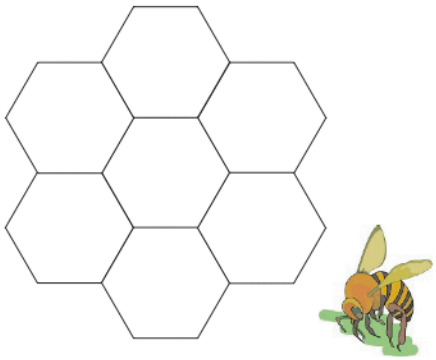
Lesson 9, November,3, 2009

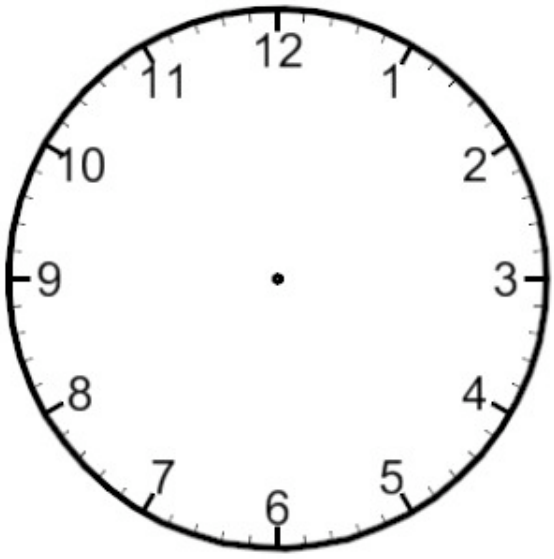
Overview

1. Honeycomb and clocks. Both problems have the same idea: one should group big numbers with small numbers to get the same sum in every group. Kids worked on the problems themselves and then we discussed it in class. The clock problem turned out to be quite hard for them.
The story about the 7-year old Gauss who found himself how to add numbers 1+2+…+100 always made me very uncomfortable. Whenever I wanted to discuss these kind of sums with somebody very young, I felt that if I tell them the trick, I would steal their chance to be like Gauss and to find the trick themselves. And then their mom and dad would not be able to say " Hey, my kid is like Gauss!" So I carefully avoid building any bridges between problems like honeycomb and clocks and this classical sum. I want all of us to be like young Gauss.
2. Pizza problem. For many kids it was not easy to count the number of slices. It is already a challenge to draw neatly 4 cuts, so we stopped drawing and started to look for the pattern. I took this opportunity to show again the related sequence of numbers in the Pascal triangle.
3. Staples paper chains may be not of great mathematical value, but at this age it is still a challenge to repeat the topological procedure of connecting two links – some participants have had hard time with that.
4. Our last game was dedicated to formal logic. I threw a ball to somebody in class and made some false statement. For example:
"All cats are black". And the person have had to make right statement out of that, preferably only by changing words "all", "some", "are", "are not". The game went very lively, but it was hard to observe the rule, so we did not pay much attention to it, we just made truth out of lie.
I was glad that one of the examples ("All kids are older than their parents") was followed in 7pm group by the negation ("Some kids are not older than their parents.") and raised the discussion, if the last statement is true. More on formal logic was done on the next lesson.

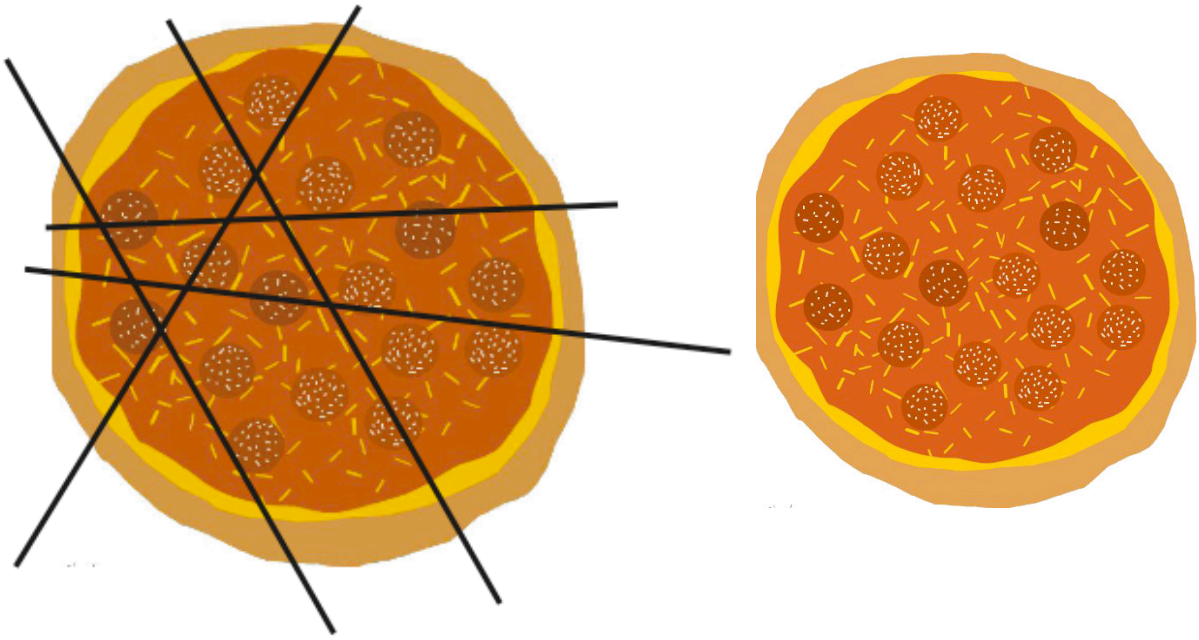
Put numbers 1,2,3,4,5, 6, 7, so that the sum in each line going through the center would be 12.



Source: http://children.kulichki.net/vopros/soty.htm
Clip art: http://classroomclipart.com



Divide clock into three parts so that the sum of numbers in each part would be the same as in others.



1. Mister Primavero made pizza and cut it into pieces by straight cuts. Count the number of pieces, cuts and “vertices”. (Vertices are the points where two cuts intersect).

Number of pieces: P=

Number of cuts (lines): C=

Number of vertices: V=

2. Cut the other pizza by 3 straight cuts to get the maximal number of pieces (the pieces do not have to be the same in size or shape).

3. Did Mister Primavero get the maximal number of pieces on his pizza?

Clipart: from aviary.com

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4. Let us study the same question for different numbers of cuts: 1, 2, 3, 4, 5… What is the maximal possible number of pieces in each case? On the next page you can find pizzas to practice. Write the results of your experiments in the table.

Number of cuts	Maximal number of pieces
1	
2	
3	
4	
5	
6	
7	
8	

5. Do you see a pattern? Do you see any relation between the numbers in the table and the numbers 1, 3, 6,10,15… in the Pascal triangle?

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          1
        1   1
      1   2   1
    1   3   3   1
  1   4   6   4   1
1   5  10  10   5   1
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Clipart: from aviary.com

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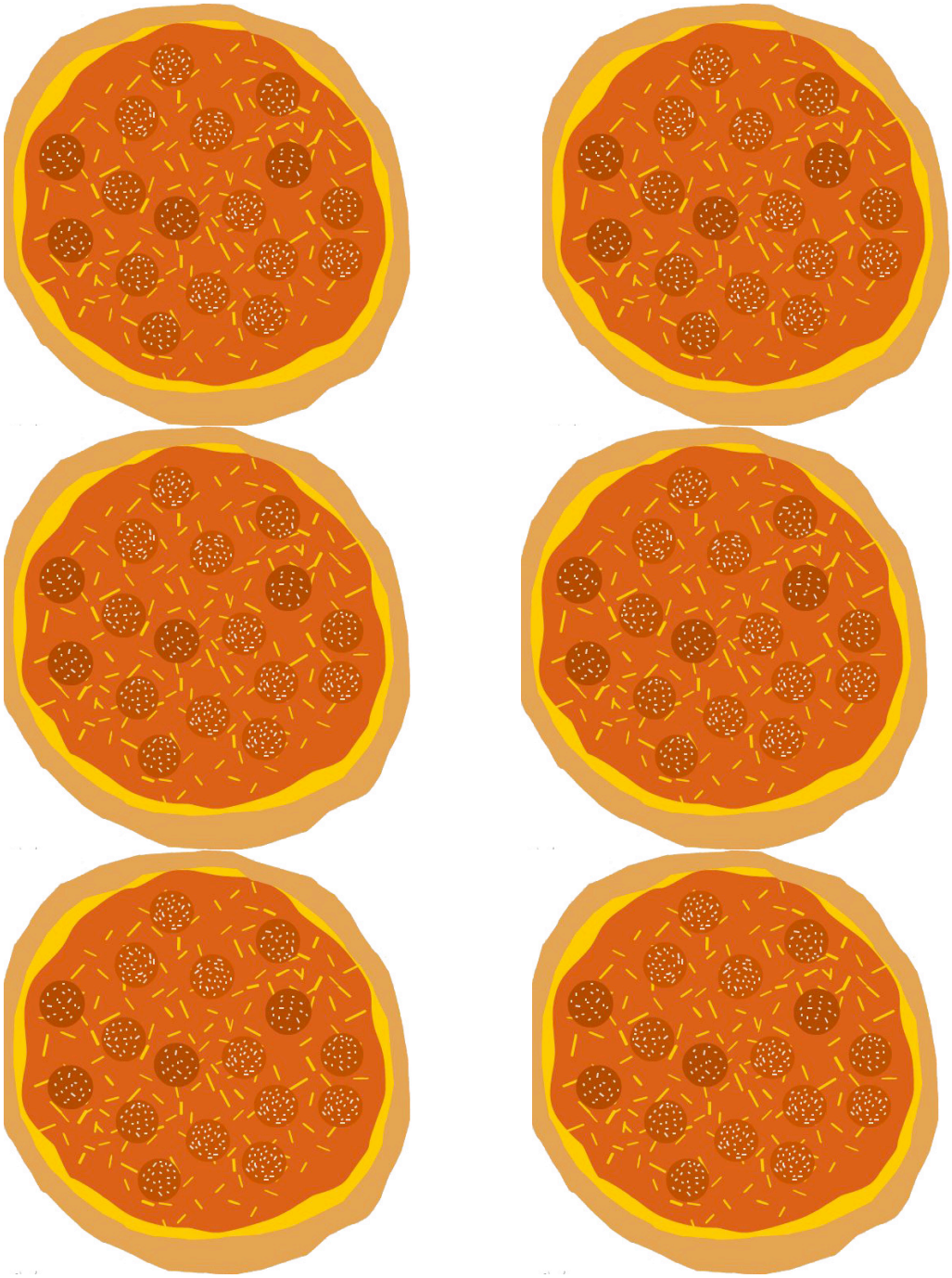
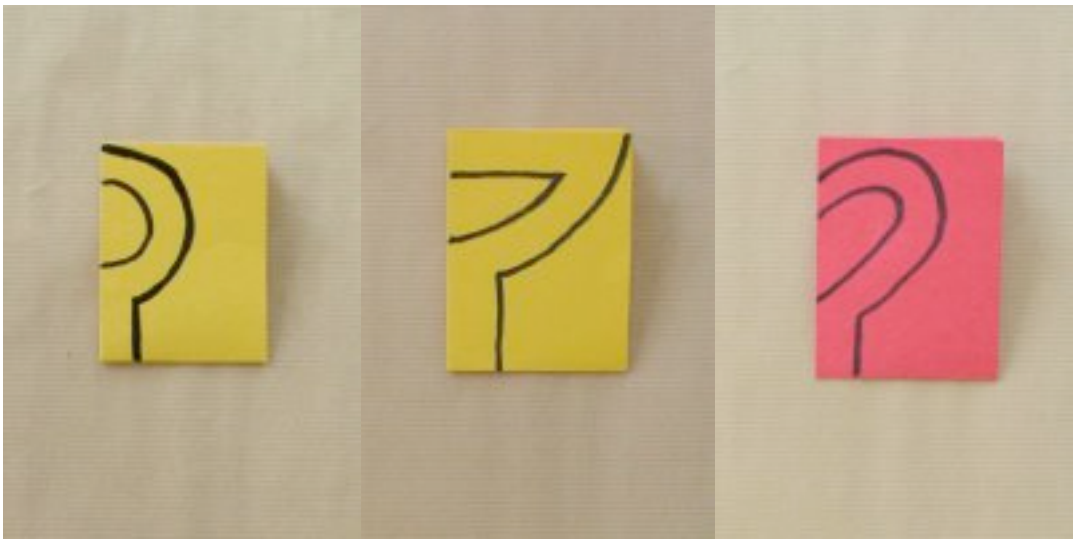
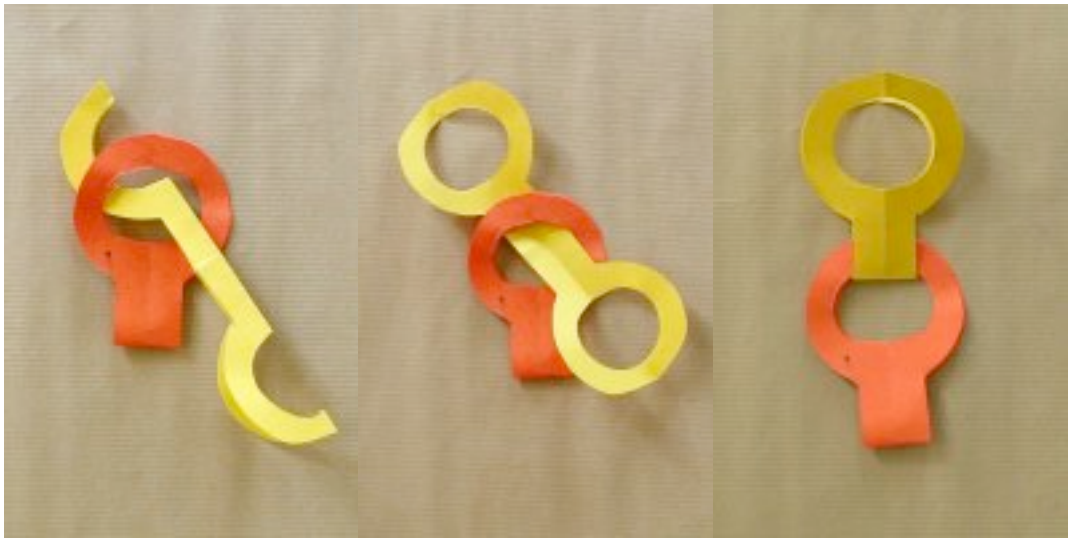


STAPLELESS PAPER CHAIN

Examples of shapes of links:





Source of pictures: http://worldpreschoolmom.blogspot.com