**Lesson 4 September, 29, 2009 BMC Elementary**

*Overview.*

1. We made short overview of powers of numbers. It went a little bit better in the 7pm group.
2. Numbers that make squares. What number of small squares one can take to construct a bigger square? We did several squares on the board and wrote the sequence
   1, 4, 9, 16, …

We discussed, what patterns one can notice in this sequence. The answers were very impressive. Kids observed themselves that

1) the odd and even numbers alternate;
2) that to get the (n+1)st number in the sequence, one has to add n and n+1 to the previous one;
3) that the differences between neighboring numbers make the sequence of odd numbers.

3. After that we wrote that
   1=1X1,
   4=2X2,
   9=3X3, …

and mentioned that these are actually second powers of numbers.

4. The same we did with cubes: using wooden blocks, we constructed the first few cubes of integers:
   1, 8, 27, 64
   We wrote that
   1=1X1,
   8=2X2X2,
   27=3X3X3, …
   and mentioned that these are actually third powers of numbers.

5. After that we did the experiment with random distribution. Every math circle participant went through the maze by this rule once or twice, and we got the following distributions:

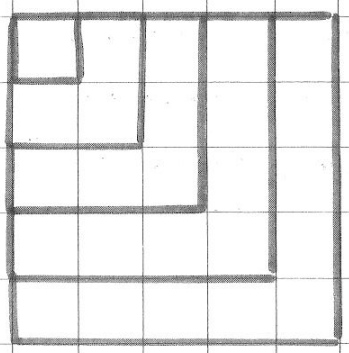
In 6 pm group:
[1,4,8,12,7,2,1]
In 7pm group:
[1,0,3,8,4,5,6] ( I am not sure about this data)

6. Homonyms – the words that have several meanings. On the handout with pictures one has to match the pictures in pairs that can be described by the same word, and to find the picture that does not match any other. The second handout – with descriptions in words – was not discussed in class.
7. The Homonyms activity prepared us for the discussion of the role of definitions in mathematics. Kids tried to give a definition of a circle (and failed ☺ ). After the real definition was given, Laura showed how to draw a real circle, and everyone tried to repeat it on the blackboard.

*Observations.*

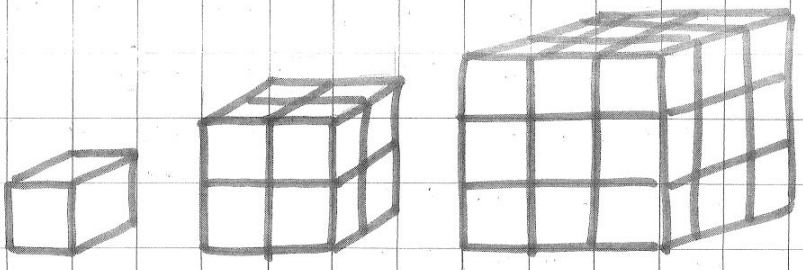
One of the participants tried to compute the next cube number by multiplying the number of horizontal slices by the number of cubes in each slice – which is very good. Probably, he would finish that, if we could give him a little bit more time for computations.

Lesson 4 BMC Elementary



NUMBERS THAT MAKE SQUARES:

1, , , , , ...

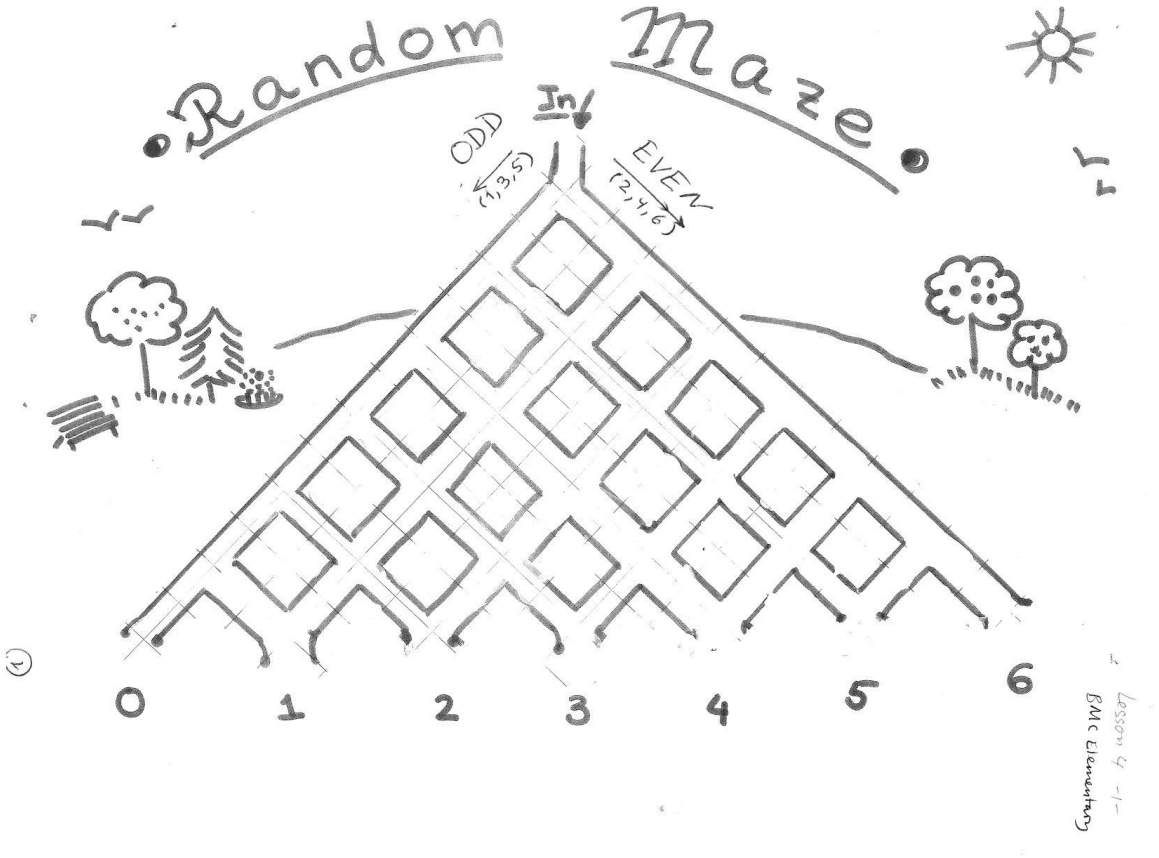


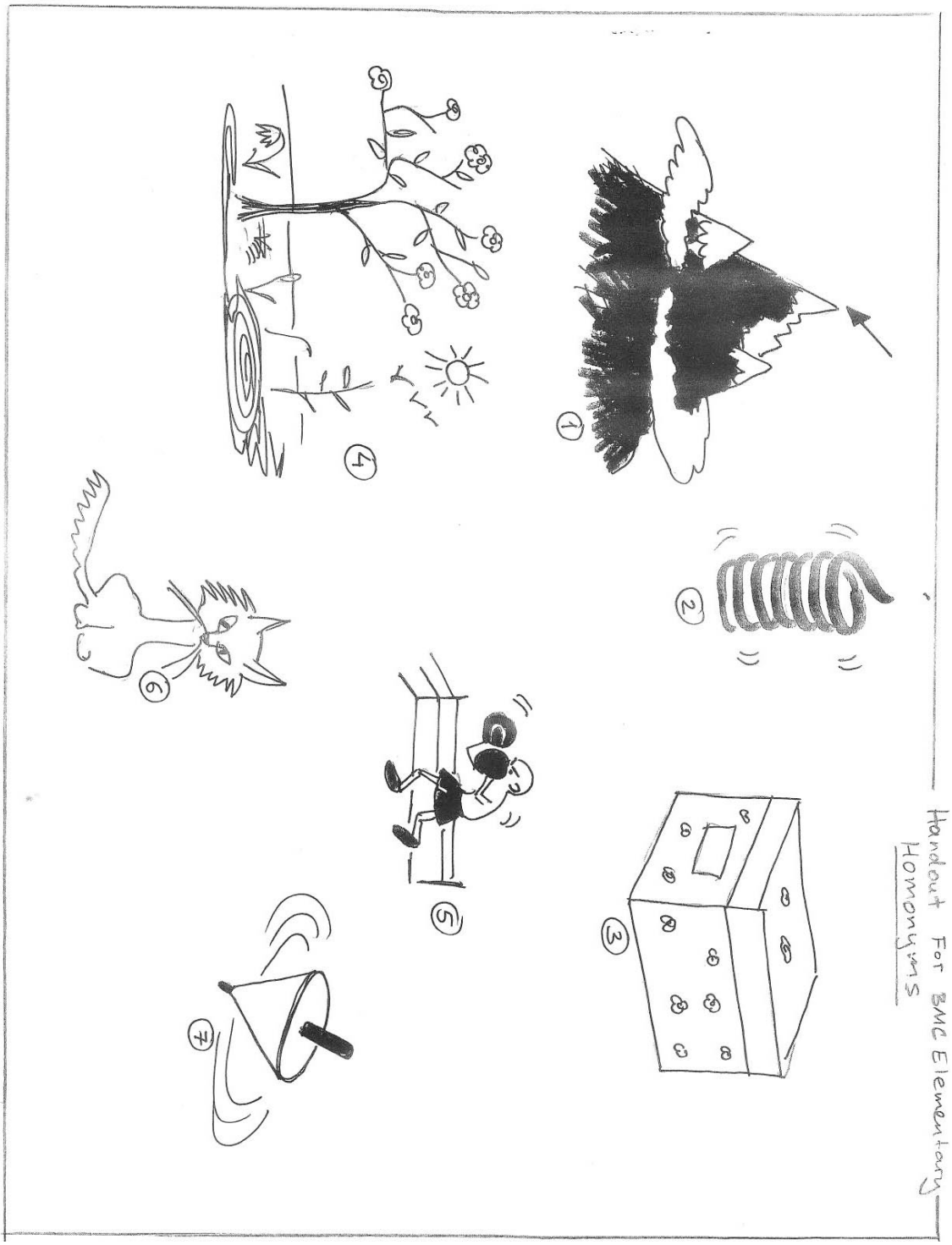
NUMBERS THAT MAKE CUBES:

1, , , , , ...

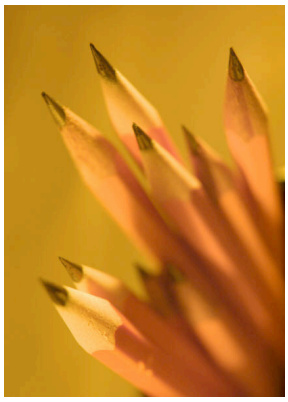
RANDOM MAZE

Mister Johnson is an ice-cream seller. He works in an amusement park, near the Random maze. The maze has one entrance and seven exits (see the picture). Mister Johnson wants to put the stand near the exit where most of the visitors come out. The maze rule is the following. On the entrance a visitor gets a dice. On every crossroad the visitor throws the dice and looks at the number on the top. If it is even, he goes left, if it is odd, he goes right.






Match the pictures in pairs described by the same word. Find the picture that does not have a pair.



Combine the descriptions in the groups of two, and write a word that suits both descriptions:

1. A layer of paint.

2. A measure of length equal to 12 inches.

3. A person who gets excited about a favorite team or a singing group.

4. A machine used to blow cool air.

5. The part of the body at the end of a leg.

6. A set of playing cards.

7. A piece of clothing worn to keep you warm.

8. The floor of a boat or ship.

Answer: 1,7 coat;2,5 foot;3,4 fan;6,8 deck.
Source: http://home.alphalink.com.au/~umbidas/Homonyms_main.ht