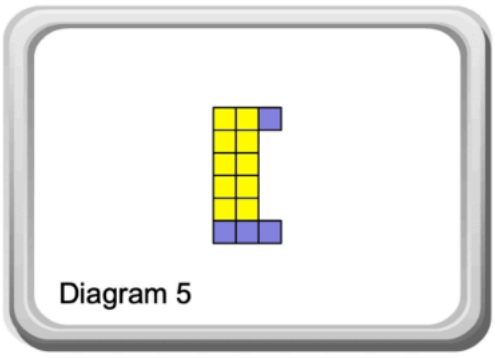
The 10th term = 10 x 3 - 1
= 29

The 100th term = 100 x 3 - 1
= 299

Click white text on black background to see object

Sequences 4

Find the next, the 10th and the 100th term in this sequence? Explain.

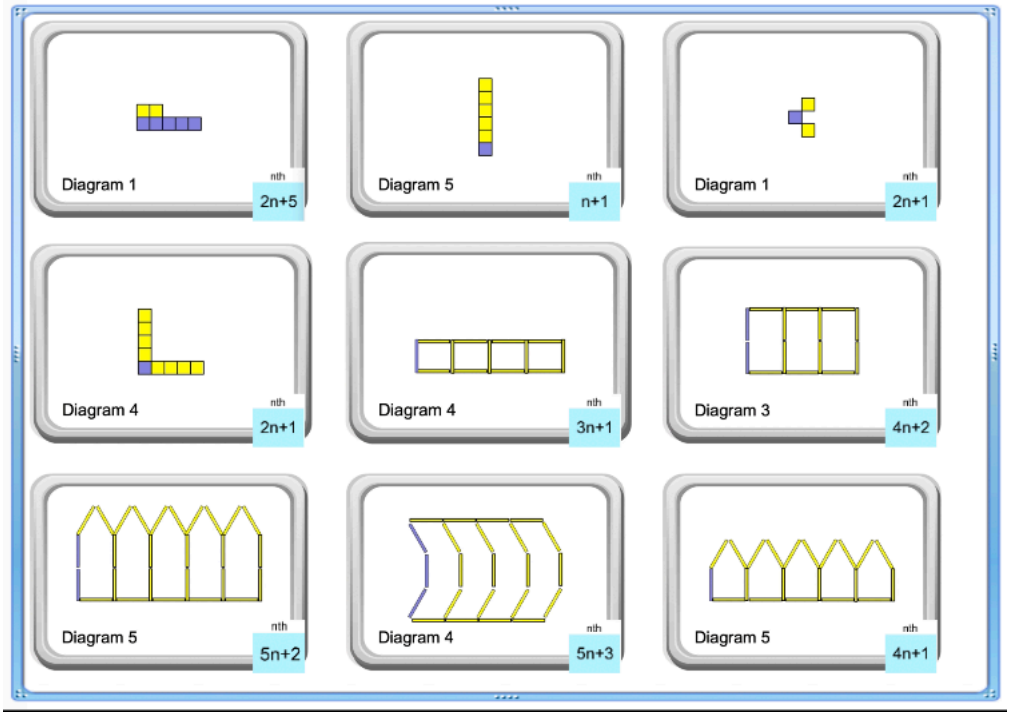


next	10th	100th	nth
16	24	204	2n+4

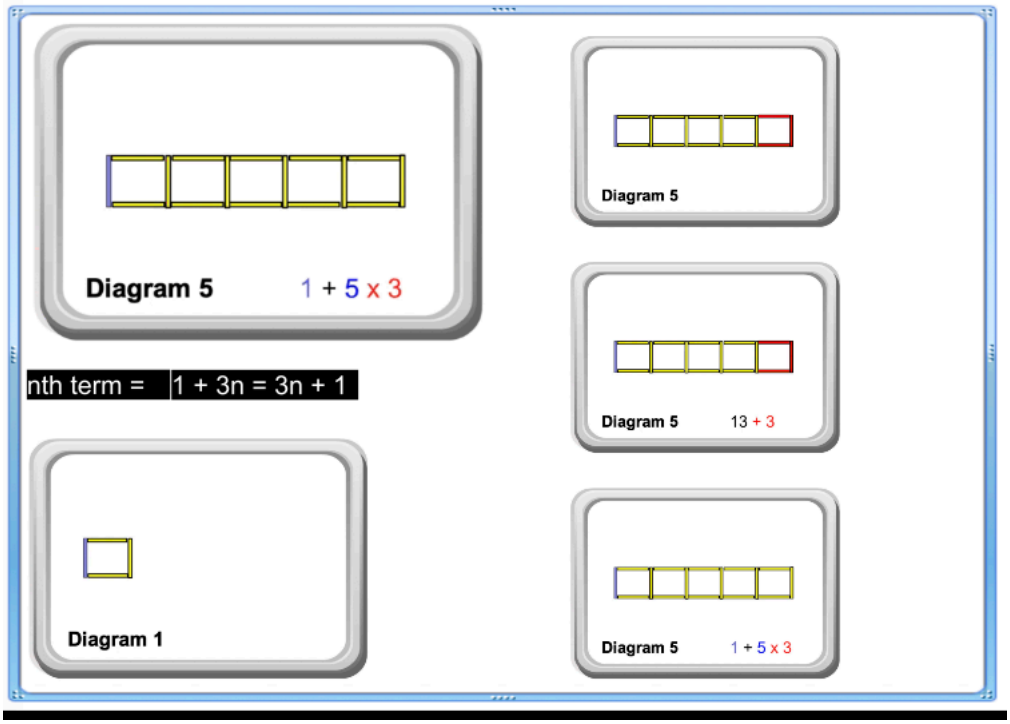
Explain how the coloured squares in the animation are linked to the nth term.

Click any part of blue cells to Show answer; click answer to Hide it.

Sequences 5: find the general term for each of these



Sequences: finding the nth term



Creating sequences

Create stick patterns for these:

nth	nth	nth	nth	nth
2n+4	n+1	2n+5	4n+1	2n+1

Create patterns with squares for these:

nth	nth	nth	nth	nth
5n+2	2n+1	4n+2	3n+1	5n+3

Check your pattern with others

Generating sequences 1: term to term

Find the first 6 terms and the nth term in this sequence

First term is 2. Term-to-term rule is add 3.

1st	2nd	3rd	4th	5th	6th
2	5	8	11	14	17

The nth term of the sequence is 3n - 1

What are common mistakes that could be made when doing this?

Click any part of sequence to Show answer; click answer to Hide it.

Generating sequences 2: term to term

First term is 5. Term-to-term rule is add 4.

1st	2nd	3rd	4th	5th
5	9	13	17	21

How do you find the nth term?

Here is one way to find the nth term

First term is 5. Term-to-term rule is add 4.

1st	+4	2nd	+4	3rd	+4	4th	+4	5th	+4
5		9		13		17		21	
1 x 4 + 1		2 x 4 + 1		3 x 4 + 1		4 x 4 + 1		5 x 4 + 1	

The 6th term = 6 x 4 + 1

The nth term = n x 4 + 1

= 4n + 1

Click white text on black background to see object

Generating sequences 3: term to term

First term is 3. Term-to-term rule is add 6.

1st	2nd	3rd	4th	5th	6th
3	9	15	21	27	33

The nth term of the sequence is 6n - 3

First term is 70. Term-to-term rule is subtract 7.

1st	2nd	3rd	4th	5th	6th
70	63	56	49	42	35

The nth term of the sequence is 77 - 7n

First term is 65. Term-to-term rule is subtract 2.

1st	2nd	3rd	4th	5th	6th
65	63	61	59	57	55

The nth term of the sequence is 67 - 2n

First term is 88. Term-to-term rule is subtract 5.

1st	2nd	3rd	4th	5th	6th
88	83	78	73	68	63

The nth term of the sequence is 93 - 5n

First term is 2. Term-to-term rule is add 4.

1st	2nd	3rd	4th	5th	6th
2	6	10	14	18	22

The nth term of the sequence is 4n - 2

Click any part of sequence to Show answer; click answer to Hide it.

Generating sequences 4: position to term

The nth term of the sequence is 4n - 2.

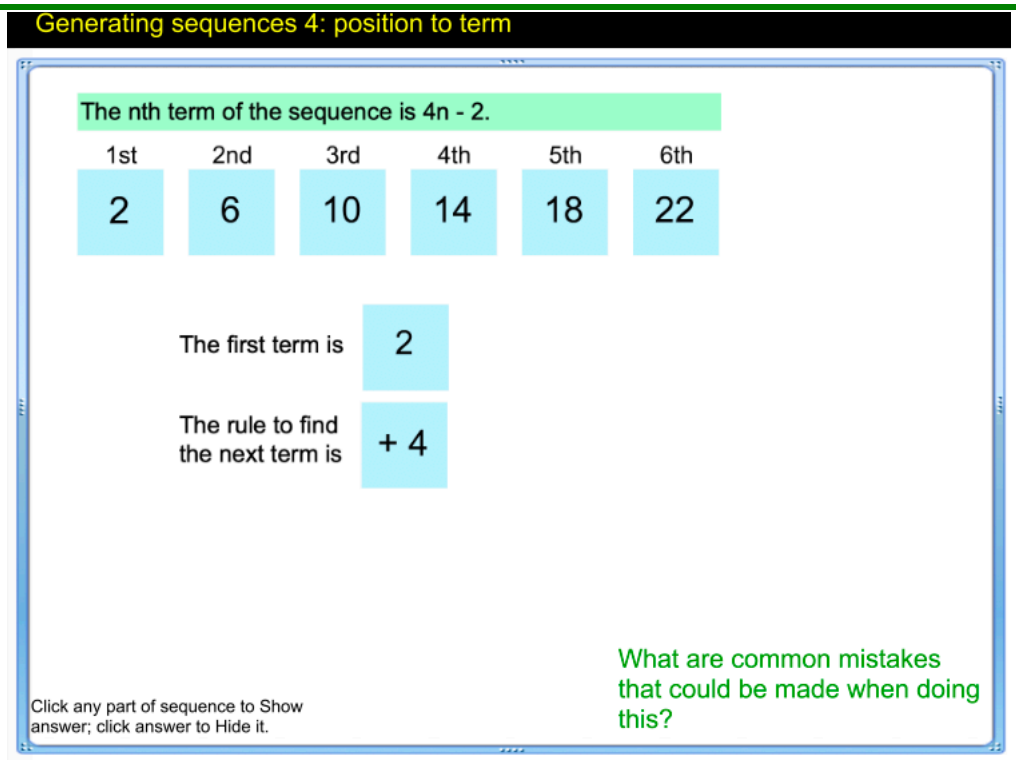
1st	2nd	3rd	4th	5th	6th
2	6	10	14	18	22

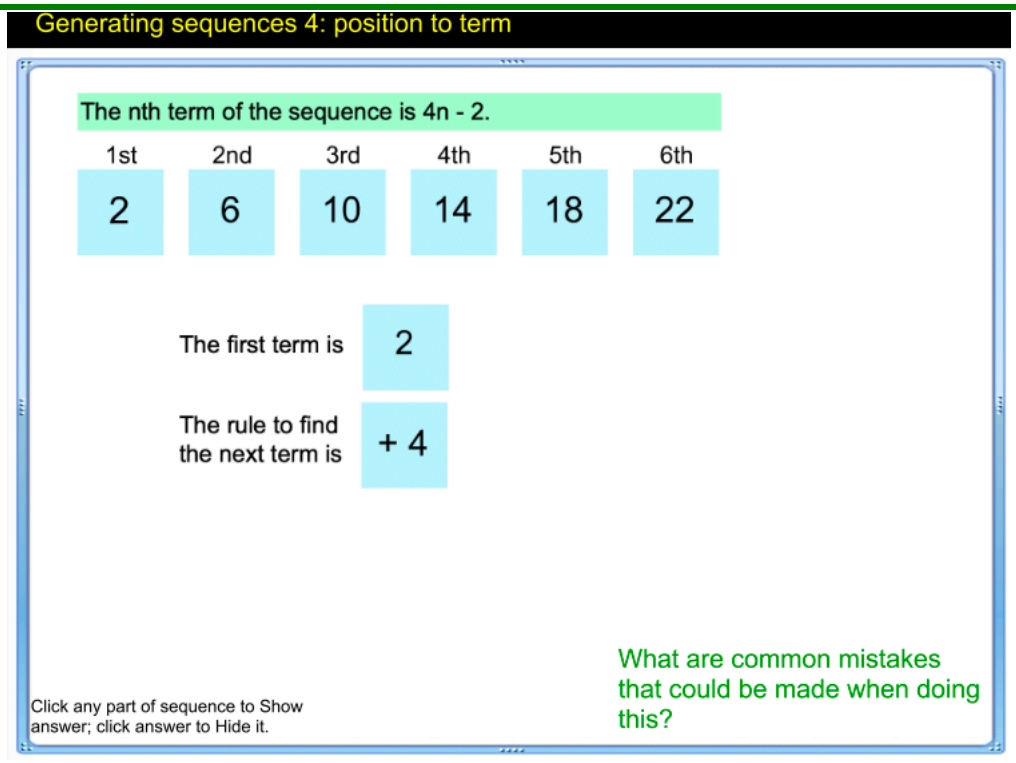
The first term is 2

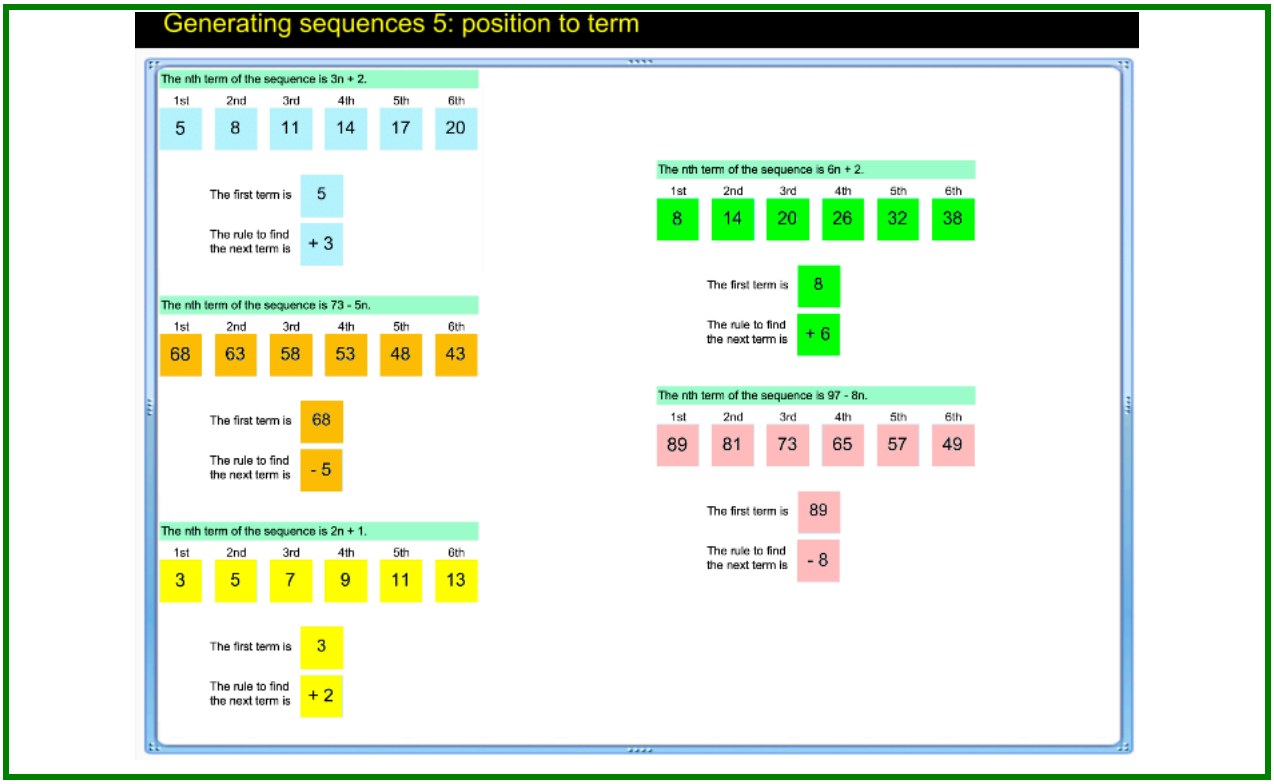
The rule to find the next term is + 4

What are common mistakes that could be made when doing this?

Click any part of sequence to Show answer; click answer to Hide it.


Generating sequences 4: position to term
The nth term of the sequence is 4n - 2.
1st 2nd 3rd 4th 5th 6th
2 6 10 14 18 22
The first term is 2
The rule to find the next term is + 4
What are common mistakes that could be made when doing this?
Click any part of sequence to Show answer; click answer to Hide it.


Generating sequences 4: position to term
The nth term of the sequence is 4n - 2.
1st 2nd 3rd 4th 5th 6th
2 6 10 14 18 22
The first term is 2
The rule to find the next term is + 4
What are common mistakes that could be made when doing this?
Click any part of sequence to Show answer; click answer to Hide it.


Generating sequences 5: position to term
The nth term of the sequence is 3n + 2.
1st 2nd 3rd 4th 5th 6th
5 8 11 14 17 20
The first term is 5
The rule to find the next term is + 3
The nth term of the sequence is 73 - 5n.
1st 2nd 3rd 4th 5th 6th
68 63 58 53 48 43
The first term is 68
The rule to find the next term is - 5
The nth term of the sequence is 2n + 1.
1st 2nd 3rd 4th 5th 6th
3 5 7 9 11 13
The first term is 3
The rule to find the next term is + 2
The nth term of the sequence is 6n + 2.
1st 2nd 3rd 4th 5th 6th
8 14 20 26 32 38
The first term is 8
The rule to find the next term is + 6
The nth term of the sequence is 97 - 8n.
1st 2nd 3rd 4th 5th 6th
89 81 73 65 57 49
The first term is 89
The rule to find the next term is - 8

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Sequences Worksheet 1

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Rule in words/symbols ______________________________

1st	2nd	3rd	4th	5th	next	10th	100th

Seeing Sequences Worksheet 2

Diagrams

1st	2nd	3rd	4th	5th	next	10th	100th	nth

Diagrams

1st	2nd	3rd	4th	5th	next	10th	100th	nth

Diagrams

1st	2nd	3rd	4th	5th	next	10th	100th	nth

Diagrams

1st	2nd	3rd	4th	5th	next	10th	100th	nth

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Rules of Sequences Worksheet 3

First term:	
Term-to-term rule is	

nth term	

1st	2nd	3rd	4th	5th	6th

First term:	
Term-to-term rule is	

nth term	

1st	2nd	3rd	4th	5th	6th

First term:	
Term-to-term rule is	

nth term	

1st	2nd	3rd	4th	5th	6th

First term:	
Term-to-term rule is	

nth term	

1st	2nd	3rd	4th	5th	6th

First term:	
Term-to-term rule is	

nth term	

1st	2nd	3rd	4th	5th	6th