The notes below are only some suggestions that teachers could bear in mind when using these materials. It is not my intention to interfere in your teaching methodology, so I have only written few explanations in order to share some ideas.

At the end of this document you can find a few questions for students to assess the teaching process and some of the websites I have used.

Hope it is useful.

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Sequences

Lesson 1: Introducing sequences

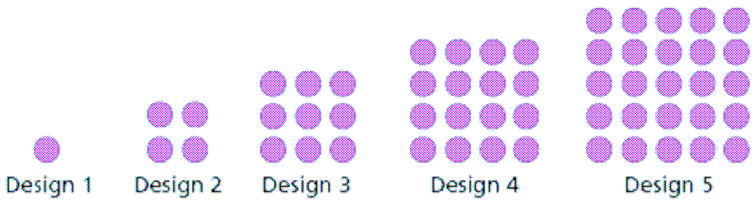
- **Activities 1, 2 and 3**

These three activities are an introduction to the topic and try to transmit to students the importance of ordering numbers, words, objects, and letters…

They can be done in plenary or in little groups. Teacher decides the time spent in each one.

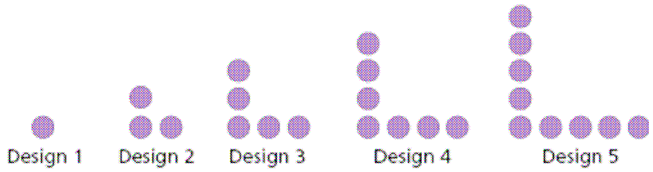
- **Activity 5**

This activity could be used to introduce the concepts of triangular numbers and square numbers, if students don't know, by using patterns and drawing. This is an example.



Design Number	1	2	3	4	5	6	7
matches	1	4					

RULE : _____



number	1	2	3	4	5	6	7	8
matches								

RULE : _____

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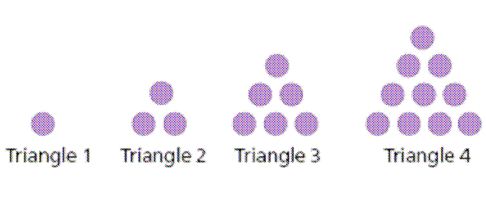
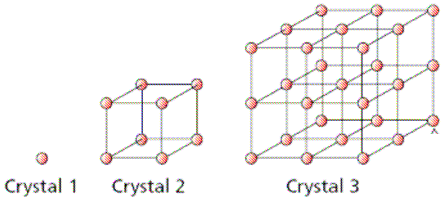


Triangle number	1	2	3	4	5	6
Number of counters						

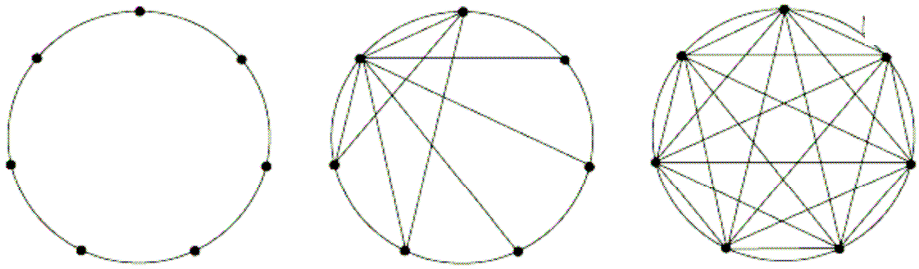
RULE : _____



Crystal number	1	2	3	4	5	6
Number of ions						

RULE : _____

The diagrams below show how to draw a 'mystic rose'.



(a) Draw three different mystic roses.

(b) How many straight lines are in each of your designs?

(c) How many lines would be in a 20-point mystic rose?

(d) Find a rule for the number of lines in a n-point mystic rose.

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- Students can draw the snowflake pattern in an isometric paper and write down the sequence of numbers of sides.

- Finally students can play with the cards below. (www.senteacher.org)

odd numbers	1,2,3,4,5,6,7,8,...
even numbers	2,4,6,8,10,12,14, ...
powers of 2	1,3,5,7,9,11,13,...
prime numbers	2,4,8,16,32,64,...
natural numbers	1,4,9,16,25,36,49,...
square numbers	1,3,5,7,11,13,17,...

- **Activities such as 8, 10 and 11**

They could be done part in class and part as homework.

- **Activities 13 and 14**

These activities have to be developed in the multimedia classroom. For that reason the teacher has to do all the session in this room.

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- **Experiment 1: Making power with our hands**

In order to solve this problem, students can make a chart as shown below

Number of cuts	Number of pieces	Previous number of pieces x2
0	1	
1	2	1x2=2
2	4	2x2=4
…	…	…

They can see that the number of layers increases.

- Teacher can explain to students that the thickness of a sheet is approximately 0.08mm and if we fold it 42 times the thickness is approximately the distance between the Earth and the moon, 351.000 km.

- Britney Gallivan has solved the Paper Folding Problem. http://en.wikipedia.org/wiki/Britney_Gallivan

- **Activity 15**

Why did Robin Hood steal from the rich?

The answer is: BECAUSE THE POOR DIDN'T HAVE ANY MONEY

- **Activity 16**

This activity could be used to sum up the content of the lesson.

Teacher could use the next domino to reinforce the vocabulary in this unit

VOCABULARY LESSON 1

In pairs students can ask each other the translation of the words below. Each student has a card ands asks both in Catalan and in English.

SEQUENCE	TERME	TERM	PARELL
EVEN	IMPARELL	ODD	POTÈNCIES DE…
POWERS OF…	SUMAR	ADD	RESTAR
SUBTRACT	MULTIPLICAR PER	MULTIPLY BY	DIVIDIR PER
DIVIDE BY	INFINIT	INFINITE	FINIT
FINITE	CREIXENT	INCREASING	DECREIXENT
DECREASING	TERME GENERAL	NTH TERM	FULL DE CÀLCUL
SPREADSHEETS	GRÀFIC	GRAPH	FILA
ROW	GRAELLA	GRID	SUCCESSIÓ

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Number words

one	fourteen	ninety
two	fifteen	hundred
three	sixteen	thousand
four	seventeen	million
five	eighteen	billion
six	nineteen	
seven	twenty	
eight	thirty	
nine	forty	
ten	fifty	
eleven	sixty	
twelve	seventy	
thirteen	eighty	

Number signs

+	add, sum, plus
-	minus, take-away, subtract
×	times, multiply, product
÷	share, divide, split
>	greater than
<	less than
°	degrees
%	percentage
½	fraction
.	decimal point

At the end of the lesson it could be very useful to do a plenary activity for 10 minutes. Recap key language by asking pupils to make statements about a sequence. For example:

The 3rd term is …

The rule is …

The sequence is…

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Recurrent Sequences

Lesson 2: Recurrence

- **Activity 6**

$a_n = 2n$	1,4,1,5,9,2,...
pi decimal places	2,4,6,8,10,12, ...
$a_n = n^2$	1,3,5,7,9,11,13,...
$a_n = 2n-1$	2,4,8,16,32,64,...
$a_n = 2^n$	1,4,9,16,25,36,...
prime numbers	1,2,3,5,7,11,13,...

- **Activity 8**

In column A enter numbers from 1 to 3.

Select these first three numbers and drag them downwards.

Go to column B and enter the first few terms of Fibonacci's sequence. (1 in B2 and 1 again in B3).

In B4 enter the formula =B2+B3 Now press 'enter', and your third term will be calculated.

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By dragging the formula from cell B4 downwards you will get other terms in Fibonacci's sequence.

The computer will recognise the pattern and continue with other counting numbers.

At the end of the lesson it could be very useful to do a plenary activity for 10 minutes. Recap key language by asking pupils to make statements about Fibonacci sequence.

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Arithmetic and Geometric Progressions

Lesson 3 : Basics of Arithmetic and Geometric sequences

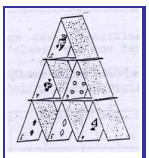
The nth term of an AP

An arithmetic sequence is a function whose rule may be expressed as

a linear equation of the form f(n) = dn + c where d is the common differencef(1) – c, and c is a constant.

Experiment 2: breaking The Guinness world Record

In order to solve this problem, students can fill a chart as shown below:

Card castle						
Number of floors	1	2	3	4	5	6
Number of cards	2	7	15	26	40	57

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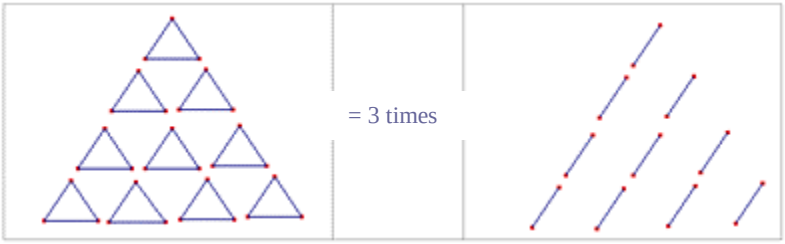
In order to find the rule students have to think about triangular numbers, and they can draw a graph like the one below:



They have to notice that it is necessary to subtract the row below of horizontal cards. That is, for n floors the number of cards is:

$$3.\left(\frac{n(n+1)}{2}\right)-n=\frac{n.(3n+1)}{2}$$

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Assessment

Name: _____
Subject: _____
Lesson: _____
Date: _____

1) Have you learnt anything new?

2) Can you use the things you have learned in your daily life?

3) You are interested in learning more about….

4) What things need to be changed?

5) What do you suggest?

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Websites

Pictures, ClipArt,Printable...

http://www.senteacher.org

http://classroomclipart.com/

http://www.gcse.com/maths/mindex.htm

http://www.vincentdutrait.com/dotclear/index.php?p48

http://www.crosswordpuzzlegames.com/create.html

Maths

http://mathforum.org/

http://www.algebra.com/

http://www.purplemath.com/

http://www.divulgamat.es/

http://www.shodor.org/interactivate/

http://demo.activemath.org

Fibonacci

http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fibInArt.html

http://mathworld.wolfram.com/FibonacciNumber.html

http://www.bbc.co.uk/dna/h2g2/Search?searchtype=article&showapproved=1&showsubmitted=1&shownormal=1&searchstring=fibonacci&dosearch.x=0&dosearch.y=0&dosearch=Search+the+Guide

Zeno's paradox

http://www.mathacademy.com/pr/prime/articles/zeno_tort/

Through the Looking Glass by Lewis Carroll

http://www.cs.indiana.edu/metastuff/looking/ch1.html.gz

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