

Selçuk Yusuf ARSLAN | Ayrancı Vocational and Technical High School | Ankara | Turkey

## Scientific Research Club

This work aims to teach scientific research methods and techniques to high school students. The implementation of these methods and techniques by students is the main target of the project. This study has been conducted by a working group selected from the 10th, 11th and 12th grade students of Ankara Ayrancı Vocational and Technical High School. The working group consists of 60 students, 28 of whom from 2014-2015 academic year and 32 of whom from 2015-2016 academic year.



*Our true mentor in life is science.*  
Mustafa Kemal ATATÜRK, Our Great leader and The Founder Of The Republic Of Turkey



Studies were administered within 2 days in a week and 3 class hours each day between February 2014 and January 2016. In the first year, Research Methods and Scientific Report Writing training is given to 28 students. In the second year, the students who took the training before assisted new students during the training. They shared their experiences in scientific research methods with the new students and they taught them how to use SPSS software. Furthermore, the students received training on SPSS from Hacettepe University faculty members and consulted them for their projects.



At the end of the training given to students about scientific research, each student has made a research. The students have benefited from 244 different sources (thesis, article and etc.) and wrote 336 pages of scientific report in 24 different projects. The students have achieved lots of success in these projects both nationally and internationally.



László Várnai | VSZC Jendrassik-Venezs Secondary School | Veszprém | Hungary







## Science under Six Thinking Hats®

#provocation#creativity#happy learning

STH® is a method:

- Invented by Edward de Bono in the 20th century
- Based on cognitive competencies and skills of humans using just one attitude at the same time
- Learning, teaching, training, developing, problem-solving, communicating method from kindergarten age

The hats symbolises different attitudes distinguished by their colours. It is about parallel and regulated approaching...

COLOURED HAT	THINK OF	DETAILED DESCRIPTION
	<i>White paper</i>	The white hat is about data and information. It is used to record information that is currently available and to identify further information that may be needed.
	<i>Fire and warmth</i>	The red hat is associated with feelings, intuition, and emotion. The red hat allows people to put forward feelings without justification or prejudice.
	<i>Sunshine</i>	The yellow hat is for a positive view of things. It looks for benefits in a situation. This hat encourages a positive view even in people who are always critical.
	<i>A stern judge</i>	The black hat relates to caution. It is used for critical judgement. Sometimes it is easy to overuse the black hat.
	<i>Vegetation and rich growth</i>	The green hat is for creative thinking and generating new ideas. This is your creative thinking cap.
	<i>The sky and overview</i>	The blue hat is about process control. It is used for thinking about thinking. The blue hat asks for summaries, conclusions and decisions.



Let's begin with the white hat...

Achievable in science lessons for:

- Personal, individual and collaborative data collections of the students and teachers connected to natural sciences' topics involved in school curriculas
- Evaluation, tests, organising of infos
- Presentation and dissemination of projects, self-evaluation
- Inventing new know-hows and products due to learning based actions and movements

Empowering  
Motivating  
Joyfulness  
Playfulness  
Relaxing  
Bringing into flow  
Freedom

Blocks debate.  
argument and  
„positive”  
agression

"My one ambition is that around the world there should be a few more young people who come to say, 'I am a thinker.' I would be even more pleased if some of them were to go further and say: 'I am a thinker, and I enjoy thinking.'" (Dr. Edward de Bono)



Why? Who? For what? How much?  
For Whom? When?

Effective work, quality -time, rational and logical issues, regulating, enforce critical and scientific thinking, developing cooperation

100%  
Great!

If you use STH®, science lessons and provocation operations together, you make scientific lessons the real sources of the developing of the key competencies.




TERESA WRÓBEL I SŁO IM. Z. HERBERTA STO  
CZĘSTOCHOWA POLAND

## SCIENCE - DIFFERENT SUBJECTS OR ONE SUBJECT TAUGHT BY DIFFERENT TEACHERS?

It is very important how children start to learn science. For young student we (teachers) should give a possibility of exploring the world around us and encourage them to ask questions about it. It is not important that children can't distinguish between physics and chemistry. The essential thing is to show them how to make observations, ask questions, look for the answers and write down the results of their observations. These observations should be exciting for them and give them a lot of fun.



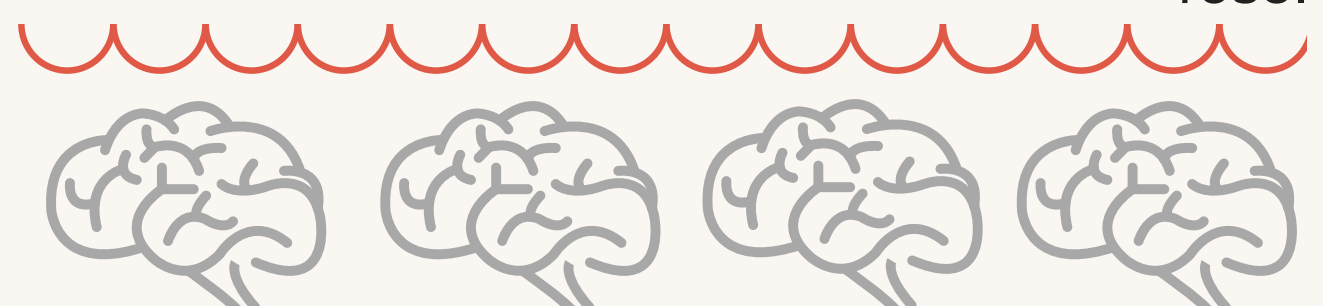
I gave a microscope to a 9-year-old boy Tomek and he had to choose what he wanted to examine. The result of his observation was multimedia presentation prepared by Tomek which he showed during „ Science on stage” in Poznań 2016. But the most important fact was the time spent on reading books , studying about things he observed and time spent on our discussions .

 **Conclusion:** As a science teacher remember that you are responsible for giving your students good understanding of the world around us and only cooperation with other teachers can give the best results.

Later at school students learn science as different subjects physics, chemistry, biology and geography and they treat these subjects separately. The task for us teachers is to convince students that only combined knowledge of all these subjects can give us the full understanding of our world. We should emphasize this during ordinary lessons but from time to time it is worth preparing an interdisciplinary project . It may take the form of presentation, exhibition, story writing, songs, competition or a drama . I used some of these forms successfully in my teacher's work with cooperation with other teachers. ( I teach physics so I cooperate with chemistry, biology, geography and maths teachers but also with an art teacher and Polish teachers).



Our last project was a drama „ Little Prince in the World of Science” in which my students playing the roles of different scientists meet Little Prince and they have to answer basic question of what physics, chemistry, biology and maths deal with. In each case they answer this question using the example of a rose.





Claudia Callies | Stedelijk Gymnasium | Leiden | The Netherlands  
Dr. Christina Diehl | Gymnasium Paulinum | Münster | Germany

## Science in Space

### How to organise a scientific exchange programme

#### Choose a topic

Start with a mind map of all topics that might be interesting. Add possible local co-operation partners who can provide expertise and opportunities for visits.

#### Find a partner school

How much time and money can you afford to spend on the exchange programme? That determines the distance you can travel and the duration of the programme. Look for a town where a school can get support from local organisations like a university or a company. Search for schools on the internet. The profiles on the websites are a good indication for suitable partners.

#### Discuss the details

Arrange a meeting with the partner school to agree on the main organisational details at both schools, e.g. age and number of students, duration and date of the exchange, application deadlines, costs for students and teachers, and accommodation.

#### Devise the programme

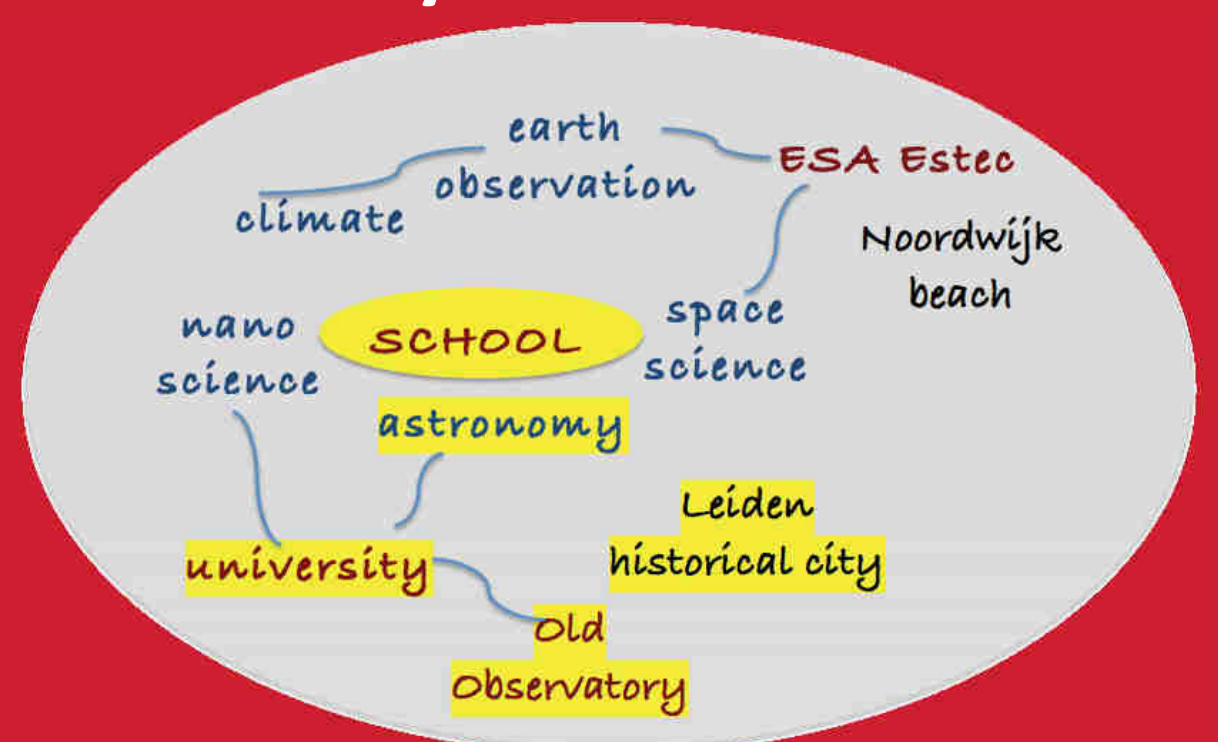
Prepare the schedule and the scientific part of the programme. Advertise the exchange at your school and select participants. The student participants organise the social and cultural activities for the home visit.

#### Evaluate and improve every year

Ask the students for feedback after each part of the exchange. Discuss improvements with teachers from both schools. The programme is never perfect, so keep changing and improving every year.

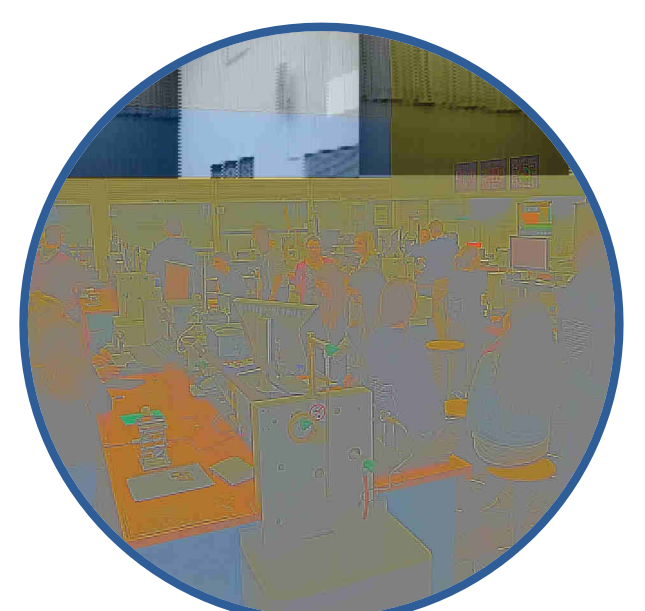
A new exchange programme

#### Why not science?



- ✓ bilateral exchange: 2 x 4 days
- ✓ English as language of science
- ✓ partner in not English speaking country
- ✓ traveltime max half a day

Day 1	Day 2	Day 3	Day 4
	<b>School</b> <ul style="list-style-type: none"><li>• Introduction</li><li>• Experiments</li></ul>	<b>University</b> <ul style="list-style-type: none"><li>• Lecture</li><li>• Experiment</li></ul>	<b>School</b> <ul style="list-style-type: none"><li>• Science Café</li><li>• Quiz</li></ul>
Arrival	<i>Doppler Shift Spectroscopy</i> <i>Kepler's Laws</i>	• Visit of different workgroups	Departure
City Explorer Tour			
Old Observatory	Sports	Hanging Out	
Group Dinner	Dinner at host	Movie Night	





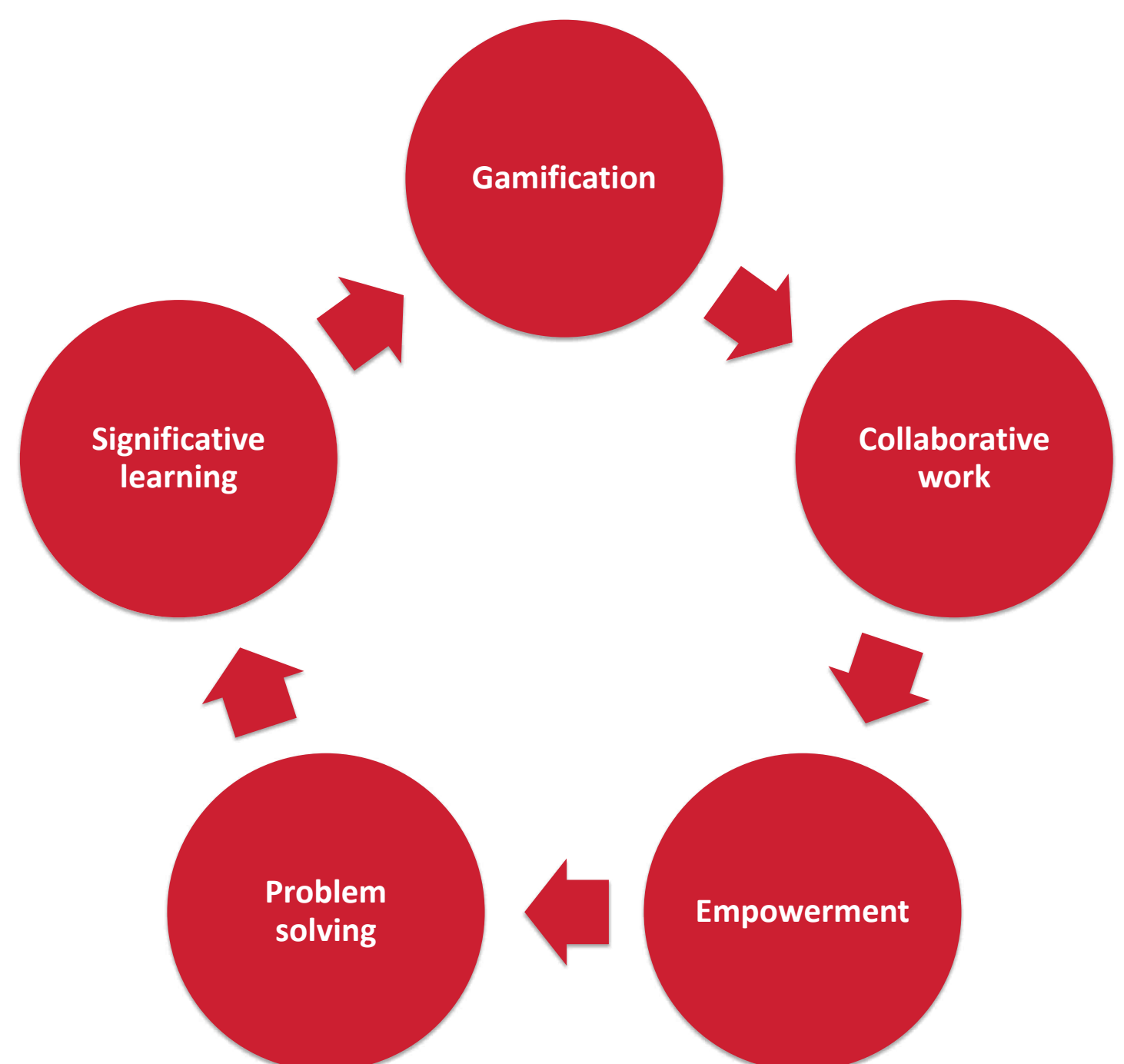
Nerea Casas y David Ballesteros | ADCIM- Lauaxeta Ikastola | Bilbao | Spain

## MATH MYSTERY BOX

### Learning mathematics by playing

This project proposes a gamification based tool, integrated in a problem-solving methodology, and incorporates motivational activities that start from an attractive approach: overcoming a challenge using acquired mathematical knowledge and building new ones.

It has created an easily replicable system consisting of a set of boxes, one into the other, closed by padlocks, keys, etc. in which clues are hidden. Only the resolution of the previous hint allows access to the next one. To achieve these challenges the students should collaborate promoting, on the way, cooperative learning.



Through the project, the game is back, which, in teaching, should never been gone.

Are you ready to play?

[www.mathmysterybox.com](http://www.mathmysterybox.com) - [mathmysterybox@gmail.com](mailto:mathmysterybox@gmail.com)