



# SCIENCE MAGAZINE

No. 3

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## Debate lesson

### “STEM is useful”



On the 1st day of the project we all listened to a debate lesson on a topic “STEM is useful” presented by two Moletai gymnasium students Monika and Lina. Monika was the proposition of the debate while Lina presented the opposing points and the listeners were able to participate in the debate by asking questions, clapping and voting. During the debate STEM was described as a kind of a learning approach where strict academic concepts are combined with real-world lessons. Monika said that STEM is important because it encompasses every part of our lives and since people become more innovative, the purpose of science innovates as well. She also amplified that STEM is all about moving forward, solving problems, learning and introducing innovation to the next level and it was created to fill the jobs of the future. Meanwhile, Lina stated that STEM has some imperfections such as the fact that under-performing students can get left out and that this program starts too late in life. Although Lina had made quite strong points during her speech, the students came to a conclusion that in order to succeed in this modern information-based and highly technological society, students need to develop their capabilities in STEM to levels much beyond what was considered acceptable in the past. According to all debate participants and listeners, the debate lesson was very informative and they claimed to have learnt more about STEM.



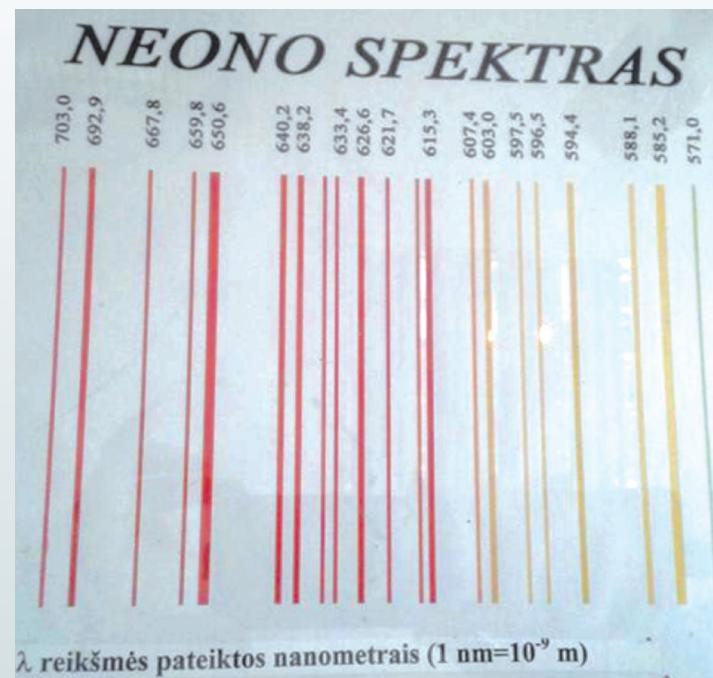
Monika Leisyte – Lithuania



## VGTU laboratory (university classes): workshop in physics lab

During our trip to Vilnius, we had an opportunity to visit Vilnius University which is the largest University in Lithuania. An interesting part of the visit was participating in a workshop in the VGTU Research Laboratory. The experiment we conducted involved a particle accelerator which made charged particles move at high speed. The machine pumped electrons upwards to the top sphere and created a light sphere. We were really impressed by the science lab equipment and modern supplies, which make the understanding and learning of difficult scientific theories and concepts much easier.

**Jakub Sarna & Jakub Miodek - Poland**



On the second day of the Erasmus+ project, all the participants of the project went to VGTU to perform laboratory tasks. We were divided into two groups: chemistry and physics. Our group went to the physics laboratory and got to carry out tests of environmental conditions (lighting, noise level, thermal conditions), sound insulation of buildings partitions and of building elements, elektromagnetic field and elektromagnetic emis-

sions, odour sampling. We were amazed and interested by everything the lecturer told us and got to experience various physical phenomena that we learned about in school. We realised that physics could be really interesting and we were glad we visited the physics laboratory.

**Mingaile Mazelyte & Domas Kazlas –  
Lithuania**

## VGTU laboratory (university classes): workshop in chemistry lab

On the second day of our project we had a trip by bus to the capital of Lithuania – Vilnius. In Vilnius we visited Vilnius Gediminas Technical University. There we had an awesome time during our visit to a chemistry lab. The guide showed us the labs, talked about all the interesting things and the projects that had been done there. We even did a laboratory work ourselves! We had a possibility to try to do some kind of an experiment with multicolored solutions. As I am not a big fan of chemistry, can't really tell what kind of an ex-

periment we did, although I'm sure I enjoyed the process greatly. That day I learnt that chemistry could be more fun than I thought before. All of us improved our abilities of working in teams, doing group work as well as our English speaking skills and just spent a good time together. I would love to go back there again and maybe even study in VGTU as well.

**Migle Urbonaitė – Lithuania**

## VGTU laboratory building constructions

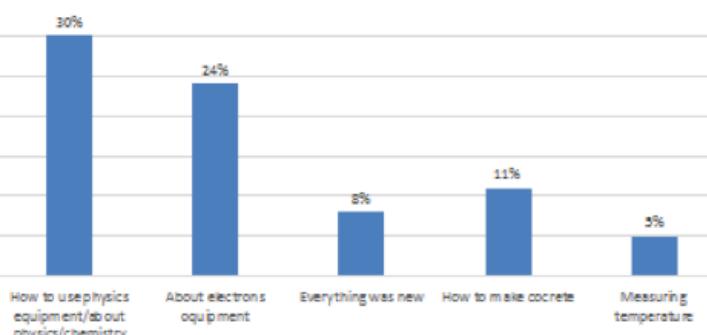
On Tuesday we visited the technical university of Vilnius. It's known as one of the best universities in the world. There, a young man gave us a

tour around the university. He taught us something more about concrete. In this university they invented something that reduced the amount of concrete. They use plastic inserts to reinforce the buildings. Those plastic inserts have the form of a cube. It was interesting to see that because of those plastic inserts the costs are reduced. It's also really ecological because you need less concrete. After the explanation the man showed us some machines which tested the strength of the concrete. He also told us that some engineers are allowed to work with those machines and test new things. It was interesting for us to see how concrete can be used in the construction.

**Femke De Rouck & Hanna Van Cauwenberge – Belgium**

### VGTU laboratory

Have you learned anything new and what in VGTU laboratory workshops?



During the Erasmus project one of the activities was going to our local university, VGTU. We had a guided tour around the university and mainly stayed at the physics lab. After that we went to the faculty of civil engineering. There we saw huge structures and large pipes. We were given some information about concrete and what influences its firmness. Also, we were watching how concrete firmness is established while carrying compression of the made concrete specimen. The participants of the project tried to identify the qualities of the material power according to its visual examination. During that workshop we gained new knowledge about the production of concrete and its specific qualities. It left an impression on us mainly because it was the first time that we went there.

**Mykolas Laurinavicius &  
Jokubas Tolocka – Lithuania**



## **Applying STEM in a workshop “Spaghetti bridges” (theoretical part)**

On Wednesday, the third day of Erasmus+ project “Innovative Generation”, we had a lecture about Spaghetti bridges. Before starting building it, we had to listen to a full presentation about building bridges. Moletai gymnasium students prepared an interesting talk about it. Firstly, they introduced us types of bridges. The first one was a beam bridge which looked like the most common and easiest to build. The second one was a more interesting type – an arch. They showed us a few photos about it and said that those kinds of bridges were popular in antique times. Also,

they mentioned a few more types. The most exciting part of the lecture was when presenters was showing the longest architecture buildings, the most interesting and the tallest ones. It was really breathtaking to see those kinds of bridges and hard to believe that they were built by people. After not a long lecture, presenters showed us a ten-question quiz about everything that was mentioned during the lesson, so the student groups started competing with each other who would get more correct answers.

**Laurynas Seikis - Lithuania**

## **Applying STEM in workshop groups: “Spaghetti bridges” (practical part)**

On Wednesday, the students of Moletai gymnasium taught us about bridges, and more specifically how to build the strongest bridge. Those students had been in the finals of the national pasta bridge building competition, so they obviously knew a lot about it.

After the presentation and quiz, we all got into groups and started building our bridge with spaghetti and kneadable adhesives. We worked together with Stella and Niccoló from Italy and we built a bridge that in the end could hold 1240g.

It was a competition to see which bridge could hold the most and we did quite well. Sadly, Aline wasn't present until the end because she was feeling too sick to stay, but she did like building this bridge. Jessie stayed to test the bridge and it was a little too short but it was strong and it could carry the same weight as the bridge of our teachers so we were very happy with the result. It was very interesting to think about the best way to build a bridge with spaghetti and we hope the school wins many more prizes with their fancy pasta bridges.

**Jessie Huysman & Aline Saeyens –  
Belgium**

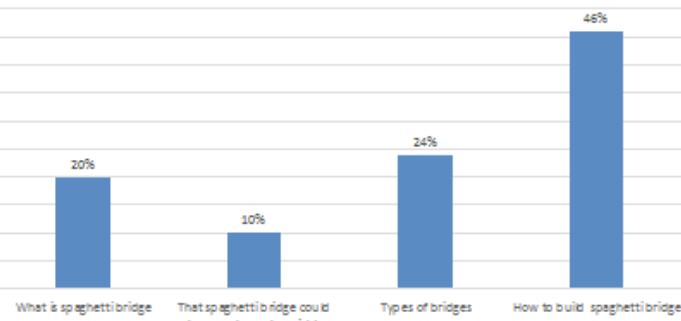
On Wednesday, October 11th, after the lunch at the school canteen, the time came for the last activity of the day – applying STEM (physics, engineering) in workshop groups: “Spaghetti bridges” in the school library. At the begining the best physicist of our school gave us a lecture about bridges – their types and showed us some interesting bridges around the world. After the lecture we made groups of 4-5 people. Each group got a package of spaghetti and plasticine clay and we started building bridges. It wasn't as easy as it looked at first because spaghetti could break easily. After the bridges were built, each group tested how strong their bridge was by hanging a weight on them. That activity was challenging, but I had a lot of fun.

**Kamile Maigyte – Lithuania**



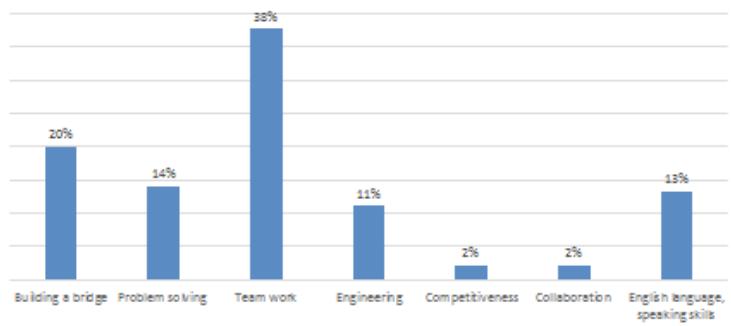
Applying STEM in a workshop “Spaghetti bridges”

Have you learned anything new in workshop "Spaghetti bridges"?



Applying STEM in a workshop “Spaghetti bridges”

What skills or abilities have you acquired or improved in workshop “Spaghetti bridges”?



## STEM workshops: mobile laboratory activity

On Wednesday we had a workshop in the biology class. First, we had to introduce ourselves by saying our name and something we like to eat. Then we had to put on a lab coat, safety glasses and gloves. After that the team of scientists explained us how to use a pipette. Each of us had to take one and to fill it with some liquid. After that they taught us something more about DNA. We learned, for example, that DNA looks like a double helix. Then we had to make our own DNA. We mixed some liquids together and

we had to leave the mixture in a special machine for a while. After the lunch break we took them out and we could clearly see the DNA. It was really cool. To end the activity we each got a tube with DNA. We had to mix it with different chemicals and after that we had to use our pipette to put the fluid into a special machine. In the end some of the chemicals were a little different than others, it was interesting to see. It was a very fun and interesting activity and we really enjoyed it.

Laura Boone & Febe Steyaert – Belgium

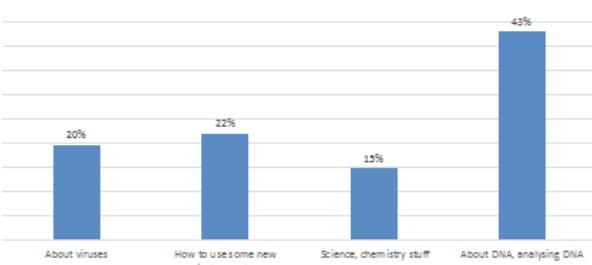


Results of the Pipetting olympics					
Name	µg	Name	µg	Name	µg
Lore	739	Andrea	466	Femke	470
Laura	454	Sebastian	469	Aline	470
Emma	705	Niccolo	448	Jessie	759
Febe	461	Stella	469	Hanna	471
Jacob H	494	Eduardo	468	Mario	455
Patryk	474	Alice	470	Alex	730
Kuba M	444	Beatrice	469	Erikas	737
Kuba S	474	Davide	475	Jose	722

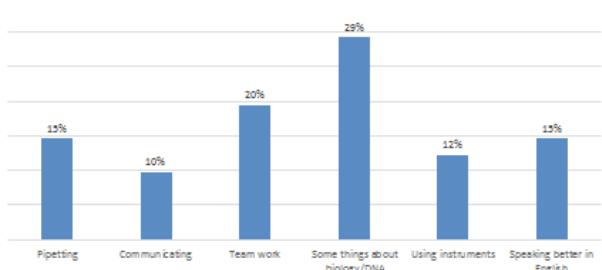


**STEM workshops: mobile laboratory activity - DNA research**

What did you learn in mobile laboratory activity?


**STEM workshops: mobile laboratory activity - DNA research**

What skills or abilities have you acquired or improved?



## Educational programme at Moletai Ethnocosmological centre

We had an educational programme at Moletai Ethnocosmological centre. When we arrived there, we were separated into 2 groups. The first group went with a guide while we were waiting for our guide in the entrance. Our guide showed us around the Ethnocosmological centre and gave us a lot of information about the things that we saw. We were even allowed to hold a piece of stone from outer space.

In the first room we saw how the first people who lived in this planet measured time and see how the universe looked like. Then we went higher and higher with every room and saw a good evolution of our way to see and measure everything in our universe. After this we went to

the highest tower where a dome was situated. We couldn't see a lot of the view because of the cloudy weather but we could imagine it would've been very impressive.

The excursion was also interactive: we did mathematics calculations and played a little bit with physics. Our guide showed us how you could break light in water and in other glass objects.

The trip was very informative and interesting! It was also nice that we could do some experiments. It would have been nice if we had gone back to see the stars at night! But the visit was well worth it!

**Lore Van Helleputte &  
Emma Van der Haeghen – Belgium**

We started our trip to the Museum of Ethnocosmology on a wonderful Thursday morning at 08.00 am. We were all excited and looking forward to this morning. When our group arrived, we were introduced to that place: the main task of the Lithuanian Museum of Ethnocosmology is to collect, accumulate, systematize, preserve, scientifically explore and provide visitors with information about cosmic world. As we found out the museum consisted of a few parts: an underground gallery with five halls where the knowledge of space is presented in exhibitions in ethnological, scientific, philosophical and astronomical aspects. All group was amazed, we were about 10-15 meters above the ground. A guide was friendly and introduce the idea of ethnocosmology and the most important topics, digital space images, performed by the world's

best telescopes and space cameras, displayed in the hall. For us it was difficult to understand, but eventually we understood. The video we saw was amazing, the guide explained to us that the observatory has a tower with 80 cm telescope, arranged at a height of 40 m, through which you can observe stars at night. Unfortunately, we didn't have a possibility to look through the telescope because it was cloudy. Under the dome there is an observation deck at an altitude of 30 meters. We were able to see very far from that height and the view was very beautiful. A guide told us about outdoor exposition. It was not included in our program but we wanted to see it. Everyone was happy and got a lot of new knowledge about space.

**Titas Zibas – Lithuania**



## Practical task at Moletai Ethnocosmological centre

One of the places all students of Erasmus+ project visited was Moletai Ethnocosmological centre. It is the first and only museum of its kind in the world. The essence of the museum is the relationship of a man and mankind with the cosmic world. At the museum we had an exceptional possibility to touch a piece of the meteorite, see the gallery exposition and rise 30 meters above the ground on the observation deck and have a look at a spectacular scenery around. We could also demonstrate and improve our skills doing practical tasks. All students were divided into different groups and were given counting tasks

and formulas. The first task was to calculate the length of one light-year in kilometres (the speed of light was given). The second one was to calculate the refractive index in glass and water and then find the speed of light in those materials. To do this task easier, we could use the diagram and formulas that were given. Cooperating in groups and with the help of our guide, we did the tasks successfully and found out some interesting facts. At the end of our practical tasks some students who got the right answers of counting tasks explained how they managed to do them correctly. It was a great experience.

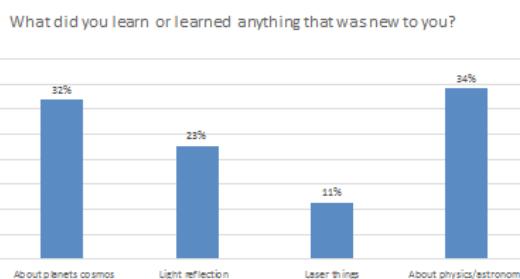
### Toma Misiulyte - Lithuania

After a great tour around the Ethnocosmological centre we were given some tasks to do. Those tasks involved maths calculations. The tasks were quite easy and everyone solved them successfully. When everyone got their answers, we checked them if they were right and whether we

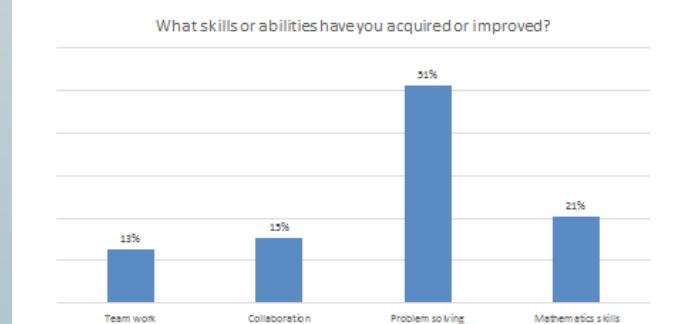
did the tasks correctly. To be honest, I think those tasks could have been more difficult. But overall, I believe the tasks were fun and interesting so everyone enjoyed doing them. I think we had a great time that day.

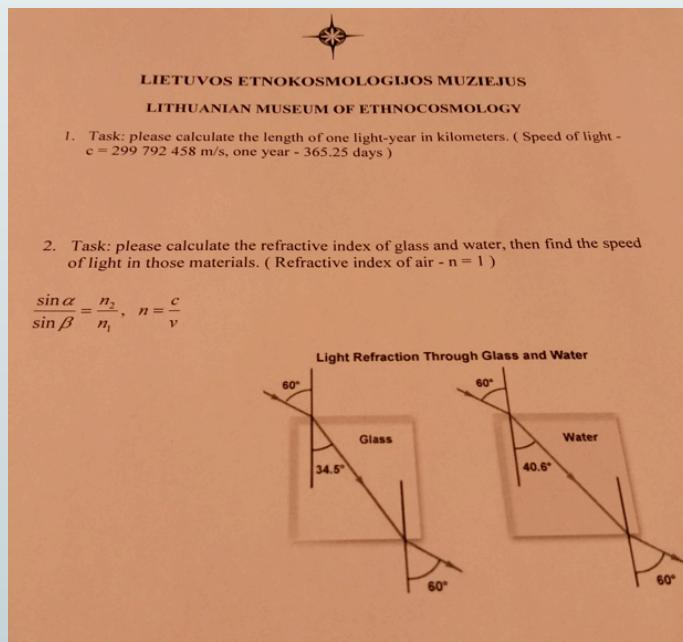
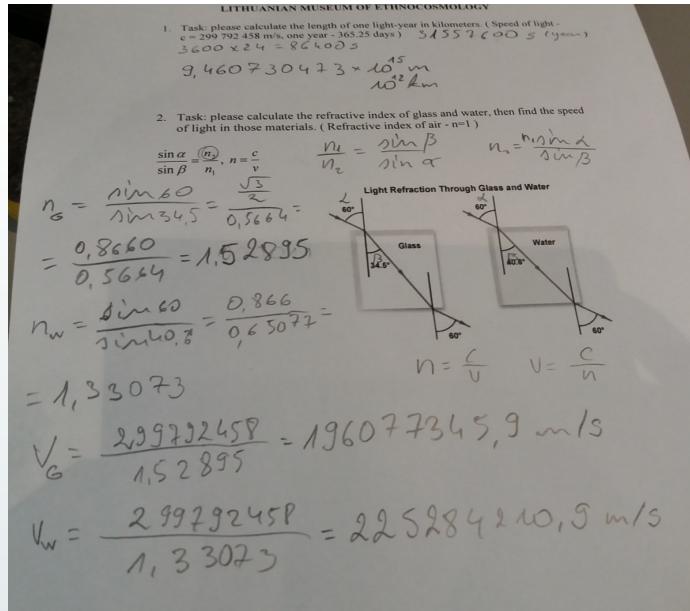
### Tomas Klevas - Lithuania & Sebastian Ionut – Spain

STEM workshops: Ethnocosmological centre



STEM workshops: Ethnocosmological centre





## STEM workshop in practice: biopower plant

The excursion started in a small room packed with different equipment. That room had a huge window with a view to a biopower plant. At first it looked just like a weirdly shaped building and I didn't even think that inside that building there

was a well-planned and constructed complex mechanism. It appeared later that the room was a control room with all the necessary information displayed on and some controls which could increase or decrease the energy being created

inside the biopower plant. So basically the bio-power plant works like this: inside it all the natural biomass is being burned chemically. During the process CO<sub>2</sub> is being created, all the CO<sub>2</sub> is being collected and recreated into bio fuel. It is a really huge benefit for farms because all the farmers can use the biomass to create fuel almost without any harm to the environment. I do believe that biopower plants can be a huge future for all of us. During our visit to the biopower plant, I had a great possibility to improve both my Physics and English knowledge as I volunteered translating from Lithuanian into English for the whole group of students and teachers.

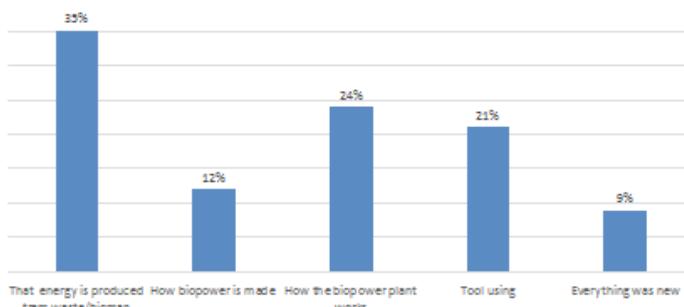


**Vytautas Juraska – Lithuania**



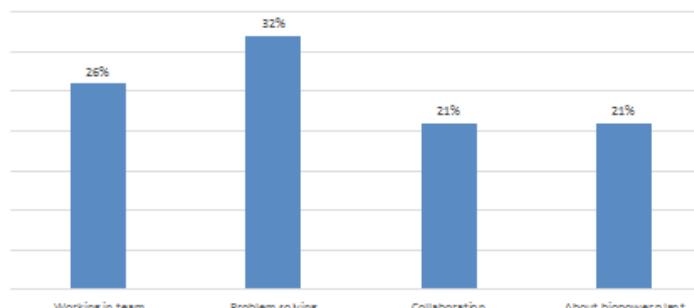
STEM workshop in practice: biopower plant

Have you learned anything new in biopower plant workshop?



STEM workshop in practice: biopower plant

What skills or abilities have you acquired or improved in biopower plant workshop?



## Workshop “The possibilities to revive old crafts for business and health”: dipping candles

On the 5th day we went to an authentic farmstead to try out old Lithuanian crafts. Dipping candles was one of them. We sat in a circle and there was a big bowl filled with melted wax in the middle so we were shown how to dip candles. Later on we could try it ourselves. That workshop was very interesting and made us feel like we were back in the old times. I guess it was one of my favourite workshops in the whole week as well.

Elinga Jurkunaite – Lithuania



## The possibilities to revive old crafts for business and health: making pots of clay

There are plenty of home based business ideas out there. But if you're looking for something that will let you exercise your creativity and work from home with supplies that are easily attainable, then a handmade business might be for you.

Clay is a material that can be transformed into sublime and beautiful objects, but it takes patience and strong hands to work such miracles. There are both physical and mental benefits from expressing yourself by creating something. Art offers an outlet and a release from all of that.

With pottery you can produce something and express yourself in some way. Pottery allows you to escape the worries of life and shift your focus toward your creation. Our hands are an outlet for creativity, the sense of touch is of high importance. A lot of focus is required while you're making pottery, therefore outside distractions are reduced and no longer stress you out. I believe that clay is a unique art medium because it is highly responsive to touch and very giving since I found it very interesting and entertaining.

**Mazvydas Datenis – Lithuania & Davide Errico – Italy**



## **Workshop “The possibilities to revive old crafts for business and health”: wool felting**

On the last day of our stay in Lithuania our hosts took us on a trip to a handicraft village “Meniskas kaimas”, where we were able to see how people in the past created candles or produced things like pillows, shoes, gloves made only from wool. We had been given a chance to take part in a workshop titled “The possibilities to revive old crafts for business and health, wool felting”. Wool felting is a centuries old craft used to make different parts of clothing and art. The whole process of wool felting is really time-consuming and it is separated into a few steps. At first, we had to create a proper base and then we made the base wet. After that we covered the base with bits of coloured wool and wetted it again. The whole process had to be repeated many times until we had the size and shape that we wanted. The task requires a lot of patience but it's really rewarding to see your own piece of art. Now we know why such things are so expensive. The Centre for Traditional Craft is a great place for people looking for cultural leisure but you can also get some knowledge connected with biology and chemistry. We have really enjoyed this way of spending time, and we are looking forward to put this knowledge into practice!



**Patryk Filipiak & Jakub Hofman – Poland**

# Summary

During the "Erasmus+" 2 project "Innovative Generation" Transnational meeting and Blended mobility of school learners 8/10 – 14/10/2017 in Lithuania, 12 STEM activities were carried out in which both, students and teachers were taking part. These activities were also tried by other Moletai gymnasium students, carrying out some local activities. Social partners - Vilnius Gediminas Technical University, Vilnius University mobile laboratory, Moletai Ethnocosmological centre have been involved into preparing these STEM and educational tasks. In the project mobility STEM activities participants acquired and improved collaboration, team work, problem solving skills and abilities, communicative and collaborative skills, developed English speaking skills.

*Science magazine No. 3 was published by the Lithuanian team*