

## Certain, impossible and random events.

During this lesson we have discussed different types of events:

**Certain event** - this is an event that is sure to occur in this experience. For example, if there are only red balls in the pouch, then the event “a red ball is removed from the pouch”.

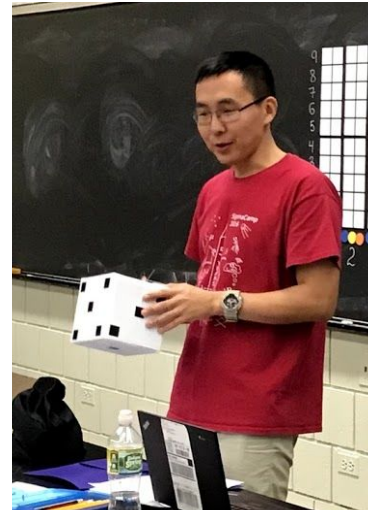
**Impossible event** – the event that cannot happen in this experience. For example, if there are only red balls in the bag, then the event “out of the bag is extracted blue ball” is impossible.

**Random event** – the event that may or may not occur in this experience. In my bag there are red and blue balls, the event “a red ball is removed from the bag” is a random one.

**First**, we simply toss the big dice several times and answer the following questions:

Which of the following events are random, certain or impossible?:

- a) the cube, having fallen, will balance on the edge;
- b) only one of the numbers will appear: 1, 2, 3, 4, 5, 6;
- c) the number 6 will appear;
- d) the number 4 falls out;
- e) an even number will appear;
- e) an odd number will appear;
- g) a number is drawn that is divisible by 5;
- h) the number that is divisible by 7 is displayed;



We also discussed what can happen in our life for sure, possibly and never.

**Second:** Let's play with color cubes!

If we have a bag with 2 yellow cubes, how many cubes do you need to take out of the bag in order to have a yellow cube for sure? Can we get a blue cube from this bag? No? Even if we try really hard?

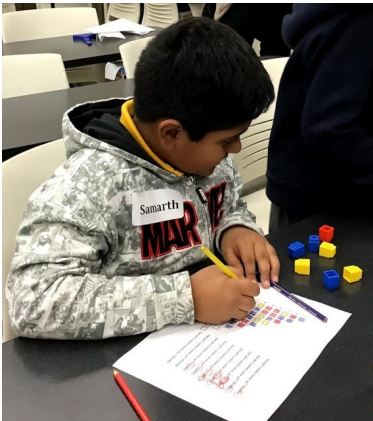
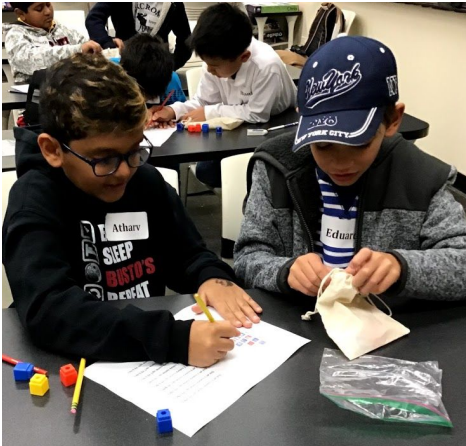
Now we have 2 yellow and 2 blue cubes in the bag. How many cubes do you need to take out of the bag in order to have a yellow cube for sure? How many cubes do we need to take from the bag to have cubes of 2 colors for sure?

Now we will play with 3 yellow and 3 blue cubes in the bag in front of the class and discuss: How many cubes do you need to take out of the bag in order to have a yellow cube for sure? How many cubes do we need to take from the bag to have cubes of 2 colors for sure? Can we get all 3 colors?

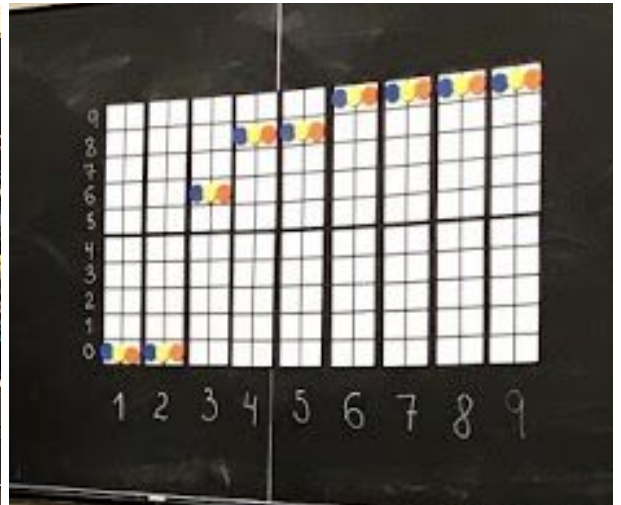
It is not as simple, so we will do an experiment: each table gets a bag with 3 orange, 3 blue and 3 yellow cubes, 3 color pencils of the same color and a worksheet. We will need to find out how many cubes do we need to take out of the bag to have cubes of all three colors.



You will start with taking one cube from the bag, color the cube on the worksheet, put this cube back, mix all cubes well and repeat with taking 2 cubes from the bag, and then 3 cubes etc. And every time you will also answer the question if you were able to get cubes of all 3 colors.



When all tables are done with all 9 cubes, we will collect the results.



What did we get:

- if you take out 1 or 2 cubes, it is impossible to get all three colors;
- if you take out 3, 4, 5 or 6 balls, then it is sometimes possible, but not necessarily all three colors;
- if you take out 7, 8 or 9 balls, for sure we will have all three colors;

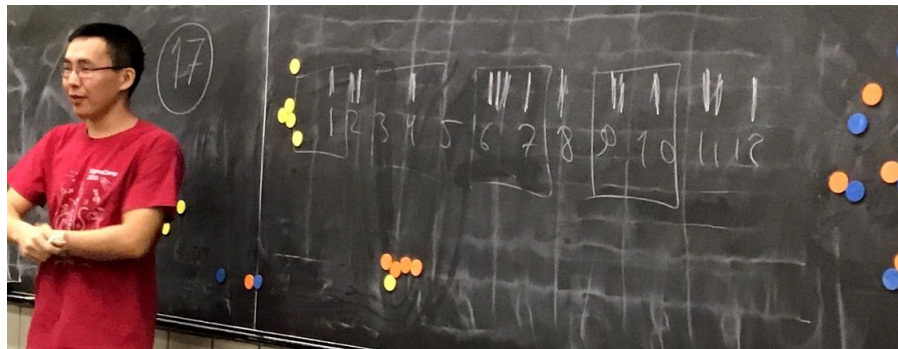


**Third:** We will solve some problems:

- a. We have 3 rabbits and we know there are 2 colors of rabbits possible. Would any 2 rabbits ever have the same color?
- b. We have 10 rabbits and they are sitting in 4 boxes. Is there, among these boxes, one with at least 3 rabbits?
- c. We now have 6 red rabbits and 4 blue rabbits in one large box. If 5 of them ran away one night, do I still have all my red rabbits with me in the cage? Is there a chance that all my blue rabbits are in still in the cage?
- d. You now have a whole basket of apples. There are ten red apples and twelve green ones. What is the smallest number of apples you will need to pull out of the basket to be sure of getting:
  - i. two green apples;
  - ii. two apples of the same color;
  - iii. two apples of different colors;
  - iv. three apples of different colors?

And play some game:

Today we have 17 students in the class. Do we have any 2 students with the same month of birth? Write down your birthday month on a piece of paper and we will check it!



Is it possible that all 17 students will have birthday on the same month? Why is it impossible to have 17 students in the classroom and have all of them be born in different months? Because 12 months is less than 17 students!

And finally we can scale up to the whole school!

We have a total 500 students at SchoolNova. Do we have any 2 students with the same exact day of birth?

**See you next week!**