Fun PATTERNS with Pascal's Triangle

★ Two triangles above the number added together equal that number.

★ The first diagonal is just 1's.

★ The second diagonal has the Natural numbers, beginning with 1.

★ The third diagonal has the triangular numbers.

★ The fourth diagonal has the tetrahedral numbers.

★ When the odd and even numbers are colored, the patterns are the same as the Sierpinski Triangle.

★ If you add up the horrizonal sums, you get powers of two.

★ Each line in the triangle is the result of 11 to an exponent.

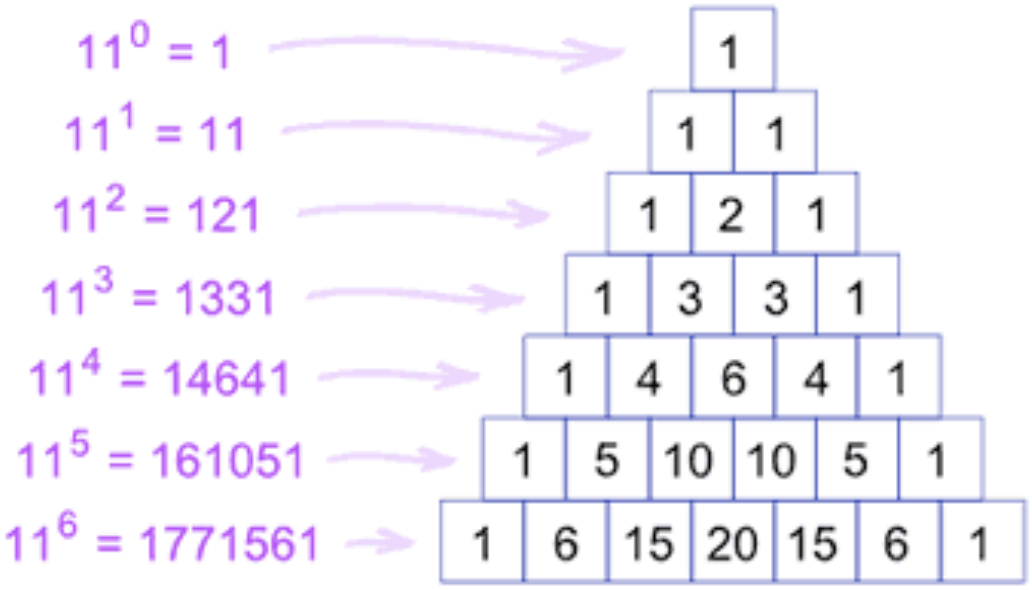
★ By going up and then along, then add up the values we will get the Fibonnacci Sequence.

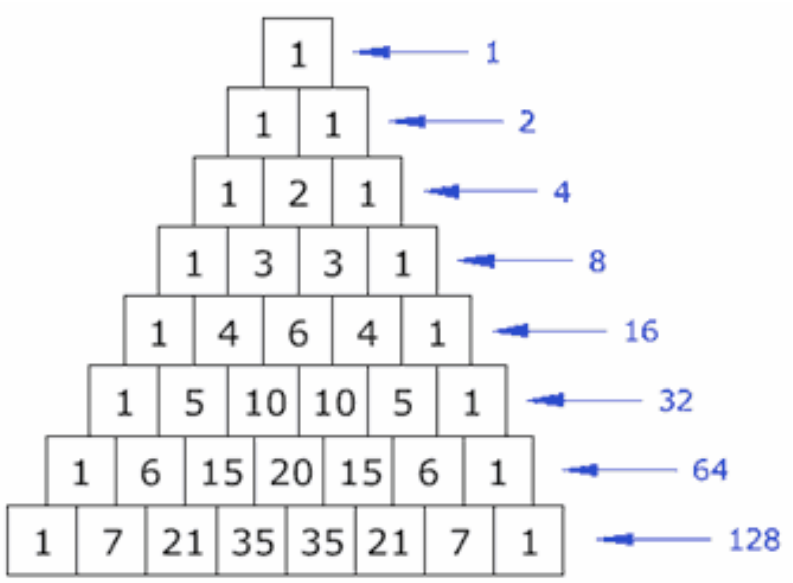
★ Symmetry.

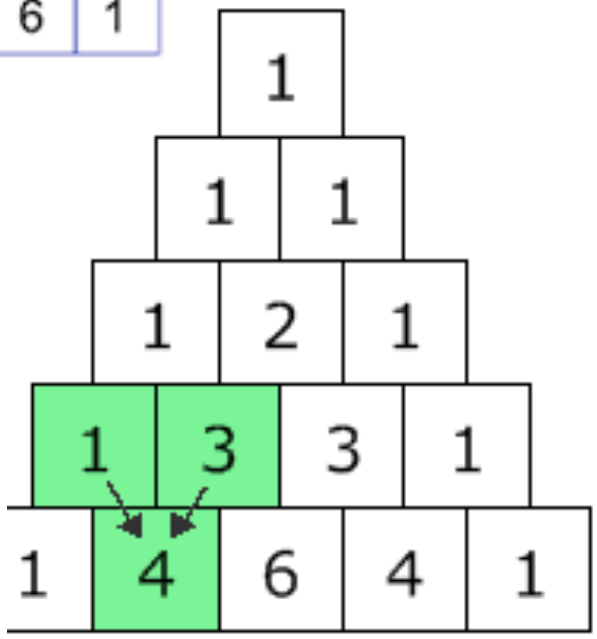
★ Hockey Stick Pattern

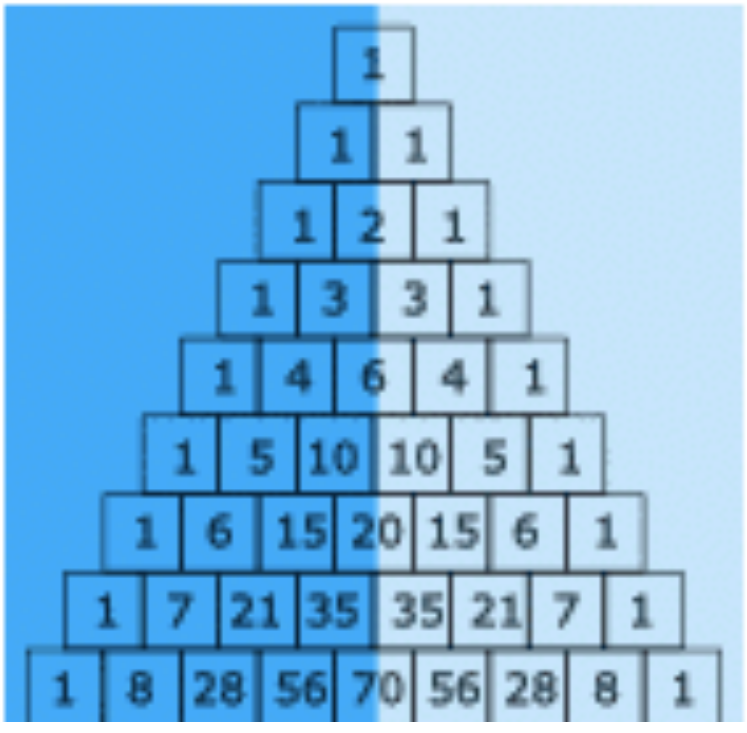
★ Prime Numbers

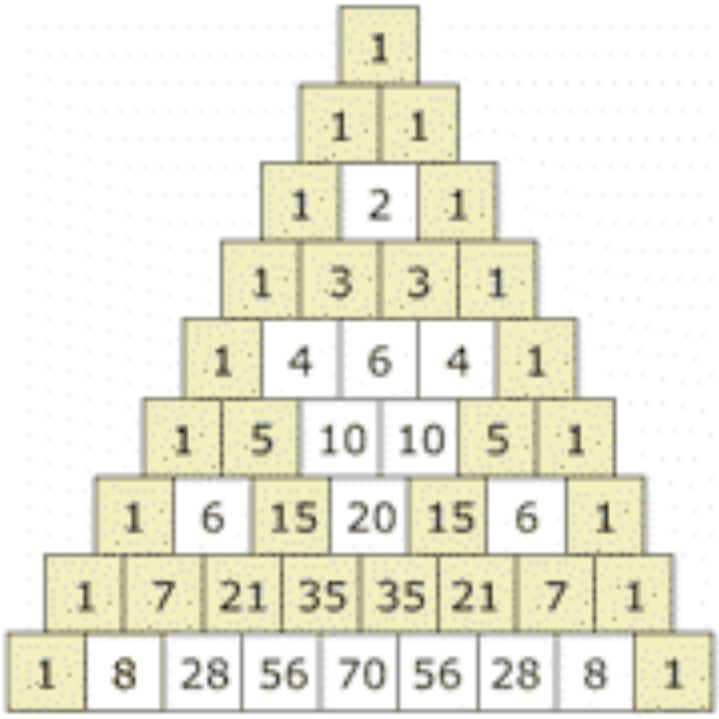
Reference:
http://www.mathsisfun.com/pascals-triangle.html

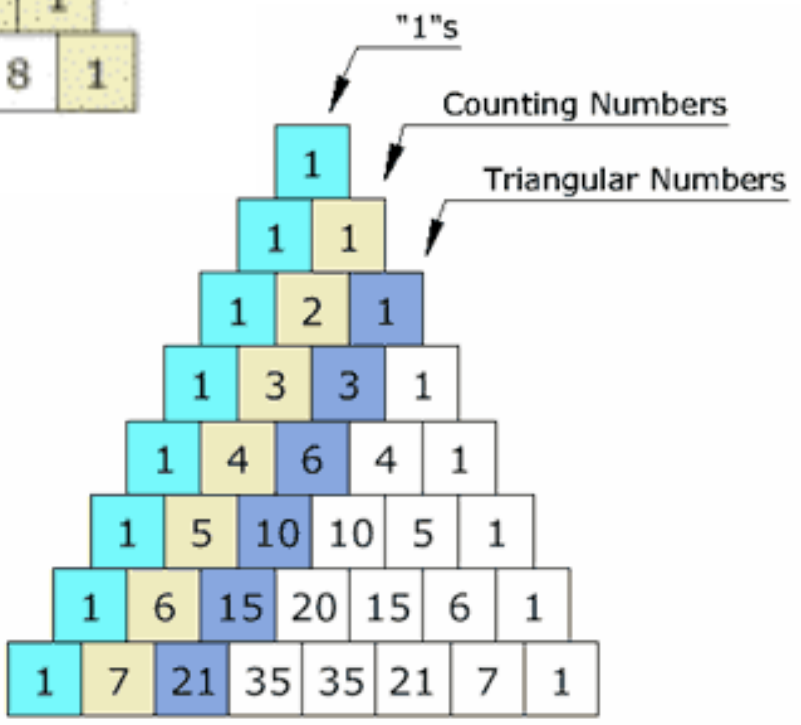

$11^0 = 1$
$11^1 = 11$
$11^2 = 121$
$11^3 = 1331$
$11^4 = 14641$
$11^5 = 161051$
$11^6 = 1771561$
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1

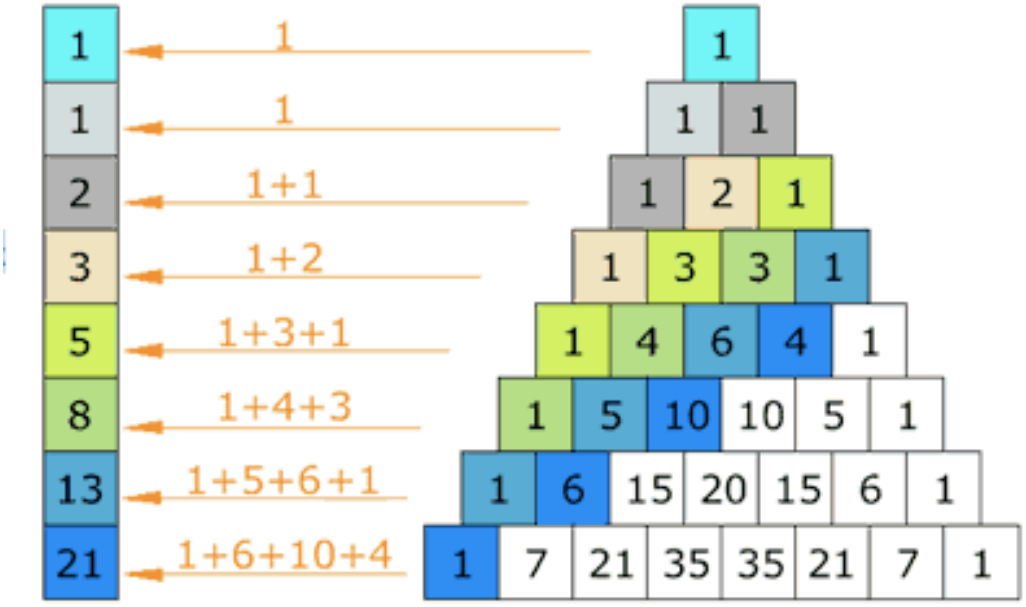

1 ← 1
1 1 ← 2
1 2 1 ← 4
1 3 3 1 ← 8
1 4 6 4 1 ← 16
1 5 10 10 5 1 ← 32
1 6 15 20 15 6 1 ← 64
1 7 21 35 35 21 7 1 ← 128


1
1 1
1 2 1
1 3 3 1
1 4 6 4 1


1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1

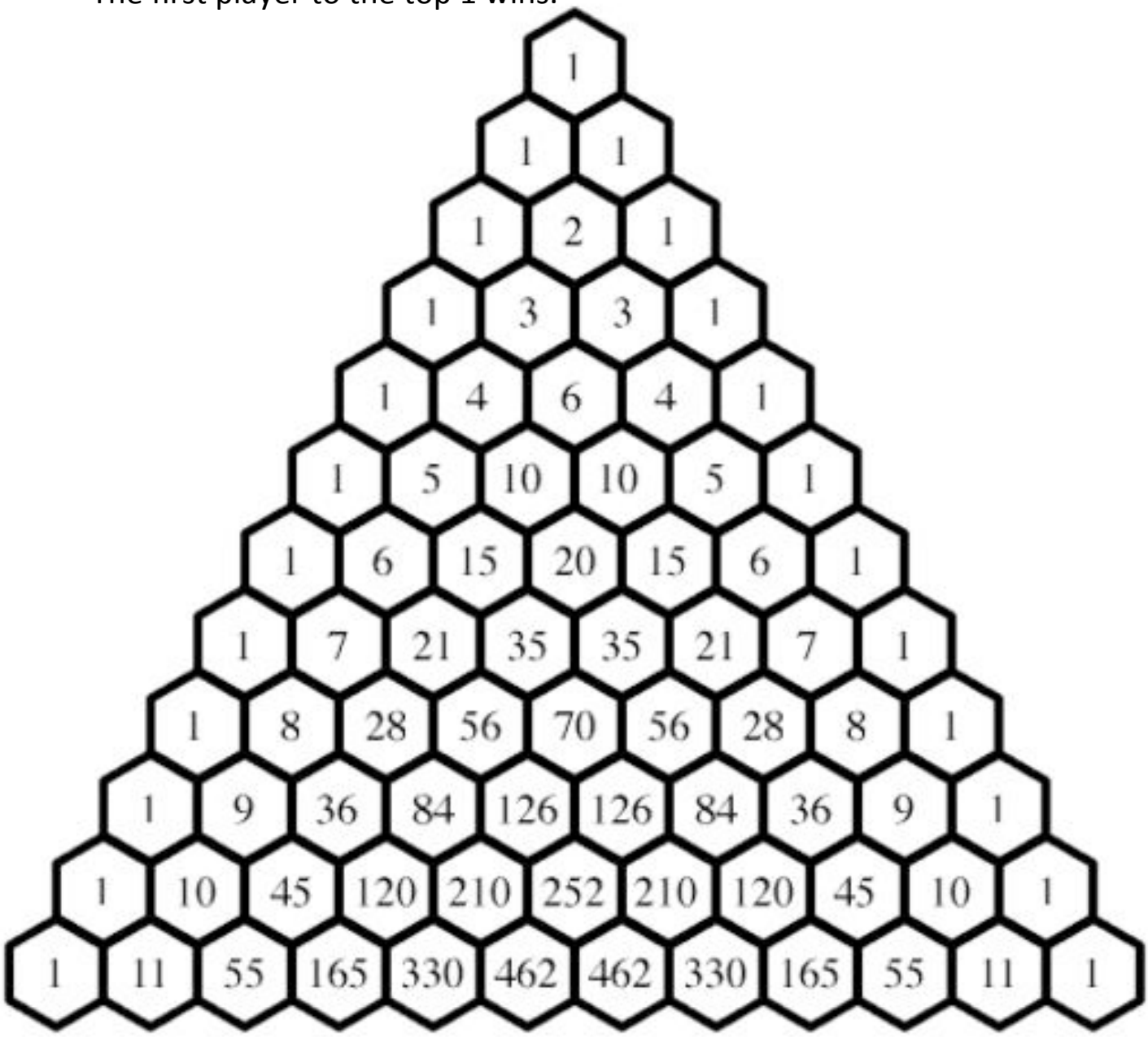

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1


"1"s
Counting Numbers
Triangular Numbers
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1


1
1
2
3
5
8
13
21
1
1
1+1
1+2
1+3+1
1+4+3
1+5+6+1
1+6+10+4
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1

Create a GAME using Pascal's Triangle.

Start with the first 12 rows of Pascal's Triangle.
Two players role dice to see who goes first, highest number wins.
A player can only move if they get a number (from 1 to 4 dice, the player gets to choose) from a pattern.
The player gets to decide if they want to multiply, subtract, add or divide to be able to move.
If they get a double and move to a pattern they can role again and move the other player where ever they want.
The first player to the top 1 wins.



FACTS on Blaise Pascal

- Born: June 19, 1623 in Clermont-Ferrand, France
- Died: August 19, 1662 in Paris, France
- Mathematitian, religious philosopher, scientist
- Started mathematics at a very young age
- Pascal, the computer programming language, which was named after him
- Blaise was twelve years old when he started attending meetings of a mathematical academy with his father, who he was taught by.
- Pascal also worked with another mathematician, Fermat, on the Theory of Probability.
- Although their investigations on Pascal's Triangle were carried out on various gambling situations, this theory has a numerous number of applications. For example, insurance schemes and many other branches of science such as quantum physics, where the behavior of particles can be described using probabilities.
- Pascal invented a simple method now known as Pascal's Triangle to determine the probability of certain outcomes.

Quotes by Blaise Pascal:
“Can anything be stupider than that a man has the right to kill me because he lives on the other side of a river and his ruler has a quarrel with mine, though I have not quarrelled with him? “

“Small minds are concerned with the extraordinary, great minds with the ordinary. “

“To have no time for philosophy is to be a true philosopher.”

“Noble deeds that are concealed are most esteemed. “

“The gospel to me is simply irresistible. “

“Imagination disposes of everything; it creates beauty, justice, and happiness, which are everything in this world. “

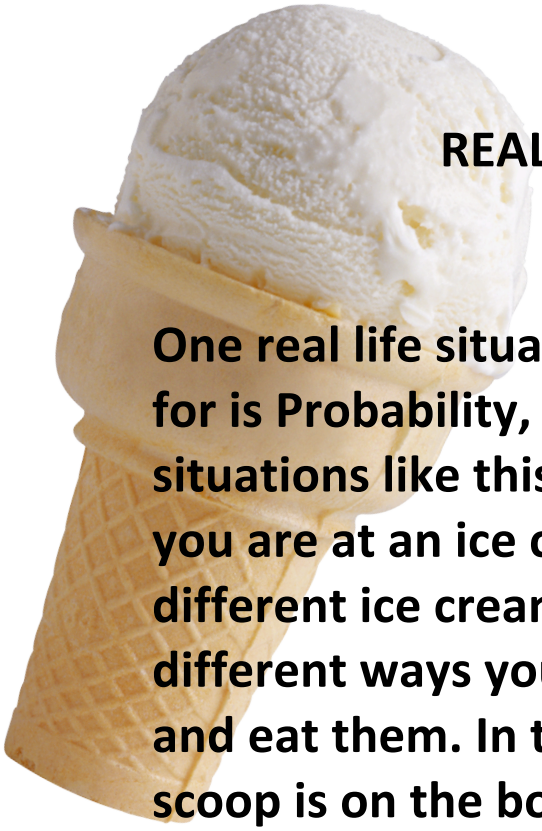
Reference:
http://www.answersingenesis.org/articles/cm/v20/n1/pascal
http://www.notablebiographies.com/Ni-Pe/Pascal-Blaise.html

APPLICATION of Pascal's Triangle

Binomial Expansion

$$(a+b)^0 = 1$$
$$(a+b)^1 = a+b$$
$$(a+b)^2 = a^2+2ab+b^2$$
$$(a+b)^3 = a^3+3a^2b+3ab^2+b^3$$
$$(a+b)^4 = a^4+4a^3b+6a^2b^2+4ab^3+b^4$$
$$(a+b)^5 = a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+b^5$$

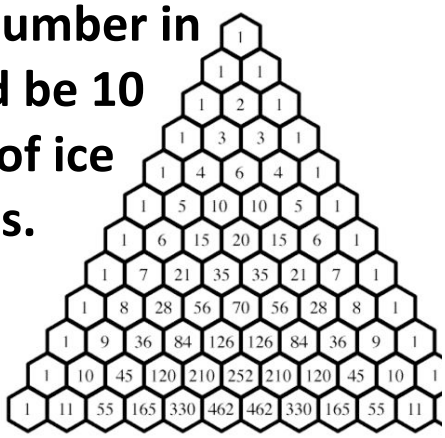
Watch:
http://www.youtube.com/watch?v=NLQmQGA4a3M



REAL LIFE with Pascal's Triangle

One real life situation that Pascal's Triangle is used for is Probability, and combinations. We have situations like this all of the time. For example, say you are at an ice cream shop and they have 5 different ice creams. You want to know how many different ways you can pick two of the ice creams and eat them. In this case, it does not matter what scoop is on the bottom or on the top, it only matters what two ice creams you pick. This math question would look like, "how many different ways can you pick two scoops of ice cream from a set of 5 different ice creams?"

To find the answer you find the second number in the fifth row, which is 10. So there would be 10 different ways you can have two scoops of ice cream from a set of 5 different ice creams.



Reference:
http://mathforum.org/dr.math/faq/faq.pascal.triangle.html

VISUAL Pascal's Triangle

Desiree Obenauf

February 15, 2013

Multi-Genre Project

Overall, I liked the idea of this the Multi-Genre project. My only concern is how I handled my progress of planning throughout this project. I feel like it was really hard to pick a topic, actually this was the hardest part. Once I figured out that I wanted to do Pascal's Triangle the genres came pretty easy to me. The first thing I visualized was the triangle. I wanted to visually show this, and that is why I choose cups. Students can visually see the triangle, but can also play with it and the triangles patterns. I thought this was a great genre for students that love hands on projects, and visual aides. Next, I was thinking of all the patterns in Pascal's Triangle. There are so many, I think it is important for students to explore these and first see what kinds of patterns they notice in the triangle. This would also be a fun way to have a guessing game as a class. Showing the patterns and color coating the pictures of the patterns allowed me to really grasp the patterns and recognize how many there really are. After, I wanted students to relate all of these patterns and try and come up with a game. My game made me think of what I could use and how the players could move. This made me think deeper and have a better understanding of Pascal's Triangle. I think students should have a deeper understanding while having fun, which is what making a game provides. Next, I wanted to have students understand why this is used,

what applications the triangle provides, and what we can use the triangle for in real life. This also created a high level of thinking. This is because I have to actually know the concepts and then think of why or how we use the Pascal Triangle. I like the ice cream example because who does not like ice cream. I think putting this into use would be fun, and I bet they would start seeing ways they could use the triangle with combinations, or other real world examples. Showing the binomial expansion allows students to see there are applications and reasons why we use Pascal's Triangle. There were other ideas to pick from but I found binomial expansion to show a shorten process other than multiplying each binomial by hand. The last genre was having facts and quotes about Blaise Pascal. This would be a great way for students to see the relationship between math and other contents like english and history. As a teacher I think it is important to bring writing into the classroom. So having the students realize there was an actual man who created this is a great way to bring the whole lesson together. Advice I would give to students in completing this project is to not worry about all of the genres at once but think of them one at a time. At the end it is nice to bring them all together and realize everything you learned and different perspectives you provided on one topic. I think this project is a great way to understand a topic more clearly, and it makes you understand the importance of the topic.