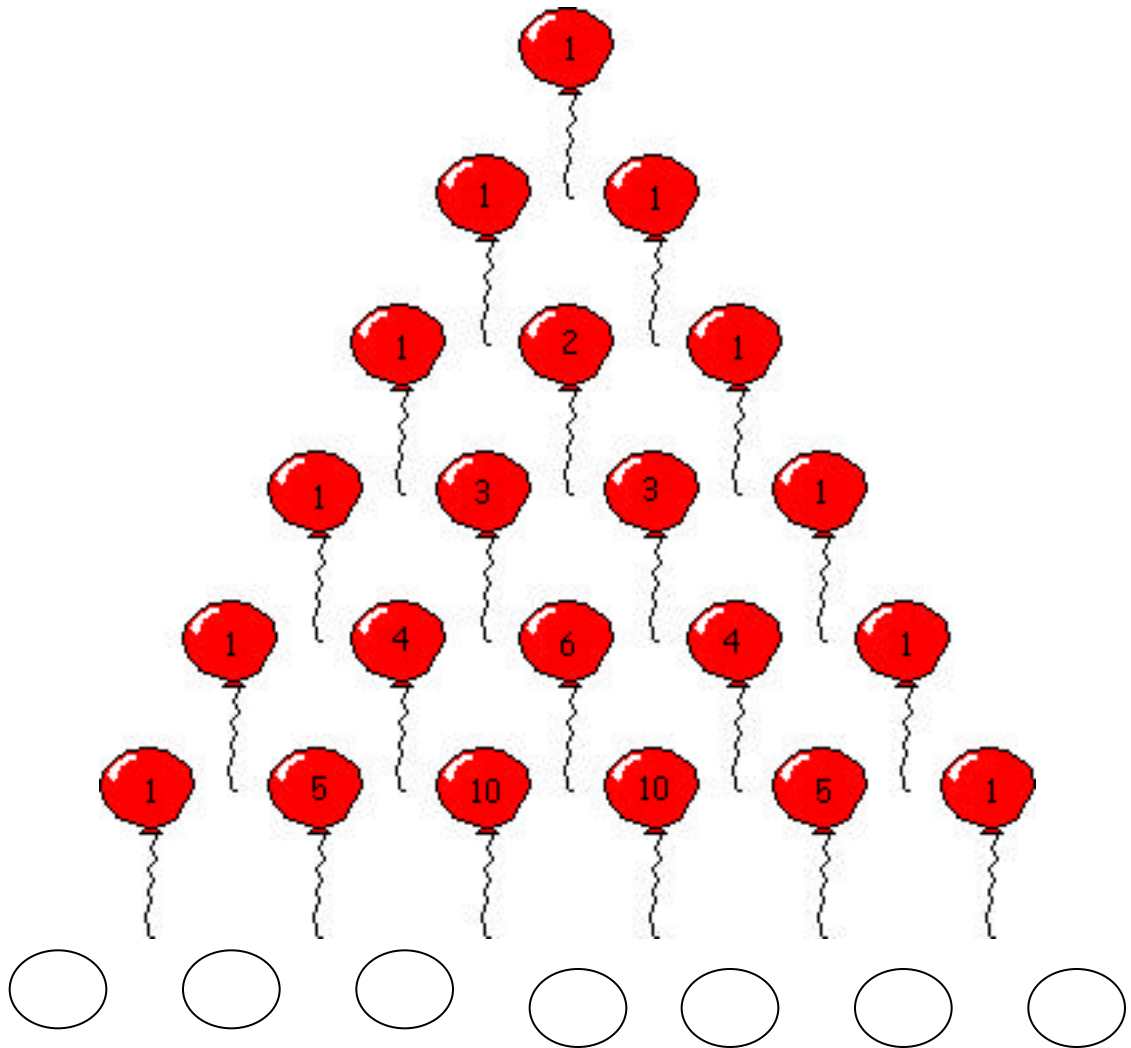


Look at the drawing and pattern shown below. Answer the questions:



- 1) Can you figure out the next row of numbers? Write the numbers in the balloons above?
- 2) Work with a partner and see if you can find the natural numbers or counting numbers; $\{1, 2, 3, 4, 5, 6, 7 \dots\}$
- 3) Try to find the multiples of 2:
 $\{2, 4, 6, 8, 10, 12, \dots\}$
- 4) Try to find the Fibonacci numbers: $\{1, 1, 2, 3, 5, 8, 13, 21, \dots\}$
- 5) Try to find the triangular numbers: $\{1, 3, 6, 10, \dots\}$

GO TO <http://forum.swarthmore.edu/workshops/usi/pascal/mo.pascal.html>
to check your answers.

The pattern shown on page 1 is called Pascal's triangle. Pascal's triangle was invented by a French mathematician named Blaise Pascal who lived between 1623 to 1662.



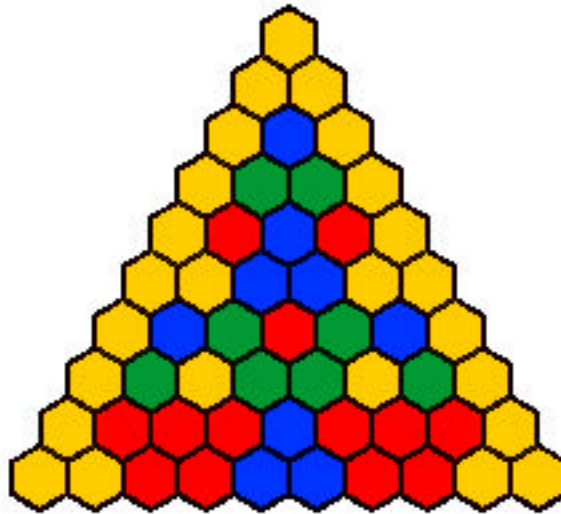
picture from:
<http://www-groups.dcs.st-and.ac.uk/~history/PictDisplay/Pascal.html>

To read more about the life and works of Blaise Pascal, GO TO
<http://www-groups.dcs.st-and.ac.uk/~history/Mathematicians/Pascal.html>

Pascal's triangle is more than a list of numbers. It is used in probability problems, and algebra problems.

- 6) On the attached sheet, color the even numbers with one color and the odd numbers with another color. What do you find? _____
- 7) The sum of an odd number and another odd number is always _____ (odd or even).
- 8) The sum of an even number and another even number is always _____ (odd or even).
- 9) The sum of an odd number and an even number is always _____ (odd or even).
- 10) On the second sheet provided, use four colors to color 1) the multiples of four, 2) the numbers one less than multiples of four, 3) the numbers two less than multiples of four, and 4) the numbers three less than multiples of four.

See if you get this answer (your colors will differ):



For a more advanced project on coloring Pascal's Triangle and discovering patterns,

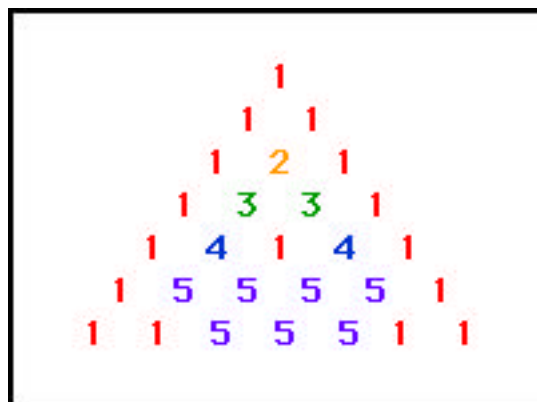
GO TO http://forum.swarthmore.edu/workshops/usi/pascal/hs.color_pascal.htm;

You need five colors and the last sheet on this packet. Decide which colors you want to use and color them here:

color	1	2	3	4	5
1	2	3	4	5	1
2	3	4	5	1	2
3	4	5	1	2	3
4	5	1	2	3	4
5	1	2	3	4	5

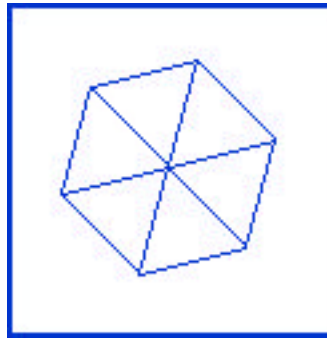
Read the directions on the web page and in case you don't finish, here are the instructions:

1. Choose any five colors.
2. Assign a different color to each number and shade each block on the color chart above.
3. Use the blank Pascal Triangle grid from the last page of this packet.
4. Color the top three hexagons color 1. (Using black for color 1 provides a nice outline.)
5. To determine the color of the next row of cells, look at the last row:
 - a. if there is only one cell above a cell, make that cell color 1.
 - b. if there are two cells above a cell, use the chart to find the color to use.
 - c. if the two cells above are both color 1, look at row 1 of column 1 on the chart for the color to use. It is color 2.
 - d. if the two cells above are colors 1 and 2, look at row 1 of column 2: it tells you to use color 3.
5. The first few rows would be colored like this:



When the grid has been completely colored, cut it out carefully along the edges.

6. Six identically colored triangles can be joined to form a hexagon, like below:



These constructions make great classroom or hall decorations. Looking at the center point gives the illusion of a cube in three dimensions.