

**Put  
MATHS BACK ON TRACK**

**Save  
the Children  
&  
MATHEMATICS!**

**TEACH  
SEQUENCES &  
SERIES**

A Genuine  
*REFORM*

Much Needed  
and  
**Long Overdue**

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*for Excellence in Mathematics*

## TEACH MATHS (3) - TEACH A FEW TOPICS

### I. SEQUENCES & SERIES

*Sequence* is a set of things, coming one after the other, in some order.

[Oxford Dict.]  
In mathematics, we study a sequence of numbers, like: 5, 2, 7, 9, 231, 54, ...  
In particular we shall study sequences that have a *definite order* or *pattern*.  
Each member or number of a sequence is called a *Term*.

**Examples of a few Sequences of numbers:**

01) 5, 8, 11, ...    02) 1, 8, 15, ...    03) 1, 6, 36, ...    04)  $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \dots$  etc.

#### BEHAVIOUR OF A SIMPLE SEQUENCE

Consider the sequence: 5, 8, 11, ...

Without listing the actual terms as above, is there another way to communicate this seq. to others?

#### First Term & Regular Change

My sequence **starts by** 5 and the terms **increase by** 3 each. Voila! That is it.  
These are the important facts about a sequence: '*the start*' & '*how the next term*'.

You could also say: First term is 5; the regular increase (or the *jump*) is 3.

Write more terms of the sequence indicating their positions.

Position	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	...
Terms	5	8	11	14	17	20	23	26	29	32	35	...

Imagine little Ram starting on top of **5** and hopping on each successive term.  
In **1 hop** Ram is on **2nd term**; **2 hops**, he is on **3rd term**; **3 hops** on **4th term**  
and so on.

After 7th hop Ram is on 8th term.

How many hops to 12th term? 11 hops;  
How many hops to 54th term? 53 hops.

#### TERMS & POSITION

- Can you tell (without seeing the table or using paper and pen) the 8th term?

Easy!  $5 + '7 \text{ hops}' = 26$

[Each hop is 3 measures]

- How many hops to 23rd term? Easy. 22 hops
- What is this term?  $5 + (22 \times 3) = 71$  [😊😊😊]
- 31st term will be  $5 + (30 \times 3) = 95$
- Which term is the number 41?  
Less 1st term, get 36; this is 12 hops; So 13th term. [😊😊😊]

As you can see, all relevant concepts are brought out by discussion, using common day to day language and children would have given these answers all the time **enjoying** and **taking part** in the discussion.

**Note:** With appropriate variables  $a, d, n, l, t_n, S_n$  introduced:

1) The second step on top, (smilies), becomes the formula:  $t_n = a + (n - 1)d$

2) The next 'smilies' step leads to this formula:  $n = \frac{T_n - a}{d} + 1$ , if you need one!

Position of term: Term, less 'start'; count the 'hops', increase by 1.

#### SUM (of the sequence)

- I have a sequence starting with 3 and increasing by 4. What will be the sum of the first 10 terms?

First term is 3; increase is 4. So 10<sup>th</sup> term is  $3 + 9 \times 4 = 39$   
So we are looking for the sum of 3, 7, 11, 15, ..., 39

Can you think any way other than simply writing all the 10 numbers and adding?  
[Some input from the teacher may be needed at this stage. My input is this:]

Let	Sum	=	3	+	7	+	11	+	15	+	...	+	27	+	31	+	35	+	39
	Sum	=	39	+	35	+	31	+	27	+	...	+	15	+	11	+	7	+	3

Add these two rows; what do you see? What is the total (not adding all numbers!)?  
 $2 \times \text{Sum} = 42 + 42 + 42 + 42 + \dots + 42 + 42 + 42 + 42$   
 $= 42 \times 10 = 420$

So Sum = 210

Sum, in words: Add first and last terms; Multiply by number of terms; half result

which is, using symbols,  $S_n = \frac{n(a+l)}{2}$ .