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Subject: Mathematics

Title of activity: Running around the school yard

Level: 2nd year of ESO (Ages: 13-14)

Justification: Maths usually requires a certain level of abstraction. They are frequently complicated for adults who have their minds developped so for kids in their early teens, sometimes they become unreachable. This is the reason why we try to acquire and discover the mathematical concepts with objects they can touch. The handwork is a previous step to the abstract reasoning.

We also try to provide experiences to remember and, of course, to have fun.

Objectives:

- Associate the concept of divisor to the situations in which the tape measure can be cut in equal pieces.

- Obtain all the divisors of a number.

- Compare the divisors of two numbers and decide which is the biggest.

Description of the activity: We set students in pairs and we give each of them a piece of paper tape measure (the kind Ikea™ gently provides) of different length. Each student, independently, will guidedly find all the different possibilities to cut his/her piece in bits of the same length (the concept of divisor we had already seen in Animal farm). Later, they share the information to determine the common possibilities and to decide on the biggest option to cut the two tape measures in pieces of the same size. In practice, they have used the logical method to obtain the Highest Common Factor

Document students work: In the next page

Cutting the rope (tape measure)

Name: _____

Situation: You and your mate have two pieces of tape measure in your hands and we want to cut them both in smaller pieces all of them of the same size. We want the little pieces to be the biggest we can achieve (being all of them of the same size). Each student is only going to work with his/her piece of tape.

Your tape measure is like this:

If we cut the two pieces of tape measure in 1 centimeter pieces obviously all the pieces would have the same size. But surely we will be able to cut them in bigger equal pieces.
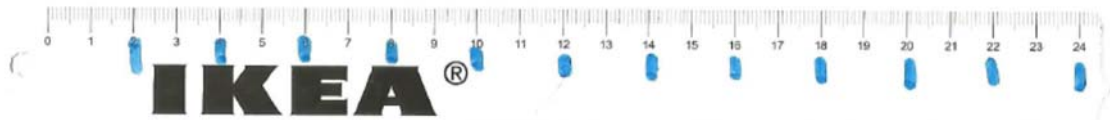
1) Can we cut our piece of tape measure in equal pieces of 2 centimeters?
   Is your number (the length of the tape measure) divisible by 2?
   Why?

   If the answer to the two first questions is "yes" (The answers to both questions must be the same), make a mark in blue in your tape measure every two centimeters.

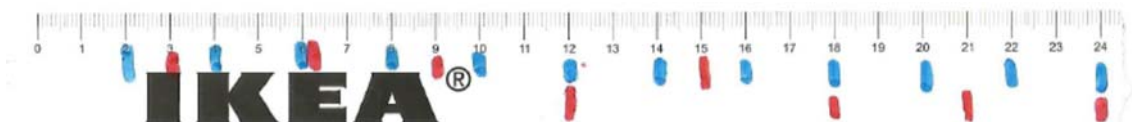If the answer is "no", do nothing. Look at the examples.

2) Can we cut our piece of tape in equal pieces of 3 centimeters?
   Is your number (the length of the tape measure) divisible by 3?
   Why?

If the answer to the first question is "yes", make a mark in red your tape measure every three centimeters. If the answer is "no", do nothing. Look at the example.
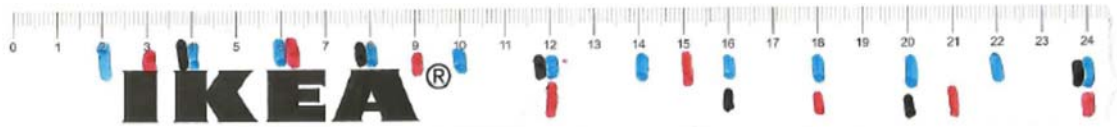

3) Can we cut our piece of tape in equal pieces of 4 centimeters?
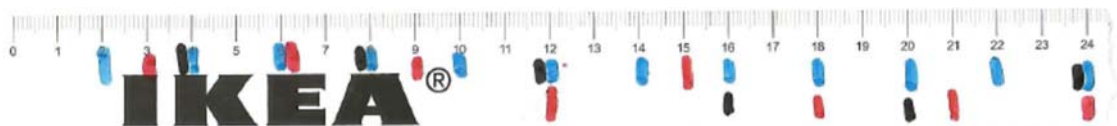   Is your number (the length of the tape measure) divisible by 4?
   Why?

If the answer to the first question is "yes", make a mark in your tape measure every two centimeters. If the answer is "no", do nothing. Look at the example.

4) Can we cut our piece of tape in equal pieces of 5 centimeters?
   Is your number (the length of the tape measure) divisible by 5?
   Why?

If the answer to the first question is "yes", make a mark your tape measure in green every two centimeters. If the answer is "no", do nothing. Look at the example.

We have done nothing.

5) Carry on with this process (only in the tape measure without answering the questions) until you reach your number (the length of your tape measure)

6) Have you been looking for multiples or divisors of your number?
7) Summarize your information in the first table and complete the second table with your mate's information

   Your name: _____   Length of your tape measure: _____

Multiples / divisors (underline the correct one) of _____(the length of your tape measure)

   Your mate's name: _____   Length of his/her tape measure: _____

Multiples / divisors (underline the correct one) of _____(the length of his/her tape measure)

8) Put one piece of tape measure above the other. When do the markings coincide?
9) From all the coinciding markings, what's the maximum length you can use?
   Each student cuts his/her piece of tape measure in pieces of the length obtained in the previous step
10) How many pieces have you obtained cutting your piece of tape measure?
11) Can you express what you have done with a mathematical operation? Do it
12) How many pieces has your mate obtained cutting his/her piece of tape measure?
13) Can you express what he/she has done with a mathematical operation? Do it
14) What do you think you have obtained: the least common multiple or the highest common factor?
15) The lengths of the pieces both you and your mate have cut your tape measure into, were they bigger or smaller than the size you had at the beginning?